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조사통계국
도서관장서

第11次 韓·日 統計 協力會議 및 센서스 自動化 시스템을 爲한 海外出張 報告書

1988. 6

經濟企劃院 調査統計局

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Ⅰ．出　張　概　要

1. 出 張 者

調査統計局 局　　長 理事官　李 康 雨

調査統計局 人口統計課長 書記官　金 日 炫

調査統計局 調査管理課 事務官　白 鍾 植*

大邱直轄市 統計擔當官 事務官　金 洸 玄*

* 韓·日 統計技術協力會議에만 參席

2. 出張期間

○ 韓·日 統計技術協力會議 : '88.5. 9～5.13 (5日間)

○ 美國 및 뉴질랜드 訪問 : '88.5.14～5.28 (15日間)

3. 出張目的

○ 韓·日 兩國의 定例的인 統計技術協力會議 參席

- 主要討議議題 : 1990年 日本의 國勢調査 推進現況 및 資料處理 方法

○ 1990年 人口 및 住宅센서스의 當面 課題인 企劃·實査 및 資料處理 過程에 대한 自動化시스템 導入을 위한 主要先進國 (美國, 뉴질랜드) 의 經驗 및 技術習得 導入

4. 主要訪問機關 및 面談者

○ 日 本

- 總務廳 事務次官
- 總務廳 統計局長, 統計센터 所長
- 香川縣 出納長

○ 美 國

- 商務省 센서스 局長
- 商務省 센서스局 컴퓨터센터 副局長
- National Computer System 社 및 Storage Tek 社 訪問

○ 뉴질랜드

- 統計廳 廳長
- 統計廳 컴퓨터센터 硏究官

5. 出張成果

○ 1990年 人口 및 住宅센서스를 實施함에 있어 調査의 企劃·實査에 대한 效率性을 極大化하고 特히 資料處理期間短縮을 위하여 自動化시스템 導入 必要性 認識

- 當局의 最大事業인 1990年 人口 및 住宅센서스의 成功的 遂行을 위한 先進諸國의 센서스業務 推進 現況 把握을 통해 우리나라 센서스의 企劃 및 實査에 대한 效率性 極大化 方案 마련

日 本

- 1987年2月에 常設會議體인 「1990年 國勢調査計劃 會議」 및 關係專門家로 構成된 「調査計劃專門會議」構成 運營
- 3차례의 試驗調査를 通해 細部計劃의 現實適用上의 問題點檢討

美國, 뉴질랜드

- 調査項目, 調査票設計등에 대한 現場適應 檢討를 위한 試驗調査 完了
- 1990年 센서스 企劃을 위한 關係專門家會議 構成運營

• 센서스 自動化시스템 導入에 따르는 全般的인 情報의 蒐集

特히 OMR (Optical Mark Reader) 調査票 使用方式에 관한 日本, 美國등의 經驗 習得

日 本

- 1965年부터 OMR方法에 의한 調査票 直接 入力方式 導入 活用
- 센서스 實施 1年後에 職業, 産業을 除外한 全項目 集計 完了

美 國

- 1990年부터 FOSDIC (Film Optical Sensing Device for Input to Computer) 方法에 의한 資料處理
- 1990年度 同 方法을 適用하나 2000年에는 OMR 方式으로 轉換

뉴질랜드

- 資料處理 過程에서 手作業이 아닌 컴퓨터에 의한 自動處理 方法 (Computer Assisted Coding)을 活用

○ 우리나라 統計實務者들의 硏修活動에 대해 積極的인 支援 및 技術協力 約束

○ 經常統計調査의 改善發展을 위한 各種 統計調査指針書등 細部資料 蒐集

6. 向後措置計劃

1) 1990年 人口 및 住宅센서스는 센서스自動化의 基本인 OMR 方式採擇

2) OMR 調査票를 判讀할 수 있는 機器의 選擇的 購入 및 效率的 運用計劃 樹立

3) 1990年 人口 및 住宅센서스 實施를 위하여 關係專門家로 構成된 諮問機構의 設置運營 및 數次의 試驗調査를 通하여 1989年까지 本調査를 위한 徹底한 準備

4) 1990年 人口 및 住宅센서스 業務와 關聯하여 實務者의 業務能力 向上을 위한 海外訓練 强化 및 必要時에는 經驗있는 國家의 諮問要請

5) 이와 關聯하여 豫算·組織 및 기타 行政的 支援事項의 效率的 뒷받침이 必要

7. 日程別 主要活動

5.10-13 ○ 第11次 韓·日 統計協力會議 參席

5.16-18 ○ 센서스局 訪問

面談者 : Director, J.G. Keane, Bureau of Census Department of Commerce

Deputy Director, C.L. Kincanon

Chief, R.O. Bartram

遂行業務 : — 센서스 自動化 시스템 關聯事項 討議

— 美國의 1990年 人口센서스의 準備 및 進行狀況 聽取

— 센서스 自動化에 관한 技術協力 方案 協議

○ 센서스局 컴퓨터 센터訪問

面談者 : Assistant Director, G.F. Cranford外 2人

遂行業務 : — 統計資料處理 시스템 視察

— OMR 調査票이 센서스 適用問題 討議

— 調査票의 Microfilm化 視察

— 資料處理 要員의 運營方案 討議

○ Storage Tek社 訪問

面談者 : Executive, B. Treadwell 外 4人

遂行業務 : — 資料處理 機器 生產機種 및 機能關係 現況把握

— 機器構造 및 資料保管에 관한 事項 協議

5.19-20 ○ National Computer System社 訪問

面談者 : President, D.C. Malmberg 外 4人

遂行業務 : — NCS의 센서스 관련 業務現況 把握

— OMR 調査票의 센서스 適用問題 協議

5.24-25 ○ 뉴질랜드 統計局 訪問

面談者 : Gov't Statistician, S. Kuzmicich 外 2人

遂行業務 : — 센서스 自動化 시스템 관련 事項 協議

- 뉴질랜드의 1991年 人口센서스의 準備 및 進行狀況 聽取
- 센서스 自動化에 의한 資料處理 技法 比較分析 및 能率性 評價

○ 統計廳 컴퓨터 센터訪問

面談者 : Research Officer, D. J. Scott外 1人

遂行業務 :
- 센서스 全般的인 資料處理 관계 協議
- 調査票 開發에 관한 事項 討議
- 컴퓨터를 이용한 符號記入 및 審査過程에 관한 討議 및 同 過程 視察

Ⅱ. 日本의 1985年 센서스 現況 및 1990年 센서스 準備

1. 1985年 센서스 概要

1. Statistics on population and housing

The Bureau is the major supplier of statistics on population and housing. It is responsible for executing the Population Census and the Housing Survey, both of which are conducted every five years. It is also responsible for compiling internal migration statistics and current population estimates.

There are two kinds of statistics in this field which are not covered by the Bureau: vital statistics and housing construction. The former is compiled by the Ministry of Health and Welfare, and the latter by the Ministry of Construction.

(1) The Population Census

A short history of the Population Census

The Population Census of Japan has been conducted almost every five years since 1920. The most recent census was the 14th Census taken in 1985. During 1940's, special population censuses were taken.

After the first Census of 1920, by the amendment of the Law Concerning the Population Census in 1922, the population censuses came to be conducted every five years, with the full-scale census and the simplified census alternately. The 1925 and 1935 Censuses were simplified censuses, and the 1930 and 1940 Censuses were full-scale censuses.

The 1945 Census was not taken because of the confusion at the end of World War II. After World War II, the Extraordinary Population Census was conducted in 1947 in conformity with the provisions of the Statistics Law (Law No. 18, 26 March 1947). In this law, it was stipulated that the census should be conducted every five years. But after the 1950 Census, this law was amended in 1954 to conduct the census every ten years and the simplified census in the fifth year after the census.

The main difference between the full-scale and the simplified censuses lies in the number of questions asked to the households. In the recent large-scale censuses, 23 questions were aksed, while in the recent simplified censuses 17 questions were asked.

Date of the census

The 1985 Population Census was taken as of 0:00 A.M. of 1 October 1985. This date is the same as past regular censuses since 1920.

Coverage of the census

The 1985 Population Census covered the whole territory of Japan excluding the following islands:

- Habomai-gunto, Shikotan-to, Kunashiri-to and Etorofu-to;
- Take-shima in Goka-mura, Oki-gun, Shimane-ken.

As the territory of Japan changed until some time after World War II, the area coverage of the census changed accordingly. Since 1975, the coverage has remained to be basically the same.

The persons enumerated in the census are those who are usually living in the territory of Japan at the time of the census. The persons enumerated are counted at the place of usual residence. This concept is called de jure population. Following persons are, however, excluded from the census:

- Foreign diplomatic corps, their suite and dependents;
- Foreign military personnel including both military corps and civilians, and their dependents.

As a general rule, the wording "persons usually living" is defined in the census as those persons who lived or are going to live for three months or more in their respective household as of the census date. Persons who had no usual places of residence or whose usual places of residence were unknown are enumerated at the places where they were present at the time of the census.

Topics to be investigated

The 1985 Population Census questionnaire contained the following 17 questions:

For individuals:

(1) Name;
(2) Sex;
(3) Year and month of birth;
(4) Relationship to the head of household;
(5) Marital status;
(6) Nationality;
(7) Labour force status;
(8) Name of establishment and kind of business (Industry);
(9) Kind of work (Occupation);
(10) Status in employment;
(11) Place of work or school;

For households:

(12) Type of household;
(13) Number of household members;
(14) Tenure of dwelling;
(15) Number of dwelling rooms;
(16) Area of floor space of dwelling rooms;
(17) Type of building and number of stories.

Five questions which were asked in the 1980 Population Census were omitted

in the 1985 Census, as the latter was a simplified one. The omitted questions are as follows:

(1) Time moved into the present residence;
(2) Previous address;
(3) Educational attainment;
(4) Transportation of commuting to work place or to school;
(5) Sources of household income.

Census organization

The 1985 Population Census was conducted through the following channel: Management and Coordination Agency - Prefectures (to, do, fu and ken) - Municipalities (shi, ku, machi and mura) - Supervisors - Enumerators - Households.

The Bureau is in charge of the planning, arrangement of the materials and documents and supervision for the census work of prefectures and municipalities. The Center is in charge of the tabulation of census data, and the Bureau is responsible for publishing the results.

Under the supervision of the Bureau, the statistics sections of the prefectural governments take responsibility for the census operations in each prefecture. Census work including distribution of census documents to municipal governments, supervision of field work of municipalities, collection of census documents from municipalities and so forth is performed by the statistics sections of the prefectural governments.

Under the supervision of the prefectural governments, the offices of shi (city), ku (ward), machi (town) and mura (village) perform such work as the establishment of the enumeration districts, the selection and training of supervisors and enumerators, the distribution of census documents to the supervisors and enumerators, and their collection.

In the 1985 Population Census, the field work was carried out by about 780,000 enumerators who were specially appointed for the census. Moreover, about 60,000 supervisors were appointed to take the responsibility of training and supervising enumerators, of examination of entries in the census questionnaires and so forth. These enumerators and supervisors were appointed by the Director-General of the Management and Coordination Agency.

Enumeration districts (EDs)

Before each census, the whole area of Japan is divided into enumeration districts and they are accurately mapped.

The EDs for the 1985 Census were demarcated as of 1 October 1984, a year before the census date so that each ED may include approximately 50 households. After that, the EDs were amended up to the census date to incorporate changes after demarcation. Thus, the EDs were finally demarcated as of the census date. The total number of EDs amounted to 778,153, which was 37,794

more than those for the 1980 Census.

These districts provide a basis of census-taking. As a rule, one enumerator is assigned to one enumeration district. The EDs are also used in many ways for statistical surveys; in particular, they provide basic area units for compiling small area statistics and sampling units for various kinds of sample surveys.

The time-table for tabulation and publication

The Center is responsible for the whole tabulation of the census results. The time-table for tabulation varies in every census according to the priority of the needs for statistics. In the 1985 Population Census, the tabulation was done in the following eight stages:

i) preliminary counts of the population from the summary sheets;
ii) prompt tabulation on the basis of 1% sample;
iii) the first basic tabulation on the basis of complete count;
iv) the second basic tabulation on the basis of complete count;
v) the third basic tabulation on the basis of complete count;
vi) the detailed tabulation on the basis of 20% sample;
vii) the tabulation on the commuting population;
viii) the tabulation by enumeration districts.

The results are published by the Bureau.

The preliminary counts are based on the data on the enumeration district summary sheets prepared by the enumerators. The data are aggregated by the municipalities, then by the prefectures, and finally by the Center. The results are released at the end of December of the year of the census.

The 1% sample prompt tabulation gives the first results based on the questionnaires. In the municipalities, about 1% of all the questionnaires are separated as a random sample. They are sent to the Center in separate containers so that they could be specially processed. The results of the sample tabulation of the 1985 Census were released in May 1986, or about 7 months after the census date.

The complete count tabulation was done in three phases in the 1985 Census. The first basic tabulation focused on the basic demographic characteristics of the population, the second basic tabulation on the industrial characteristics, and the third one on the occupational characteristics. They were completed (or are to be completed), respectively, December 1986, July 1987, and August 1988.

Post enumeration survey

After every census since 1950, the post enumeration survey has been conducted by the Bureau in order to evaluate the actual coverage of the enumeration and the reliability of the data obtained by the enumeration. The results of the post enumeration survey are used to interpret the census results from the viewpoint of accuracy, and to plan for the next census.

The 1985 post enumeration survey was conducted as of 15 December 1985. The survey was conducted for about 1,900 EDsrandomly selected from all the EDs of the 1985 Census.

(2) The current population estimates

In order to give major population figures for the most recent reference date as well as for the inter-censal period, the Bureau has been compiling two sets of the current population estimates: monthly estimates for the whole country and annual estimates for the prefectures. Both sets of the estimates are based on the census population and extrapolated with vital statistics and migration statistics.

The monthly estimates are computed for population of the whole country by sex and five-year age group. The figures refer to the first day of the month. The estimates are computed by adding to the census population the number of births and the number of persons entering Japan, and subtracting from it the number of deaths and the number of persons exiting from Japan. Although the vital statistics are available with breakdowns by sex and age every month, the same breakdowns are available for migration statistics only at a certain time interval. The latter figures are, therefore, prorated with the distribution by sex and age of the most recent period for which such data are available.

The annual estimates are computed for the populations of prefectures by sex and five-year age group and the population of the whole country by sex and single year of age. The figures refer to 1 October every year. For computing the estimates, internal migration statistics are used in addition to the statistics used to compute the monthly estimates.

The estimates are revised retroactively when the results of the more recent census become available. The discrepancy between the estimates and the results of the more recent census is generally negligibly small. The annual population estimates of the inter-censal period are available for every year since 1921, the next year of the first Population Census.

(3) Internal migration statistics

The statistics on internal migration in Japan are compiled by the Bureau from the records of the Basic Resident Register. The records cover the migration of the Japanese people across the borders of municipalities, i.e., cities, towns, and villages. The records are tabulated by prefectures of origin and destination of migration. The figures for the 11 largest cities are also compiled in the same manner as the prefectures.

The Law on the Basic Resident Register stipulates that every Japanese be registered at the office of the municipality where he/she lives. Every municipal office summarizes every month the records of the persons who moved into the municipality in the same month. The summary tables thus compiled are

sent at the end of every quarter to the prefectural office to which the municipality belongs. The prefectural office puts together the tables of all the municipalities in the prefecture and sends them to the Bureau. The Bureau compiles the statistics from all the summary tables received from the municipalities.

Internal migration statistics are important sources to assess the mobility of the Japanese population. During 1960's and the early part of 1970's, when Japan experienced a rapid economic growth, high mobility ratios were observed. But in mid-1970's and afterwards, as the economic growth slowed down, the mobility ratio went down significantly. Internal migration statistics are also used to produce the current population estimates.

The Bureau has been publishing the internal migration statistics in quarterly reports and annual reports since 1954.

(4) The Housing Survey

The Housing Survey is the most comprehensive, large-scale sample survey on the housing conditions in Japan. It has been conducted every five years since 1948. The most recent survey was conducted in 1983. The survey has been conducted as of 1 October of the year of the survey. The survey is authorized as the Designated Statistics No. 18.

Coverage

The units to be enumerated in the survey are dwellings, occupied and unoccupied, and other buildings with occupants as well as the households living in the dwellings and such buildings. But the following types of dwellings and institutions are excluded from the survey:

i) dwellings of the foreign diplomats and their suite;
ii) dwellings and institutions of the property of the imperial household;
iii) prisons, detention houses and the like;
iv) camps and other facilities of the Self-Defense Forces of Japan;
v) camps and other facilities of the U.S. Army.

The survey covers all the territories of Japan except for the following islands:

- Habomai-gunto, Shikotan-to, Kunashiri-to and Etorofu-to;
- Take-shima in Goka-mura, Oki-gun, Shimane-ken.

Sampling

The Housing Survey employs a two-stage cluster sampling, the primary sampling unit being the enumeration districts (EDs) of the Population Census and the secondary sampling unit being the unit areas established by dividing the ED into two in most cases. For each ED, one of the unit areas is randomly selected for enumeration. All the dwellings with or without occupants and the buildings with occupants in the sampled unit areas were enumerated.

In the 1983 Survey, 136 thousand EDs were sampled out of approximately 740 thousand EDs of the 1980 Population Census by a stratified sampling. The number of dwellings and buildings actually enumerated was 3,668 thousand units, where the population size was estimated at 38,607 thousand units.

Topics of the survey

The topics covered by the Housing Survey varies slightly every time to reflect the changes in housing characteristics of the general interest, although they remain mostly the same over the years. Following are the topics of the 1983 Housing Survey:

i) Building characteristics
- Use
- Structure
- Degree of dilapidation
- Number of stories
- Type of building

ii) Housing characteristics
- Type
- Tenure
- Period of construction
- Floor area
- Construction area
- Land area
- Type of the kitchen and its size
- Water supply
- Type of toilet, shared use or not
- With or without bathroom
- Total time of receiving the sunshine
- Width of the road in front

iii) Owner-occupied dwellings
- Rebuilding, purchase, or new construction
- If remodelled or expanded, the place and the area concerned
- Tenure of the land and time of acquiring the land

iv) Households
- Name of the representing person
- Type of household
- Composition of household
- Number of rooms for living
- Type of the dining room
- Annual income

v) Main earner of the household
- Age
- Status in employment
- Commuting time
- Time of moving into the present dwelling
- Reason for moving
- Other topics concerning the place of previous residence and so on

vi) Environment of the housing
- Area classification concerning the urban planning

. Others

Tabulation and publication

Since the 1973 Housing Survey, the mark-sheet questionnaires have been used so that the questionnaires may be directly input to the optical mark reader (OMR). In the 1983 Housing Survey in order to release the major results as early as possible, the subsample tabulation was done first, and the results were published in May 1984. Tabulation of the other results using the full sample was also done simultaneously. From September 1984 till December 1984, the results for prefectures were released successively. In March 1985, the results for the whole country and those for the metropolitan areas were released and the tabulation was completed.

2. Statistical Data Processing

(1) Statistical tabulation

The Statistics Center is responsible for statistical tabulation of the censuses and the surveys of the Statistics Bureau. In addition, the Center performs tabulation of the censuses and the surveys of other ministries, agencies and local governments, if it is so requested.

In 1985, the Center took charge of 54 tabulations of different governmental bodies. Major ones among them are as follows:

the Census of Commerce (the Ministry of International Trade and Industry),
the Statistics on Construction Starts (the Ministry of Construction),
the Survey on the Labour Trends (the Ministry of Labour),
the Survey on the Wage and Salary Structures (the Ministry of Labour),
the Basic Survey on Schools (the Ministry of Education),
the Survey on Salaries by Occupatinal Type in the Private Sector (the National Personnel Authority).

In most of the censuses and surveys, the questionnaires are submitted for tabulation to the Center from the prefectures after the completion of the field work of the censuses and surveys. At the Center, the tabulation is performed in the following process.

Registration and storage

Upon receipt of the questionnaires, the Center confirms the amount and the composition of the questionnaires. Then, they are registered in the directory and stored in the storage rooms located in the basement of the buliding so that they can be easily retrieved in the work of tabulation.

Visual contents check

Before the questionnaires are processed, the contents of the questionnaires are visually checked by the clerks. These checks are only applied to the cases where such checks can be done by the clerk, not by the computer.

Coding

Verbal responses in the questionnaire are coded by the clerks according to the appropriate classifications.

Data input

The contents of the questionnaires are input to the computer. The data input is done either by the optical mark reader (OMRs) or by key-entry operators. If the OMRs are used, the intervention by the clerks can be minimized, as all the responses in the questionnaires are automatically read by the OMRs. The surveys employing the mark-sheet questionnaires are: the

Population Census, the Housing Survey, the Employment Status Survey, and the Survey on Time Use and Leisure Activities. For the rest of the surveys, the data input is done by the key operators.

Data examination by the computer

Validity and consistency of the data are examined by the computer. As the visual check can cover mainly the obvious errors, the detailed examination is done by the computer. For simple errors which can be easily corrected without referring back to the questionnaires, the corrections may sometimes be done by the computer. But, for more complex cases, intervention by the clerks is needed.

Correction of error data

If errors requiring the handling by the clerks are detected by the computer, the clerks in charge look into the cases. They may check the original questionnaires or refer to the prefectural offices to determine the correct entries.

Tabulation by the computer

The "clean" data thus prepared are tabulated by the computer. In most of the censuses and the surveys of the Bureau, the tables are printed by the High-Speed Kanji (Japanese characters) Printer so that the output may be used as the original copy for printing.

Examination of the final tables

The tables thus produced are finally examined from the viewpoints of layout, consistency within the table and consistency among the tables. In addition, the figures are checked with the past data and related statistics to assure that no abnormality took place in the process of field work and the tabulation process. After the whole process the tables are finalized.

(2) **Manual processing**

In 1986, about 1,100 clerks of the Center were engaged in the manual processing of the statistical tabulation throughout the year. In addition, about 100 temporary workers were employed to perform the manual work

The clerks of the Center are assigned mainly to the operations which require knowledge and experience in the survey itself, classification and various matters of tabulation work. Such operations include coding, correction of error data, and examination of final tables. The operations at the rest of the stages in tabulation are mainly assigned to the temporary workers, who have little experience and knowledge in the statistical tabulation.

The Center has been taking some measures to enhance the efficiency and th

quality of tabulation work, particularly in respect of manual processing. Such measures have been urgently needed because there is a strong trend in the government as a whole to reduce the number of employees.

For the tabulation of the 1985 Population Census, the Center developed four systems which support the manual processing, namely, the Interactive Error Correction System, the System for Supporting the Examination of the Final Tables, the Questionnaire Management System, and the Tabulation Process Management System. These systems are generally designed to eliminate the manual work which can be done more efficiently by the computer, and to streamline the job flow and the flow of information at the same time. The systems are found to be very effective, and similar systems are being developed for the tabulation of other censuses and surveys.

In addition to the use of the advanced systems supporting the manual processing, the methods of total quality control (TQC) has been introduced to the tabulation of the 1985 Population Census. The TQC in general aims at objectively detecting the sources of errors or inefficency, and quickly responding to the problems. For this purpose, so-called QC circles are established which voluntarily review the quality of the work for themselves, and propose the measures for improvement. It is generally considered to be very effective in improving the quality of the products and services. The method is very popular in many private firms in Japan in various sectors such as manufacturing and services. The government sector, however, has little experience in TQC due to the different nature of their work.

The TQC for the tabulation of the 1985 Population Census sets the first target as quality control of coding procedures for industry and occupation. The results of the coding by the clerks are evaluated on a sample basis by the QC team. The results of the evaluation are immediately analyzed and fed back to the groups of clerks responsible for coding in order to take the necessary actions as soon as possible. Although the occurrence rate of coding errors are constantly monitored in order to assure the accuracy of the results of the coding, more emphasis is placed on early detection of the problems and quick measures to prevent reoccurrence of the errors.

The effectiveness of the quality control in the tabulation of the 1985 Population Census is not fully evaluated yet. But so far, compared with the error rates of the 1980 Census, some improvements are observed. The Center plans to extend the quality control program to the tabulation of other censuses and surveys.

(3) Use of the computer systems

Hardware configuration of the main-frame computer systems

The Center employs two computer systems for its data processing: ACOS 950 of Nippon Electric Corporation and IBM 3090 of International Business Machines. The ACOS system is mainly used for tabulation of the Population

Census and relatively large-scale sample surveys, while the IBM system is mainly used for tabulation of monthly surveys and database applications. The two systems are operated independently. Main features of the two systems as of 1987 are as follows:

	ACOS 950 system	IBM 3090 system
Main storage	32 MBytes	64 MBytes
Disk storage	24 GBytes	30 GBytes
Tape unis	6 units	6 units
Printers	1 line printer 1 page printer (Capable of printing Japanese characters. Model 7384)	1 line printer 1 image printer (Capable of printing images and Japanese characters. Model 3800)
Terminals	52 units (Model 6300. Operable as both a terminal and a personal computer.)	53 units (Model 5550. Operable as both a terminal and a personal computer.)
Other features	Automatic Operation Control Unit	Communication Control Unit

Other systems for specialized uses

The Center employs four other systems for specialized uses: optical mark reader (OMR) systems; data entry system; high-speed Kanji (Japanese characters) printer system; automatic drafter system.

The OMR systems are used to input the data on mark-sheet questionnaires directly. Such questionnaires are used in the Population Census, the Housing Survey, the Employment Status Survey, and the Survey on Time Use and Leisure Activities, all of which are conducted by the Bureau.

The current model of OMR was specially developed by Nippon Electric Corporation for use at the Center. Its original model was developed for the 1970 Population Census. Its main features were nearly the same as the current model except that the original model could read only one side of the sheet in one pass. In order to enhance the processing capacity, it was improved so that both sides of the sheet could be read in one pass for the 1975 Population Census. After that, some minor improvements were applied, and the current model N7237 was made.

The current model is capable of reading mark sheets of up to 257 mm x 364 mm. The reading speed is 200 sheets per minute when continuously operated. On a normal 8-hour working day, however, due to interruptions such as refilling the hopper (feeding bed) and correcting the jamming of the sheets, the actual speed goes down to 166 per minute. In addition, about 2 hours of maintenance time is required every month. The figures above concerning the operational speed were taken from the 1985 Population Census.

A system of OMR consists of a unit of OMR, a mini-computer, a console, a printer, and a magnetic-tape unit. The data read by the OMR are recorded on the magnetic tape, which will be processed by the main-frame system.

The monthly rental charge of a system of OMR is 1.4 million yen as of 1987, including the maintenance charges. Other operational costs include that for operators. For each system, two operators are assigned. The work of the operators is to set the mark sheets for feeding and to remove the sheets from the OMR after processing. The operators do not have to have any special experience. They can be trained in three weeks on the job at the beginning of their work.

The data entry system of the Center consists of a network of the IBM work stations. The entered data are at first stored in the hard disks of the work stations. The accumulated data in the hard disks are transmitted to the IBM main frame on a regular basis. The system is composed of 88 units of IBM 5540 and 20 units of IBM 5550. The latter model serves as the key station of the network.

The high-speed kanji printer system is used to provide the original copies for photo offset printing to produce statistical publications for the Population Census and other major surveys.

The system consists of a terminal (N6300 MODEL 55) which is used for input of Japanese characters, and a printing system (N7370 MODEL 2). The printing system consists of a magnetic tape unit, an operation console including a CRT display, and a page printer.

The current system was introduced by Nippon Electric Corporation in August 1985. The first similar system was introduced in October 1970 in order to produce the original copies for printing the publications of the 1970 Population Census. The printing speed of the current model is 5,250 to 7,000 lines per minute. It has been remarkably improved from the first model of 300 to 480 lines per minute. Since the system was improved, the system has been used more widely.

The technique of phototype processing by laser beam is used in the current model. It can handle 7,664 kinds of characters including Japanese characters. The size of a side of a letter square is 1/10 to 1/6 inch and the density is 240 dots per inch. The monthly rental charge of the system is approximately 2 million yen.

The automatic drafter system is used for drawing various statistical charts automatically. It can draw charts with four kinds of colour pens by reading the data and the drawing instructions on the magnetic tape.

The Center utilizes the system to draw statistical charts to represent major results of the Labour Force Survey, the Family Income and Expenditure Survey, the Consumer Price Index, etc.

The current model, the DRASTEM 9000, was introduced in October 1985. The maximum drawing speed is 106 meters per minute, which is a great improvement from the former medel, the DRASTEM 3000E. The former model operated at 48 meters/minute. The drawing range of the current model is 841 mm x 1,200 mm.

Program development

Data Processing Division of the Center is responsible for program development. The division has about 70 programmers in five units. The Systems Development Unit, consisting of 15 programmers and analysts, is in charge of maintenance of the system and development of various application systems of general purposes. The other four programming units, each consisting of about 15 programmers and analysts, share the responsibilities of developing and modifying the programs for tabulating the censuses and the surveys of the Bureau and other ministries and agencies. Special application programs for specific censuses and surveys are also developed by the four units.

Major software in use for the ACOS system

Operating System: MVP (Multi-Virtual-Processor)
Other programs
  Compilers: PL/I and COBOL
  Online application support: VIS (Versatile Information System) and ATSS (Advanced Time Sharing System)
  Database management: RIQS (Relational Information Query System)
  Program development support: ITE (Interactive Text Editor)
  Automatic operation control: ARC (Automatic Running Control)

Major software in use for the IBM system

Operating system: VM/XA SF (Virtual Machine/Extended Architecture System Facility)
MVS/XA (Multiple Virtual Storage/Extended Architecture)
Other programs
  Compilers and interpreters: PL/I, COBOL, FORTRAN and VS APL
  Communications: ACF/VTAM (Advanced Communication Function/Virtual Telecommunications Access Method)
  Program development support: TSO/E (Time Sharing Option/Extention) and ISPF/PDF (Interactive System Productivity Facility/Program Development Facility)
  Database management: IMS (Information Management System) and DB2 (Database System 2)
  Statistical package: SAS (Statistical Analysis System)

2. 1985年 센서스 業務 進行 豫定表

昭和６０年国勢調査事務進行予定表

実施機関	昭和６０年 4月	5月	6月	7月	8月	9月	10月	11月	12月	昭和６１年 1月	2月	3月	備考
総務庁	●全国都道府県統計主管課(部)長会議	●広報担当者会議 第一次地方別事務打合せ会 地方別庶務主任者事務打合せ会	第二次地方別事務打合せ会	●指導員任命	●環境整備等事務連絡等会議	●調査員任命	●調査実施	調査書類の受付	●要計表による人口の公表		地方別事後報告会		
	調査書類・用品の発送				事後調査要綱等の決定			事後調査地方別事務打合せ会	事後調査実施				
都道府県	市区町村統計主管課長会議	第一次市区町村職員事務打合せ会	第二次市区町村職員事務打合せ会	調査区の修正（関係書類の修正）				事後調査市町村事務打合せ会 事後調査調査員事務打合せ会					
				指導員内申	調査員内申			調査関係書類の審査・提出及び要計表の作成・提出		事後調査関係書類の提出			
市区町村		指導員の選考	指導員の配置					調査書類の審査・提出					
		調査員の選考		調査員の配置									
			指導員事務打合せ会	調査員事務打合せ会									
	調査区の修正（関係書類の修正）								事後調査関係書類の提出				

3. 1985年 센서스 調査區設定 作成方案 概要

（参考）

地図の種類，縮尺

地域図	2,500～50,000
市街図	2,500～10,000
地形図	2,500～50,000
都市計画図	2,500～25,000
国土基本図	2,500～5,000

昭和60年国勢調査調査区の設定に関する調査区関係書類作成事務手順の概要

市町村事務

A 基本地図の整備

①基本地図の選定

市街地 縮尺2.5千

市街地周辺・農村部 縮尺5千，1万

山間部 縮尺2.5万，5万，10万

適切な地図がない場合は，手書方式により基本地図となる地図を作成する。

市町村全域図の縮尺は適宜選定する

②基本地図の修正

現地踏査

内容が現地の実情と合わない場合は，基本地図を修正する。

B 調査区の画定

③調査区の画定

④拡大・縮小部分図の作成

他の調査区と同一縮尺とすることが適当でない一部の調査区については，その部分を拡大又は縮小した部分図を別に作成する。

C 関係書類の作成

⑤調査区界，町丁・字界（分割区界）の記入

⑥各調査区地図に収める地域範囲の決定

市区町村全域図に各調査区地図の境界を記入

メッシュ線，メッシュコード

市町村事務（続き）

C 関係書類の作成（続き）

⑦調査区地図原図台紙への貼込

⑧メッシュ線，メッシュ・コードの記入

昭和55年国勢調査調査区地図からメッシュ線及びメッシュ・コードを転記する。

⑨調査区内人口中心点の記入

面積が0.05km² 以上の調査区について，人口中心点を記入する。

⑩昭和55年国勢調査調査区番号との対応

昭和55年国勢調査調査区地図を参照

⑪調査区と都市計画法の地域区分との照合

都市計画図等

⑫調査区一覧表，町丁・字一覧表の作成

調査区一覧表 3部作成

町丁・字一覧表 3部作成

⑬調査区地図原図等の提出

調査区地図原図（1部）

市区町村全域図（1部）

調査区一覧表（2部）

町丁・字一覧表（2部）

都道府県事務

⑭調査区地図原図等の審査

調査区地図原図

市区町村全域図

調査区一覧表

町丁・字一覧表

都道府県事務（続き）

D 調査区地図原図等の審査及び調査区地図の写真複製

⑮写真複製発注

調査区地図原図

市区町村全域図

調査区地図原図をポリエステルフィルムに裏面から焼き付ける。

調査区地図（3部作成）

市区町村全図（3部作成）

（納品）

⑯調査区界等の補記入

池，沼，湖，川などを青で塗る。

調査区界等の色付けを表面から行う。

E 関係書類の作成

⑰調査区数・調査区地図枚数一覧表の作成

2部作成

⑱市町村へ送付

調査区地図

市区町村全図

⑲統計局へ提出

調査区地図（1部）

市区町村全図（1部）

調査区一覧表（1部）

町丁・字一覧表（1部）

調査区数・調査区地図枚数一覧表（1部）

統計局事務

F 受付，整理，審査

⑳受付，整理，審査

調査区地図

市区町村全図

調査区一覧表

町丁・字一覧表

調査区数・調査区地図枚数一覧表

4. 1985年 센서스 集計體系

昭和60年国勢調査集計体系

集計区分		集計の性格	対象	公表の時期	表章地域	産業	職業	結果公表の方法
速報集計	要計表による人口集計	要計表による男女別人口を早期に提供する。	全数	昭和60年12月	全国 都道府県 市区町村	—	—	・新聞発表後報告書刊行，官報に公示
	抽出速報集計	基本集計及び抽出詳細集計の一部を全国又は都道府県段階まで早期に提供する。	1％	昭和61年5月	全国 都道府県 人口50万以上の市	小分類	小分類	・原則として報告書による。
基本集計	第1次基本集計	人口及び世帯数の確定結果並びに人口，世帯及び住居に関する基本的な結果を市区町村段階まで提供する。また，高齢者の世帯に関する基本的な結果等も提供する。	全数	昭和61年11月	全国 都道府県 市区町村	—	—	・原則として報告書によるが，一部閲覧に供する。 ・人口及び世帯数については数回に分けて官報に公示
	第2次基本集計	人口の産業別構成に関する基本的な結果を市区町村段階まで提供する。		昭和62年9月		大分類	—	・原則として報告書によるが，一部閲覧に供する。
	第3次基本集計	人口の職業別構成及び特定世帯の状況に関する基本的な結果を市区町村段階まで提供する。		昭和63年7月		大分類	大分類	
抽出詳細集計		多重クロス表及び産業・職業などに関する詳細な結果を原則として都道府県段階まで提供する。	約20％	昭和64年11月	全国 都道府県 市区町村	小分類	小分類	・原則として報告書によるが，一部閲覧に供する。
従業地・通学地集計	その1	従業地・通学地による人口の基本的構成に関する結果及び産業別構成に関する基本的な結果を市区町村段階まで提供する。	全数	昭和62年10月	全国 都道府県 市区町村	大分類	—	・原則として報告書によるが，一部閲覧に供する。
	その2	従業地・通学地による人口の職業別構成に関する基本的な結果を市区町村段階まで提供する。		昭和63年8月		大分類	大分類	
	その3	従業地・通学地による人口の経済的構成などに関する詳細な結果を原則として都道府県又は市区町村段階まで提供する。	約20％	昭和64年12月	全国 都道府県 市区町村	中分類	中分類	
調査区別集計	その1	第1次基本集計，第2次基本集計及び調査区特性に関する基本的な結果と標本調査用資料を調査区別に提供する。 第1次基本集計に係る分	全数	昭和61年11月	調査区又は分割区	—	—	・閲覧に供する。
	その2	第2次基本集計に係る分		昭和62年9月		大分類	—	
特別集計		未定						

（注） 上記に関連して国勢統計区別集計及びメッシュ別集計を行う。

5. 1985年 센서스 世帶名簿

昭和60年国勢調査 世　帯　名　簿

総務庁統計局

➡ 黒のボールペンで記入してください。　➡ 分割区がある調査区の場合は，分割区ごとに作成してください。

都道府県名	市郡支庁名	区町村名	調査区番号

調査員 氏名 ……㊞　　指導員 検印 ㊞

（……枚のうち……枚目）

一般の世帯，一人世帯，30人未満の単身者の世帯 について

(1) 世帯番号	(2) 世帯主又は代表者の氏名	(3) 世帯の所在地（町名・字名と番地）	(4) 世帯員の数 総数	男	女	(5) 調査票枚数	(6) 備考

6. 1985年 센서스調査票

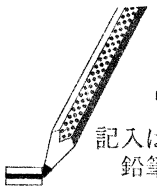
指定統計第１号

㊙ 国勢調査調査票

昭和60年10月１日
総務庁統計局

この調査票は，統計以外の目的には使用しませんから，ありのままを記入してください。

○ この調査票は機械にかけますので，**汚したり 折ったり 丸めたりしない**でください。
○ 世帯では，表も裏も太わくの中だけに記入してください。
○ 記入には必ず**黒鉛筆を使用**し，書き間違えた場合は消しゴムできれいに消してください。
○ 答えを記入する欄が□の場合は，当てはまる□に■のように横線を**太く濃く記入**し，その他の場合は，**点線のわく内に答えを記入**してください。



「記入の際には，「国勢調査についてのお願い」を参照してください。」

世帯では 表も裏も 太わくの中だけに記入してください

世帯員全員について

	1	2	3	4	5
1 氏名及び男女の別 ふだん住んでいる人をもれなく書いてください	男 □ 女 □	男 □ 女 □	男 □ 女 □	男 □ 女 □	男 □ 女 □
2 世帯主との続き柄 孫の配偶者は孫に　兄弟姉妹の配偶者は**兄弟姉妹**に含めます 世帯主の配偶者の父母・祖父母・兄弟姉妹は　それぞれ　**父母・祖父母・兄弟姉妹**に含めます	世帯主又は代表者 □ 世帯主の配偶者 □ 子 □ 子の配偶者 □ 孫 □ 父母 □ 祖父母 □ 兄弟姉妹 □ 他の親族 □ 住み込みの雇人 家事 □ 営業 □ その他 □	世帯主又は代表者 □ 世帯主の配偶者 □ 子 □ 子の配偶者 □ 孫 □ 父母 □ 祖父母 □ 兄弟姉妹 □ 他の親族 □ 住み込みの雇人 家事 □ 営業 □ その他 □	世帯主又は代表者 □ 世帯主の配偶者 □ 子 □ 子の配偶者 □ 孫 □ 父母 □ 祖父母 □ 兄弟姉妹 □ 他の親族 □ 住み込みの雇人 家事 □ 営業 □ その他 □	世帯主又は代表者 □ 世帯主の配偶者 □ 子 □ 子の配偶者 □ 孫 □ 父母 □ 祖父母 □ 兄弟姉妹 □ 他の親族 □ 住み込みの雇人 家事 □ 営業 □ その他 □	世帯主又は代表者 □ 世帯主の配偶者 □ 子 □ 子の配偶者 □ 孫 □ 父母 □ 祖父母 □ 兄弟姉妹 □ 他の親族 □ 住み込みの雇人 家事 □ 営業 □ その他 □
3 出生の年月 該当する元号について記入したうえで年及び月を書いてください	明治 □ 大正 □ 昭和 □ ．． 年　月	明治 □ 大正 □ 昭和 □ ．． 年　月	明治 □ 大正 □ 昭和 □ ．． 年　月	明治 □ 大正 □ 昭和 □ ．． 年　月	明治 □ 大正 □ 昭和 □ ．． 年　月
世帯では右の欄には記入しないでください 年 10のケタ	1 2 3 4 / 5 6	1 2 3 4 / 5 6	1 2 3 4 / 5 6	1 2 3 4 / 5 6	1 2 3 4 / 5 6
年 1のケタ	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9
月	1月～3月 □ 4月～6月 □ 7月～9月 □ 10月～12月 □	1月～3月 □ 4月～6月 □ 7月～9月 □ 10月～12月 □	1月～3月 □ 4月～6月 □ 7月～9月 □ 10月～12月 □	1月～3月 □ 4月～6月 □ 7月～9月 □ 10月～12月 □	1月～3月 □ 4月～6月 □ 7月～9月 □ 10月～12月 □
4 配偶者の有無 届出の有無に関係なく記入してください	未婚 □ 有配偶（幼児などを含む） □ 死別 □ 離別 □	未婚 □ 有配偶（幼児などを含む） □ 死別 □ 離別 □	未婚 □ 有配偶（幼児などを含む） □ 死別 □ 離別 □	未婚 □ 有配偶（幼児などを含む） □ 死別 □ 離別 □	未婚 □ 有配偶（幼児などを含む） □ 死別 □ 離別 □
5 国　籍 **外国**の場合は　国名も書いてください	日本 □ 外国 □ →（国名）	日本 □ 外国 □ →（国名）	日本 □ 外国 □ →（国名）	日本 □ 外国 □ →（国名）	日本 □ 外国 □ →（国名）

世帯について

(1) 世帯員の数
世帯員全員の数を書いてください
総数　人　／　男　人　女　人

(2) 住居の種類
持ち家 □ ／ 都道府県・市区町村営の賃貸住宅 □ ／ 住宅・都市整備公団・供給公社等の賃貸住宅 □ ／ 民営の借家又は賃貸アパート □ ／ 給与住宅（社宅・公務員住宅など） □ ／ 住宅に間借り □ ／ 会社等の独身寮・寄宿舎 □ ／ その他 □
→ (3)・(4)欄にも記入
→ 第２面へ

(3) 居住室数
玄関・台所(炊事場)・便所・浴室・廊下や　店・事務室などの営業用の室及び他の世帯が使っている室は除いてください
ダイニングキッチン(食事室兼台所)は　居住室に含めます

1室 □　2室 □　3室 □　4室 □　5室 □　6室 □　7室 □　8室 □　9室 □　10室以上 □

(4) 居住室の畳数の合計
(3)欄の居住室について その全体の広さを畳数で記入してください
畳の敷いてない室も 3.3平方メートル(１坪)を２畳に換算して畳数に含めてください
畳・

☎ 電話　局　番　（わからないことがあった場合　問い合わせに利用させていただきます）

裏面にも記入してください

世帯では　下の欄には記入しないでください

国籍	1	1 2 3 4	4	1 2 3 4			
	2	1 2 3 4	5	1 2 3 4			
	3	1 2 3 4					
世帯員の数（総数）	100のケタ	1 2 3					
	10のケタ	0 1 2 3 4 5 6 7 8 9					
	1のケタ	0 1 2 3 4 5 6 7 8 9					
居住室の畳数の合計	100のケタ	1 2 3					
	10のケタ	0 1 2 3 4 5 6 7 8 9					
	1のケタ	0 1 2 3 4 5 6 7 8 9					
世帯の種類	一般の世帯 □	一人世帯（会社等の独身寮の入居者を含む） □	寮・寄宿舎の学生・生徒 □	病院・療養所の入院者 □	社会施設の入所者 □	その他 □	
住宅の建て方	一戸建 □	長屋建 □	共同住宅 □ → 1・2階建 □	3～5階建 □	6～10階建 □	11階建以上 □	その他 □
世帯番号	100のケタ	1 2 3 4 5					
	10のケタ	0 1 2 3 4 5 6 7 8 9					
	1のケタ	0 1 2 3 4 5 6 7 8 9					
この世帯の調査票	枚のうち	枚目	100のケタ	1 2 3			
			10のケタ	0 1 2 3 4 5 6 7 8 9			
			1のケタ	0 1 2 3 4 5 6 7 8 9			
調査区番号							

汚したり 折ったり 丸めたり しないでください

（世帯では，太わくの中だけに記入してください。）

世帯員全員について

6 9月24日から30日までの1週間に仕事をしましたか

仕事とは　収入を伴う仕事をいい 自家営業（農業や店の仕事など）の手伝いや 内職・アルバイトも含めます

通学には　予備校・洋裁学校などに通っている場合も含めます

	1	2	3	4	5
少しでも仕事をした人は（家事・通学だけの場合は含めません）	主に仕事 / 家事などのほか仕事 / 通学のかたわら仕事				
（7～10欄にも記入）					
少しも仕事をしなかった人は	仕事を休んでいた / 仕事を探していた / 家事 / 通学 / その他（幼児・高齢など）				
	（7～10欄にも記入）記入おわり / （7欄まで記入）記入おわり				

就業者について

7 従業地又は通学地

仕事も通学もしている人は　仕事をしている場所について記入してください

他の市区町村の場合は その都道府県・市区町村名（11大都市の場合は区名まで）も書いてください

11大都市とは　東京都区部と札幌・横浜・川崎・名古屋・京都・大阪・神戸・広島・北九州・福岡の各市をいいます

	1	2	3	4	5
自宅（住み込みを含む） / 同じ他の市町村 / 他の市区町村					
（所在地を記入）					
都道府県					
市郡支庁					
区町村					

8 勤めか 自営かの別

パートタイムで雇われている人は **雇用されている人**に含めます

業主とは 個人で事業を経営している人（農家などを含む）や自由業の人をいいます

	1	2	3	4	5
雇用されている人					
会社などの役員					
雇人のある業主					
雇人のない業主					
家族従業者					
家庭内の賃仕事					

9 勤め先・業主などの名称及び事業の種類

仕事をしている事務所・工場・店などの名称（官公庁の場合は課名まで）と事業の種類について書いてください

事業の内容がよくわかるように**「国勢調査についてのお願い」**の**記入例**を参考にしてくわしく書いてください

	1	2	3	4	5
勤め先・業主などの名称					
事業の種類					

10 本人の仕事の種類

仕事の内容がよくわかるように**「国勢調査についてのお願い」**の**記入例**を参考にしてくわしく書いてください

	1	2	3	4	5

世帯では右の欄には記入しないでください

従業地又は通学地（「他の市区町村」の場合）

		1	2	3	4	5
都道府県	10のケタ	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	1のケタ	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9
市区町村	100のケタ	1 2 3 4 / 5 6 7	1 2 3 4 / 5 6 7	1 2 3 4 / 5 6 7	1 2 3 4 / 5 6 7	1 2 3 4 / 5 6 7
	10のケタ	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9
	1のケタ	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9	0 1 2 3 4 / 5 6 7 8 9

産業分類

	1	2	3	4	5
	農業 林業 漁業 鉱業 建設 / 製造 電気 運・通 卸・小 ・・ / 金融 不動産 サービス 公務 他	農業 林業 漁業 鉱業 建設 / 製造 電気 運・通 卸・小 ・・ / 金融 不動産 サービス 公務 他	農業 林業 漁業 鉱業 建設 / 製造 電気 運・通 卸・小 ・・ / 金融 不動産 サービス 公務 他	農業 林業 漁業 鉱業 建設 / 製造 電気 運・通 卸・小 ・・ / 金融 不動産 サービス 公務 他	農業 林業 漁業 鉱業 建設 / 製造 電気 運・通 卸・小 ・・ / 金融 不動産 サービス 公務 他

	1	2	3	4	5
1 産業	A農 B林 C漁 D鉱 E建 / F製 G電 H運 I卸・小 ・ / J金 K不 L サ M公 N	0 1 2 3 4 5 6 7 8 9 / 0 1 2 3 4 5 6 7 8 9 / 0 1 2 3 4 5 6 7 8 9			
1 職業	0専 1管 2事 3販 / 4農 5鉱 6運・通 / 7技 9保 Vサ N	0 1 2 3 4 5 6 7 8 9 V / 0 1 2 3 4 5 6 7 8 9 V / 0 1 2 3 4 5 6 7 8 9 V			
2 産業	A農 B林 C漁 D鉱 E建 / F製 G電 H運 I卸・小 ・ / J金 K不 L サ M公 N	0 1 2 3 4 5 6 7 8 9 / 0 1 2 3 4 5 6 7 8 9 / 0 1 2 3 4 5 6 7 8 9			
2 職業	0専 1管 2事 3販 / 4農 5鉱 6運・通 / 7技 9保 Vサ N	0 1 2 3 4 5 6 7 8 9 V / 0 1 2 3 4 5 6 7 8 9 V / 0 1 2 3 4 5 6 7 8 9 V			
3 産業	A農 B林 C漁 D鉱 E建 / F製 G電 H運 I卸・小 ・ / J金 K不 L サ M公 N	0 1 2 3 4 5 6 7 8 9 / 0 1 2 3 4 5 6 7 8 9 / 0 1 2 3 4 5 6 7 8 9			
3 職業	0専 1管 2事 3販 / 4農 5鉱 6運・通 / 7技 9保 Vサ N	0 1 2 3 4 5 6 7 8 9 V / 0 1 2 3 4 5 6 7 8 9 V / 0 1 2 3 4 5 6 7 8 9 V			
4 産業	A農 B林 C漁 D鉱 E建 / F製 G電 H運 I卸・小 ・ / J金 K不 L サ M公 N	0 1 2 3 4 5 6 7 8 9 / 0 1 2 3 4 5 6 7 8 9 / 0 1 2 3 4 5 6 7 8 9			
4 職業	0専 1管 2事 3販 / 4農 5鉱 6運・通 / 7技 9保 Vサ N	0 1 2 3 4 5 6 7 8 9 V / 0 1 2 3 4 5 6 7 8 9 V / 0 1 2 3 4 5 6 7 8 9 V			
5 産業	A農 B林 C漁 D鉱 E建 / F製 G電 H運 I卸・小 ・ / J金 K不 L サ M公 N	0 1 2 3 4 5 6 7 8 9 / 0 1 2 3 4 5 6 7 8 9 / 0 1 2 3 4 5 6 7 8 9			
5 職業	0専 1管 2事 3販 / 4農 5鉱 6運・通 / 7技 9保 Vサ N	0 1 2 3 4 5 6 7 8 9 V / 0 1 2 3 4 5 6 7 8 9 V / 0 1 2 3 4 5 6 7 8 9 V			

汚したり 折ったり 丸めたり しないでください

7. 1985年 센서스 産業分類 項目表

昭和60年国勢調査

産業分類項目表

総務庁統計センター

A 農業
01 農業
011 農業（農業サービス業を除く）
018 農業サービス業

B 林業
02 林業
020 林業

C 漁業
03 漁業
030 漁業
04 水産養殖業
040 水産養殖業

D 鉱業
05～08 鉱業
050 金属鉱業
060 石炭・亜炭鉱業
070 原油・天然ガス鉱業
080 非金属鉱業

E 建設業

F 製造業
12 食料品製造業
121 畜産食料品製造業
122 水産食料品製造業
123 野菜缶詰・果実缶詰・農産保存食料品製造業
124 調味料製造業
126 精穀・製粉業
127 パン・菓子製造業
128 動植物油脂製造業
129 その他の食料品製造業
13 飲料・飼料・たばこ製造業
131 清涼飲料製造業
132 酒類製造業
133 茶・コーヒー製造業
134 製氷業
135 飼料・有機質肥料製造業
136 たばこ製造業
14 繊維工業（衣服，その他の繊維製品を除く）
141 製糸業
142 紡績業，ねん糸製造業
144 織物業
145 ニット製造業
146 染色整理業
149 その他の繊維工業
15 衣服・その他の繊維製品製造業
150 衣服・その他の繊維製品製造業
16 木材・木製品製造業（家具を除く）
161 製材業，木製品製造業
162 造作材・合板・建築用組立材料製造業
163 木製容器製造業(竹,とうを含む)
169 その他の木製品製造業（竹，とうを含む）
17 家具・装備品製造業
171 家具製造業
173 建具製造業
179 その他の家具・装備品製造業
18 パルプ・紙・紙加工品製造業
181 パルプ・紙製造業
185 紙製容器製造業
189 その他のパルプ・紙・紙加工品製造業
19 出版・印刷・同関連産業
191 新聞業
192 出版業
193 印刷業（謄写印刷業を除く）
195 製本業，印刷物加工業
199 印刷業に伴うサービス業
20 化学工業
201 化学肥料製造業
202 化学工業製品製造業
204 化学繊維製造業
205 油脂加工製品・石けん・合成洗剤・界面活性剤・塗料製造業
206 医薬品製造業
209 その他の化学工業
21 石油製品・石炭製品製造業
211 石油精製業
219 その他の石油製品・石炭製品製造業
22 プラスチック製品製造業(別掲を除く)
220 プラスチック製品製造業（別掲を除く）
23 ゴム製品製造業
231 タイヤ・チューブ製造業
232 ゴム製・プラスチック製履物・同附属品製造業
239 その他のゴム製品製造業
24 なめし革・同製品・毛皮製造業
241 なめし革製造業
243 革製履物・同材料・同附属品製造業
246 かばん・袋物製造業
249 その他のなめし革製品製造業
25 窯業・土石製品製造業
251 ガラス・同製品製造業
252 セメント・同製品製造業
253 建設用粘土製品製造業（陶磁器製を除く）
254 陶磁器・同関連製品製造業
259 その他の窯業・土石製品製造業
26 鉄鋼業
260 鉄鋼業
27 非鉄金属製造業
270 非鉄金属製造業
28 金属製品製造業
280 金属製品製造業
29 一般機械器具製造業
291 ボイラ・原動機製造業
292 農業・建設・鉱山機械製造業
294 金属加工機械製造業
295 産業用機械製造業（他に分類されないもの）
299 その他の一般機械器具製造業
30 電気機械器具製造業
301 発電用・送電用・配電用・産業用電気機械器具製造業
302 民生用電気機械器具製造業
304 通信・電子機器,同部分品製造業
307 電気計測器製造業
309 その他の電気機械器具製造業
31 輸送用機械器具製造業
311 自動車・同附属品製造業
312 鉄道車両・同部分品製造業
313 自転車・同部分品製造業
314 船舶製造・修理業，舶用機関製造業
315 航空機・同附属品製造業
319 その他の輸送用機械器具製造業
32 精密機械器具製造業
325 光学機械器具・レンズ製造業
327 時計・同部分品製造業
329 その他の精密機械器具製造業
33～34 その他の製造業
330 武器製造業
342 楽器・レコード製造業
343 がん具・運動競技用具製造業
349 他に分類されない製造業

G 電気・ガス・熱供給・水道業
36～39 電気・ガス・熱供給・水道業
361 電気業
371 ガス業
381 熱供給業
390 水道業

H 運輸・通信業
40 鉄道業
400 鉄道業
41 道路旅客運送業
410 道路旅客運送業
42 道路貨物運送業
420 道路貨物運送業
43 水運業
430 水運業
44 航空運輸業
440 航空運輸業
45 倉庫業
450 倉庫業
46 運輸に附帯するサービス業
464 旅行業
469 その他の運輸に附帯するサービス業
47 通信業
470 通信業

I 卸売・小売業，飲食店
49～52 卸売業
491 各種商品卸売業
501 繊維品卸売業（衣服，身の回り品を除く）
502 化学製品卸売業
503 鉱物・金属材料卸売業
504 機械器具卸売業
505 建築材料卸売業
506 再生資源卸売業
511 衣服・身の回り品卸売業
512 農畜産物・水産物卸売業
513 食料・飲料卸売業
514 医薬品・化粧品卸売業
515 家具・建具・じゅう器等卸売業
519 その他の卸売業
521 代理商，仲立業
53 百貨店
531 百貨店
54 織物・衣服・身の回り品小売業
541 呉服・服地・寝具小売業
542 男子・婦人・子供服小売業
544 靴・履物小売業
549 その他の織物・衣服・身の回り品小売業
55 飲食料品小売業
552 酒・調味料小売業
553 食肉小売業
554 鮮魚小売業
556 野菜・果実小売業
557 菓子・パン小売業
558 米穀類小売業
559 その他の飲食料品小売業
56 自動車・自転車小売業
561 自動車小売業
562 自転車小売業(二輪自動車を含む)
57 家具・建具・じゅう器小売業
571 家具・建具・畳小売業
572 金物・荒物小売業
573 陶磁器・ガラス器・じゅう器小売業
574 家庭用機械器具小売業
58 その他の小売業
581 医薬品・化粧品小売業
583 燃料小売業
584 書籍・文房具小売業
585 スポーツ用品・がん具・娯楽用品・楽器小売業
589 他に分類されない小売業
59 一般飲食店
591 食堂，そば・すし店
594 喫茶店
599 その他の一般飲食店
60 その他の飲食店
600 料亭，バー，キャバレー，酒場

J 金融・保険業
61～68 金融・保険業
610 銀行・信託業
620 その他の金融業
660 証券業，商品取引業
670 保険業，保険媒介代理業，保険サービス業

K 不動産業
69～70 不動産業
690 不動産取引業
701 不動産賃貸・管理業（貸家業，貸間業を除く）
702 貸家業，貸間業

L サービス業
72 物品賃貸業
720 物品賃貸業
73 旅館，その他の宿泊所
730 旅館，その他の宿泊所
74 家事サービス業
741 家事サービス業(住込みのもの)
742 家事サービス業(住込みでないもの)
75 洗濯・理容・浴場業
751 洗濯・洗張・染物業
753 理容業
754 美容業
755 浴場業
76 その他の個人サービス業
761 写真業
762 衣服裁縫修理業
769 他に分類されない個人サービス業
77～78 映画・娯楽業
770 映画業
781 劇場，興行場(別掲を除く)，興行団
783 競輪・競馬等の競走場・競技団
785 運動競技場，公園，遊園地
787 遊戯場
789 その他の娯楽業
79 放送業
790 放送業
80 駐車場業
801 駐車場業
81 自動車整備業
811 自動車整備業
82 その他の修理業
821 機械修理業
829 他に分類されない修理業
83 協同組合（他に分類されないもの）
830 協同組合(他に分類されないもの)
84 情報サービス・調査・広告業
841 情報サービス業
842 ニュース供給業,興信所,広告業
85 その他の事業サービス業
854 建物サービス業
859 他に分類されない事業サービス業
86 専門サービス業（他に分類されないもの）
861 法律・特許・司法書士事務所，公証人役場
863 公認会計士事務所，税理士事務所
864 獣医業
865 土木建築サービス業
868 個人教授所
869 その他の専門サービス業
87 医療業
871 病院
872 一般診療所
873 歯科診療所
879 その他の医療業
88 保健衛生
881 保健所，健康相談施設
889 その他の保健衛生
89 廃棄物処理業
890 廃棄物処理業
90 宗教
900 宗教
91 教育
911 学校教育（専修学校，各種学校を除く）
917 専修学校，各種学校
918 社会教育
919 その他の教育施設
92 社会保険，社会福祉
921 社会保険事業団体，福祉事務所
923 児童福祉事業
924 老人福祉事業
929 その他の社会保険，社会福祉
93 学術研究機関
930 学術研究機関
94 政治・経済・文化団体
940 政治・経済・文化団体
95 その他のサービス業
950 その他のサービス業
96 外国公務
960 外国公務

M 公務（他に分類されないもの）
97 国家公務
970 国家公務
98 地方公務
980 地方公務

N 分類不能の産業

8. 1985年 센서스 職業分類 項目表

昭和60年国勢調査

職業分類項目表

総務庁統計センター

0 専門的・技術的職業従事者

00 科学研究者
- 000 自然科学系研究者
- 001 人文・社会科学系研究者

01 技術者
- 010 鉱山技術者
- 011 金属製錬技術者
- 012 機械技術者
- 013 電気技術者
- 014 化学技術者
- 015 建築技術者
- 016 土木技術者
- 017 農林技術者
- 018 情報処理技術者
- 01V その他の技術者

02～03 保健医療従事者
- 020 医師
- 021 歯科医師
- 022 獣医師
- 023 薬剤師
- 024 保健婦
- 025 助産婦
- 026 看護婦，看護士
- 027 栄養士
- 028 診療放射線・エックス線技師
- 029 臨床検査技師，衛生検査技師
- 030 歯科衛生士
- 031 歯科技工士
- 032 あん摩マッサージ指圧師，はり師，きゅう師，柔道整復師
- 03V その他の保健医療従事者

04 法務従事者
- 040 裁判官，検察官，弁護士
- 041 その他の法務従事者

04 公認会計士，税理士
- 042 公認会計士，税理士

05 教員
- 050 幼稚園教員
- 051 小学校教員
- 052 中学校教員
- 053 高等学校教員
- 054 大学教員
- 055 盲学校・ろう(聾)学校・養護学校教員
- 05V その他の教員

06 宗教家
- 060 宗教家

07 文芸家，記者，編集者
- 070 文芸家，著述家
- 071 記者，編集者

08 美術家，写真家，デザイナー
- 080 彫刻家，画家，工芸美術家
- 081 デザイナー
- 082 写真家，カメラマン

09 音楽家，舞台芸術家
- 090 音楽家(個人に教授するものを除く)
- 091 音楽家(個人に教授するもの)
- 092 俳優，舞踊家，演芸家(個人に教授するものを除く)
- 093 俳優，舞踊家，演芸家(個人に教授するもの)

0V その他の専門的・技術的職業従事者
- 0V0 保母，保父
- 0V1 社会福祉事業専門職員
- 0V2 職業スポーツ家(個人に教授するものを除く)
- 0V3 職業スポーツ家(個人に教授するもの)
- 0V4 個人教師(学習指導)
- 0V5 個人教師(他に分類されないもの)
- 0VV 他に分類されない専門的・技術的職業従事者

1 管理的職業従事者

10 管理的公務員
- 100 管理的公務員

11 会社・団体等の役員
- 110 会社役員
- 11V その他の法人・団体の役員

12 その他の管理的職業従事者
- 120 会社・団体等の管理的職業従事者
- 121 駅長，区長
- 122 郵便局長，電報・電話局長
- 12V 他に分類されない管理的職業従事者

2 事務従事者

20 一般事務従事者
- 200 一般事務員
- 201 会計事務員

21 運輸・通信事務従事者
- 210 運輸事務員
- 211 郵便・通信事務員

22 外勤事務従事者
- 220 集金人
- 22V その他の外勤事務従事者

23 その他の事務従事者
- 230 速記者，タイピスト
- 231 せん孔機等操作員
- 232 電子計算機等操作員

3 販売従事者

30 商品販売従事者
- 300 小売店主
- 301 卸売店主
- 302 飲食店主
- 303 販売店員
- 304 行商・露天販売従事者
- 305 再生資源卸売・回収従事者

31 販売類似職業従事者
- 310 商品仲立人
- 311 商品販売外交員
- 312 外交員(商品，保険，不動産を除く)
- 313 保険代理人・外交員
- 314 不動産仲介人・売買人
- 315 質屋店主・店員
- 31V その他の販売類似職業従事者

4 農林漁業作業者

40 農業作業者
- 400 農耕・養蚕作業者
- 401 養畜作業者
- 402 植木職，造園師
- 40V その他の農業作業者

41 林業作業者
- 410 育林作業者
- 411 伐木・造材作業者
- 412 集材・運材作業者
- 413 製炭・製薪作業者
- 41V その他の林業作業者

42 漁業作業者
- 420 漁ろう作業者
- 421 漁ろう船の船長・航海士・機関長・機関士
- 422 海草・貝採取作業者
- 423 水産養殖作業者
- 42V その他の漁業作業者

5 採掘作業者

50 採鉱・採石作業者
- 500 採鉱員
- 501 採炭員
- 502 石切出作業者
- 503 砂利・砂・粘土採取作業者

51 その他の採掘作業者
- 510 支柱員
- 511 坑内運搬員
- 512 選鉱員，選炭員
- 51V 他に分類されない採掘作業者

6 運輸・通信従事者

60 鉄道運転従事者
- 600 電気・ディーゼル・蒸気機関士
- 601 電車・気動車運転士

61 自動車運転者
- 610 自動車運転者

62 船舶・航空機運転従事者
- 620 船長・航海士(漁ろう船を除く)，水先人
- 621 船舶機関長・機関士(漁ろう船を除く)
- 622 航空機操縦士，航空士，航空機関士

63 その他の運輸従事者
- 630 車掌
- 631 操車掛，信号掛，転てつ手，連結手
- 632 甲板員
- 633 船舶機関員
- 63V 他に分類されない運輸従事者

64 通信従事者
- 640 無線通信士，無線通信技術員
- 641 有線通信員
- 642 電話交換手
- 643 郵便・電報外務員
- 64V その他の通信従事者

7～8 技能工，生産工程作業者及び労務作業者

70 金属材料製造作業者
- 700 製銑工，製鋼工
- 701 非鉄金属製錬工
- 702 鋳物工
- 703 鍛造工
- 704 圧延工
- 705 伸線工
- 706 金属熱処理工
- 70V その他の金属材料製造作業者

71 金属加工作業者
- 710 金属工作機械工
- 711 金属プレス工
- 712 金属溶接工
- 713 鉄工，びょう打工，製缶工
- 714 板金工
- 715 金属彫刻工
- 716 めっき工
- 71V その他の金属加工作業者

72 一般機械器具組立・修理作業者
- 720 一般機械器具組立工
- 721 一般機械器具修理工

72 電気機械器具組立・修理作業者
- 722 電気機械器具組立工
- 723 電気機械器具修理工
- 724 半導体製品製造工
- 725 電球・真空管組立工
- 726 被覆電線製造工
- 72V その他の電気機械器具組立・修理作業者

73 輸送機械組立・修理作業者
- 730 自動車組立工
- 731 自動車整備工
- 732 鉄道車両組立工・修理工
- 733 船舶ぎ装工(他に分類されないもの)
- 734 航空機組立工・整備工
- 735 自転車組立工・修理工
- 73V その他の輸送機械組立・修理作業者

74 時計・計器・光学機械器具組立・修理作業者
- 740 時計組立工・修理工
- 741 レンズ研磨工・調整工
- 742 光学機械器具組立工・修理工
- 743 計器組立工・調整工
- 74V その他の時計・計器・光学機械器具組立・修理作業者

75 製糸・紡織作業者
- 750 繰糸工
- 751 粗紡工，精紡工
- 752 合糸工，ねん糸工，加工糸工
- 753 揚返工，かせ取工
- 754 織機準備工
- 755 織布工
- 756 編物工，編立工
- 757 製網工，製網工(繊維製)
- 758 漂白工，精練工
- 759 染色工
- 75V その他の製糸・紡織作業者

76 衣服・繊維製品製造作業者
- 760 洋服仕立職
- 761 和服仕立職
- 762 婦人・子供服仕立職
- 763 ミシン縫製工
- 764 裁断工
- 765 刺しゅう工
- 76V その他の衣服・繊維製品製造作業者

77 木・竹・草・つる製品製造作業者
- 770 製材工
- 771 チップ製造工
- 772 合板工
- 773 木工
- 774 木製家具・建具製造工
- 775 船大工
- 776 竹細工工
- 777 草・つる製品製造工
- 77V その他の木・竹・草・つる製品製造作業者

78 パルプ・紙・紙製品製造作業者
- 780 パルプ工，紙料工
- 781 製紙工
- 782 紙器製造工
- 783 紙製品製造工
- 78V その他のパルプ・紙・紙製品製造作業者

79 印刷・製本作業者
- 790 製版工
- 791 文選工，植字工
- 792 印刷工
- 793 製本工
- 79V その他の印刷・製本作業者

7V ゴム・プラスチック製品製造作業者
- 7V0 ゴム工
- 7V1 ゴム製品成形工
- 7V2 プラスチック製品成形工・加工工・仕上工
- 7VV その他のゴム・プラスチック製品製造作業者

80 かわ・かわ製品製造作業者
- 800 製革工
- 801 靴製造工・修理工
- 80V その他のかわ・かわ製品製造作業者

81 窯業・土石製品製造作業者
- 810 窯業原料工
- 811 ガラス製品成形工
- 812 陶磁器工
- 813 窯業絵付工
- 814 れんが・かわら・土管製造工
- 815 セメント製造工
- 816 セメント製品製造工
- 817 石工
- 81V その他の窯業・土石製品製造作業者

82～83 飲食料品製造作業者
- 820 精穀工，製粉工
- 821 パン・菓子製造工
- 822 めん類製造工
- 823 豆腐・こんにゃく・ふ製造工
- 824 製糖工
- 825 製茶工
- 826 みそ・しょう油製造工
- 827 缶詰・瓶詰食品製造工
- 828 酒類製造工
- 829 清涼飲料製造工
- 830 乳・乳製品製造工
- 831 水産物加工工
- 832 動植物油脂製造工
- 83V その他の飲食料品製造作業者

84 化学製品製造作業者
- 840 化学工
- 841 油脂加工工
- 84V その他の化学製品製造作業者

85 建設作業者
- 850 大工
- 851 屋根ふき工
- 852 左官
- 853 とび工
- 854 れんが積工，タイル張工
- 855 配管工，鉛工
- 856 畳工
- 857 土木工，舗装工
- 858 鉄道線路工事作業者
- 85V その他の建設作業者

86 定置機関・機械及び建設機械運転作業者
- 860 汽缶士
- 861 起重機・巻上機運転工
- 862 建設機械運転工
- 86V その他の定置機関・機械及び建設機械運転作業者

87 電気作業者
- 870 発電員，変電員
- 871 電線架線工
- 872 電気工事人
- 873 電信電話機器据付工・保守工
- 87V その他の電気作業者

88～89 その他の技能工，生産工程作業者
- 880 たばこ製造工
- 881 塗装工，画工，看板工
- 882 漆塗師，まき絵師
- 883 内張工
- 884 表具師
- 885 和傘・ちょうちん・うちわ製造工
- 886 貴金属・宝石・甲・角等細工工
- 887 印判師
- 888 洋傘組立工
- 889 かばん・袋物製造工
- 890 がん具製造工
- 891 製図工，写図工
- 892 現図工
- 893 包装工
- 894 映写技士
- 89V 他に分類されない技能工，生産工程作業者

8V 運搬労務作業者
- 8V0 船内・沿岸荷役作業者
- 8V1 陸上荷役・運搬作業者
- 8V2 倉庫作業員
- 8V3 配達員
- 8V4 荷造工

8V その他の労務作業者
- 8V5 清掃員
- 8VV 他に分類されない労務作業者

9 保安職業従事者

90 保安職業従事者
- 900 自衛官
- 901 警察官，海上保安官，鉄道公安員
- 902 消防員
- 903 看守，守衛，監視員
- 90V その他の保安職業従事者

V サービス職業従事者

V0 家事サービス職業従事者
- V00 家事手伝い(住込みの女子)
- V01 家政婦
- V0V その他の家事サービス職業従事者

V1～V2 個人サービス職業従事者
- V10 理容師
- V11 美容師
- V12 浴場従事者
- V13 クリーニング工，洗張職
- V14 調理人
- V15 バーテンダー
- V16 給仕従事者
- V17 接客社交係
- V18 芸者，ダンサー
- V19 娯楽場等の接客員
- V20 物品一時預り人，賃貸人
- V2V その他の個人サービス職業従事者

V3 その他のサービス職業従事者
- V30 旅館・貸席等の主人・番頭
- V31 下宿・アパートの管理人，舎監，寮母
- V32 広告宣伝員
- V3V 他に分類されないサービス職業従事者

N 分類不能の職業

9. 1990年 센서스를 爲한 試驗 調査 槪要(案)

昭和65年国勢調査調査区設定試験及び試験調査の概要（案）

昭和63年４月21日
総務庁統計局
統計センター

１　調査等の目的

昭和65年国勢調査の実施に先立ち，調査区設定の方法，調査事項の選定，調査票の様式，調査方法の適否その他同調査実施計画の立案に際し必要な諸事項を実地に検討することを目的とする。

２　検討事項

次の事項について検討する。

(1) 調査票の設計
(2) 調査事項
(3) 抽出調査の方法
(4) プライバシー保護等
(5) 不在世帯に対する調査方法
(6) 調査員の選考及び配置
(7) 調査区設定の方法
(8) その他

３　調査等の時期，地域等

(1) 調査区設定試験

設定期日	設定地域	設定調査区数
昭和63年８月１日（月）	岩手県　盛岡市	70調査区
	埼玉県　大宮市	70調査区
	東京都　渋谷区	75調査区
		（計215調査区）

(2) 試験調査

	期　　日	調　査　地　域	調　査　区　数
第一次	昭和63年６月13日（月）	東京都　調布市 石川県　金沢市	各市20調査区 （計40調査区）
第二次	昭和63年11月21日（月）	岩手県　盛岡市 大阪府　堺市	同　上
第三次	昭和64年２月13日（月）	埼玉県　大宮市 東京都　渋谷区 愛知県　名古屋市 広島県　広島市	各市区20調査区 （計80調査区）

(3) その他

試験調査の対象調査区は，岩手県盛岡市，埼玉県大宮市及び東京都渋谷区については調査区設定試験で設定された調査区の中から選定し，その他の地域については昭和60年国勢調査調査区の中から選定する。

4　調査等の系統

(1) 調査区設定試験

総務庁長官 — 実施都県知事 — 実施市区長 — 調査区設定員

(2) 試験調査

総務庁長官 — 実施都府県知事 — 実施市区長 — 調査員 — 世帯

（参考）　　昭和65年国勢調査試験調査（第1次~第3次）に係る検討事項の内容（案）

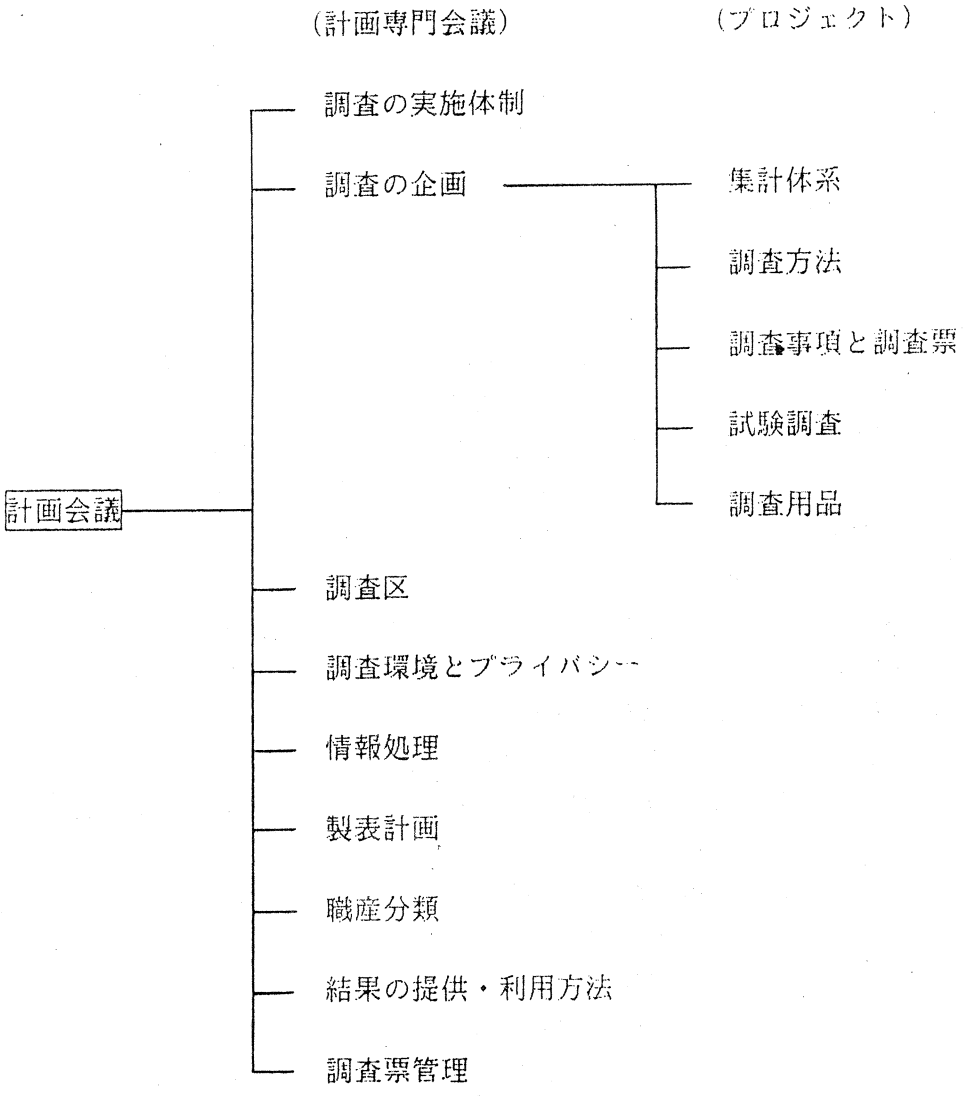
事　　項	第1次試験調査	第2次試験調査	第3次試験調査
1.主なねらい	プライバシー保護の観点から，調査票の形状・様式について検討するとともに，抽出調査方法の適否について検討を行う。	調査票の様式・設計，産業欄の世帯マーク化の可能性等について検討するとともに，密封用封筒の使用及び持参方式の適用等調査票の取集方法について検討を行う。	1次，2次の検討結果を総括するとともに「お願い」による調査票の封入提出方法について検討を行う。
2.検討事項 (1)調査票の設計	・プライバシー保護の観点から，むき出し感（記入内容が露出しているとの印象）を解消した調査票を設計する。具体的には次の2種類の調査票によりその検討を行う。 調査票 A …小冊子型 調査票 B …3つ折り型 ・職業産業欄をイメージ入力できるよう設計する。 ・イメージ入力に関連し，氏名欄の切り離しについて検討する。 ・調査員転記欄・記入欄の世帯によるマーク記入への切替え（世帯マーク化）について検討する。	・1次と同様，2種類の形状・様式の調査票により検討する。 ・産業の世帯マーク化（大分類程度）の可能性について検討する。 } 1次と同様とする。	・従来の調査票様式（B4で1枚）と小冊子型又は3つ折り型の2種類の様式により検討する。 ・その他，1次，2次の検討結果に基づき，総合的な検討を行う。
(2)調査事項	・新規調査事項の是非について検討する。 ・long form（調査票 A）とshort form（調査票 B）における調査事項の割振りの適否について検討する。	・調査項目数はどちらの調査票様式も同程度とする。なお，「教育の状況」と「世帯の収入の種類」は，片方の調査票のみで調査し，他の調査事項への影響を把握する。	・1次，2次の検討結果に基づいて決定する。
(3)抽出調査の方法	・1/5の調査区を抽出してlong form（調査票A）を配布し，残りの調査区にはshort form（調査票B）を配布する。	・2種類の調査票は，調査区単位に配布する。配布割合は1/2ずつとする。	
(4)ﾌﾟﾗｲﾊﾞｼｰ保護等	・調査票がﾌﾟﾗｲﾊﾞｼｰ保護を考慮した様式であるため1次試験調査においては，これのみの効果を測定する意味で密封用封筒あるいは「お願い方式」は用いずに調査票の配布・取集を行う。ただし，調査票をｾﾛﾃｰﾌﾟで封し，提出することは認める。	・調査票とともに密封用封筒を全世帯に配布し，密封希望者はそれに封入して調査員へ提出するものとする。また，市町村への持参も認める。	・60年調査で用いた「お願い方式」による。ただし，封入提出できることを60年調査より明確に記載する。

検討事項	第1次試験調査	第2次試験調査	第3次試験調査
(5)不在世帯に対する調査方法	・不在世帯用調査票は用いずに行う。 ・調査票の配布に当たっては，可能な場合は第三者に預け，それが困難な場合は郵便受等に入れておく。 ・取集時においても面接できない場合は，代理申告又は聞き取り調査を行う。	・不在世帯用調査票及び提出用封筒を用いる。 ・配布方法は，1次と同様とする。 ・取集は原則として調査員によるが，それが困難な場合は，市町村への持参も認める。 ・調査票が回収されない場合は，1次と同様，代理申告又は聞き取り調査を行う。	・不在世帯用調査票及び提出用封筒を用いる。 ・配布方法は，1次と同様とする。 ・取集は可能な限り世帯の人に面接して回収するように努める。 ・面接できない場合は，代理申告又は聞き取り調査を行う。
(6)調査員の選考及び配置	・調査員の配置は，顔見知り調査員とそうでない調査員とを考慮して行う。 ・調査員への有効な指導方法について検討する。	1次と同様とする。	・調査員の複数調査区受持ちの可否について検討する。
(7)その他	・世帯に対してアンケート調査を行い，調査事項の適否，調査票の設計の適否，調査員の配置方法などについての意見を把握する。		

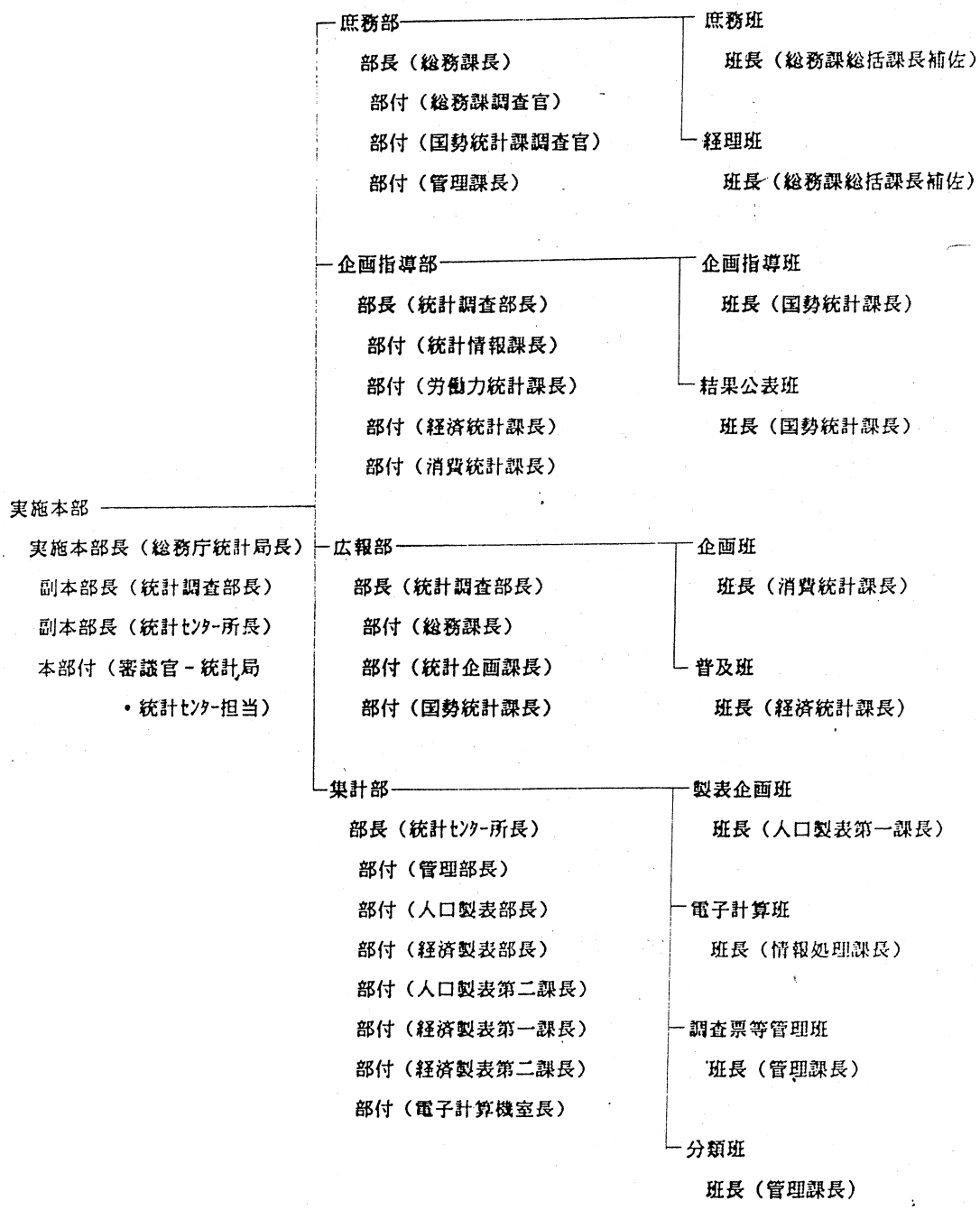
(注) 調査区設定試験では，実地に調査区を設定することによりその設定基準，設定方法等について検討する。
なお，試験設定された調査区は，第2次及び第3次試験調査の調査区としては用いる

10. 1990年 센서스 計劃會議 組織圖

昭和65年国勢調査計画会議組織図



昭和６０年国勢調査実施本部組織



昭和６５年国勢調査計画会議等の開催要領

昭和62年2月16日

（統計局長
決定
統計センター所長）

1　目的

昭和６５年国勢調査の実施に関する基本的諸問題について審議し，同調査の基本計画を策定するため，統計局及び統計センター並びに官房審議官(統計局・統計センター担当)合同による昭和６５年国勢調査計画会議(以下「計画会議」という。)及び同調査計画専門会議(以下「専門会議」という。)を開催する。

2　審議事項等

(1)　計画会議は，統計局長主宰の下に，昭和６５年国勢調査の実施に関する基本的諸問題について審議し，同調査の基本計画を策定する。

(2)　専門会議は，統計局長が指名した者の主宰の下に，計画会議から付託された案件を調査，審議し，その結果を計画会議に報告する。

3　構成員

(1)　計画会議の構成員は，次のとおりとする。

統計局長
統計調査部長
総務課長
統計情報課長
国勢統計課長

統計センター所長
管理部長
人口製表部長
管理課長
情報処理課長
電子計算機室長
人口製表第一課長

官房審議官(統計局・統計センター担当)

(2)　専門会議の構成員は，統計局及び統計センターの職員のうちから統計局長が指名した職員とする。

(3)　各会議の主宰者は，必要に応じ構成員以外の統計局及び統計センターの職員を出席させることができる。

4　庶務

会議の庶務は，国勢統計課において処理する。

昭和６０年国勢調査実施本部設置要領

昭和５９年１０月１日
統計局長
決定
統計センター所長

1　目　的

昭和６０年国勢調査の実施に際し，総務庁統計局及び統計センターを挙げてその処理に当たり，強力かつ効果的な調査実施体制を整えるため，総務庁統計局に昭和６０年国勢調査実施本部（以下「実施本部」という。）を置く。

2　実施本部長等

(1)　実施本部に，実施本部長，副本部長及び本部付を置く。

(2)　実施本部長は，総務庁統計局長とし，実施本部の事務を統括する。

(3)　副本部長は，実施本部長を補佐し，実施本部の事務を整理する。

(4)　本部付は，実施本部長を補佐する。

3　部

(1)　実施本部に庶務部，企画指導部，広報部及び集計部を置く。

(2)　庶務部は，国勢調査の実施に関する人事，文書，予算，会計，公務災害及び他部の所管に属しない事務を行う。

(3)　企画指導部は，国勢調査の企画，地方指導（庶務部で行う地方指導を除く。）並びに結果の編成及び公表に関する事務を行う。

(4)　広報部は，国勢調査の広報に関する事務を行う。

(5)　集計部は，国勢調査の製表の計画及び実施に関する事務を行う。

(6)　各部に，部長及び部付を置く。

(7)　部長は，部の事務を掌理する。

(8)　部付は，部の事務について部長を補佐する。

4　班

(1)　庶務部に，庶務班及び経理班を，企画指導部に，企画指導班及び結果公表班を，広報部に，企画班及び普及班を，集計部に，製表企画班，電子計算班，調査票等管理班及び分類班を置く。

(2)　各班に，班長及び班員を置く。

(3)　班長は，部長の命を受けて，班の事務を処理する。

(4)　班員は，班長の命を受けて，班の事務に従事する。

5　構成員

(1)　副本部長，本部付，部長，部付及び班長は，別紙のとおりとする。

(2)　班員は，部長が別に指名する。

6　その他

(1)　この要領は，昭和５９年１０月１日から実施する。

(2)　昭和６０年国勢調査計画委員会は，廃止する。

11. 1990年 센서스를 爲한 調査票 入力機器 裝置仕樣書

昭和６２年６月２９日

調査票入力機器装置仕様書

仕様項目	発注仕様の内容
1．調査票	
(1) 用紙	(1) Ｂ全判90～110kg のＯＣＲ規格用紙が使用できること。
(2) 帳票の大きさ	(2) Ｂ５判(257㎜ x 182㎜) からＢ４判(364㎜ x 257㎜) までの帳票が使用できること。
(3) 印刷色	(3) 印刷色は，ＰＣＳ値が最高 0.15 のものまで使用できるものとする。（使用できる印刷色（ドロップアウトカラー）の種類を多くすること。） $PCSp=\frac{Rw-Rp}{Rw}$ p：　測定点 Rw：直径0.2 ㎜の円形光で測定した白紙部分の反射率 Rp：同じくpにおける反射率
(4) 裁断の誤差	(4) 帳票印刷時の裁断誤差の許容範囲は，0.3㎜以下を前提とする。アライニングエッジの反対側は，世帯での記入後，入力までの間に断裁機等又はあらかじめ調査票に付加したミシン目等により切り離した上，フィードするものとする。この際の切断の誤差の許容範囲は 1.5　以下を前提とする。
(5) 帳票設計	
ｱ．マーク枠の寸法等	(ｱ) マーク枠の大きさは（3 ～ 4㎜）×（1.5～ 2㎜）とする。同一の帳票の中に異なった大きさのマーク枠が存在してよいものとする。 (ｲ) マーク枠の長手方向がアライニングエッジに直角となる形で設計が可能なこと。 (ｳ) マーク間隔は，マーク枠の長手方向についてはマークの中心間の距離を最低 5～6㎜ とする。マーク枠の短い方向については、マーク枠の端から端までの距離を最低 1㎜とする。 (ｴ) マークの形状はマーク枠の長手方向の端から端までの「－」を原則とし、枠内のぬりつぶしでも読み取り可能とすること。 (ｵ) 筆記具は鉛筆(HB)とする。 (ｶ) 異種帳票を区別するためのインデックスマークエリア（１か所）を設定すること。 （参考）マークが裏面にぬけることを防止するために，帳票の表裏のマークが重ならないよう帳票を設計することが可能である。
ｲ．タイミングマーク	タイミングマークエリアは，アライニングエッジから7㎜ 以下とする。また，インデックスマークエリアは，リーディングエッジから15㎜以下とする。

仕様項目	発注仕様の内容
2．マーク読み取り機能	
(1) 区分読み取り	(1) 区分読み取り（調査票に数行又は数列からなる矩形の読み取り区分を設定し，その区分ごとにデータの読み取りを行うこと）の機能を有すること。（帳票表裏とも約 100区分以上）
(2) 濃淡比較機能	(2) 択一項目の読み取り区分において，2つ以上のマークがあった場合，濃淡比較機能により濃淡の比較を行い，最も濃いマークを検出して出力する。比較は，各マークの濃度レベルを少なくとも 4段階（ブランク含む）以上に分けて行う。二つ以上のマークがいずれも一定以上の濃度を有し，その濃淡の差が判定できないほど小さい場合には，それらすべてをマルチマークとして出力する。多重回答項目の読み取り区分においては，一定基準以上の濃度を有するマークをすべて出力する。
(3) 濃度レベルの出力	(3) マークごとに濃度レベルの出力を可能とする。その場合，濃度レベルは4段階（ブランクを含む）とし，必要に応じレベル調整及び標準シートにより各レベルの検証が可能なこと。
(4) 異種帳票読み取り	(4) 異種帳票（10種類以上）が同時に読み取り可能なこと。
(5) 読み取りの安定性	(5) あらかじめ定めたOMRテスト用紙を用いた読み取りレベルのテストを行うことを可能とし，そのテスト結果は，常時，一定の許容範囲内におさまること。
3．イメージ読み取り機能	(1) 調査票上の指定された範囲内のエリアをイメージとして読み取ることが可能なこと。読み取ったデータは光ディスク装置上に書き出すことが可能なこと。 (2) イメージ入力のエリアは，少なくとも片面に設定でき，その面積の合計は少なくとも幅175㎜ x 長さ70㎜とする。 (3) イメージの解像度は1㎜ あたり6 画素とし，各画素の読み取り階調は2階調（白黒）とする。 (4) 入力されたイメージデータは，当局での集計業務において，端末装置の画面上に鮮明に表示できること。 (5) 将来，イメージ入力エリアを両面に設定できるよう，拡張の可能性を有すること。
4．機械的条件	
(1) 読み取り速度	(1) A4判で 180枚／分以上，B4判で 150枚／分以上（いずれもハンドリングタイムを除く）読み取ること。
(2) 読み取り精度	(2) 正常な用紙についてのリジェクト率が0.01%以下であること
(3) 両面同時読み取り	(3) 帳票の両面に印刷，記入したマークを1回のフィードで連続して読み取りできること。
(4) 出力媒体	(4) 出力媒体には，マークデータについては磁気テープが，イメージデータについては光ディスクが使用できること。この光ディスクは，当局が集計業務に使用するコンピュータシステムの下で利用が可能なこと。
(5) 用紙の汚染等	(5) 用紙の汚れに強く，折れ，シワも極力誤読しないこと。
(6) ホッパー	(6) 数量は1個とし，容量は 1,000枚以上であること。 ホッパーへの給紙は，機械を停止しないで可能なこと。
（次ページに続く）	

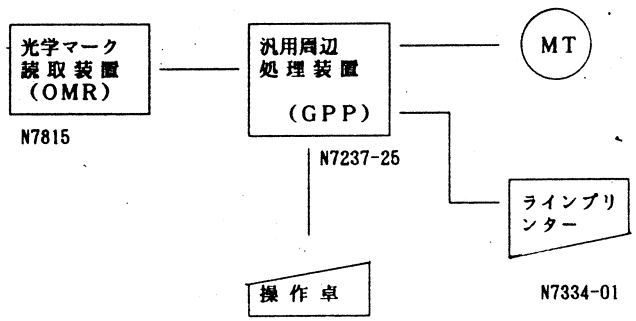
仕様項目	発注仕様の内容
4．機械的条件（続き）	
(7) スタッカー	(7) 数量は3個とし，容量はそれぞれ次のとおりとする。 ① アクセプト(1)　500枚以上 ② アクセプト(2)　500枚以上 ③ リジェクト　200枚以上
(8) 帳票の配列	(8) 帳票の配列は，入力前と入力後とで同じ向きで，同じ順序であること。
5．チェック機能	
(1) 異種帳票のチェック	(1) 異種帳票（10種類以上）について，帳票の種類に応じた読み取りを行い，指示されたスタッカーに入れられること。
(2) マーキングチェック	(2) 帳票の種類ごとに規定したタイミングマーク数のチェック（等しい，多い，少ない，ない）を行い，ユーザーの指示したスタッカーに帳票を入れ，出力レコードにそのシンボルを付加することができること。
(3) 機械的チェック	(3) 機械的チェック • ジャムが発生した場合は，フィードを停止し、再入力を行えるようにする。 また，ジャムが発生した帳票が読み取り部を過ぎている場合には，そのレコードにシンボルをつけて出力することもできること。 • ダブルフィードをチェックし，ダブルフィードが発生した場合はスタッカーに落とし，更に指定によりフィードを停止することを可能とする。この場合，レコードの出力を行うか否かはオペレーターの指示により行い，出力する場合はそのレコードにシンボルをつける。 • ホッパーエンプティ又はスタッカーフルが発生した場合はフィードを停止し，ランプ等でその状態を表示する。
(4) 読取状況チェックカウントリスト	(4) 読取状況チェックカウントリスト • 読取状況を監視するために、一定間隔で各種カウントを操作画面又は操作員用のプリンターへ出力する。 各種カウント：入力総枚数，帳票別入力枚数，スタッカー別枚数，マーキングチェックでの「等しい多い，少ない，ない」別の枚数，ジャム、ダブルフィードの回数の一定間隔内合計数入力終了時までの累計 一定間隔：通常は，500枚の帳票を入力した時とする。機器，帳票の具合等によりオペレーターが任意に変更できるものとする。 • 出力媒体（磁気テープ）に書き出したレコードカウントの出力 前述の読取状況チェックのための各種カウント以外に，出力したレコードの各種カウント，及び指示により帳票の種類別，表裏別，マークポジション別にマークの有無別と濃度レベル別カウントをプリンターへ出力する。

仕様項目	発注仕様の内容
6．その他	
(1) 操作法	(1) 機器の操作は安全かつ容易であり，専任職員でなくても操作できること。 テープユニットはオートローディング方式とする。
(2) 外形・寸法	(2) 横 200cm，縦65cm，高さ 150cm程度以下の大きさであること
(3) 設置条件	(3) 通常のオフィス環境において稼働が可能なこと。特に，騒音及び発熱は低いことが望ましく，通常のＯＡ機器程度とする。
(4) メンテナンス・耐久性	(4) 1台につき，多くても月2回（帳票 100万枚に1回）半日程度の保守で済み，耐久性に優れていること。
(5) トラブル発生時の処置	(5) トラブルが発生した場合の回復が容易であること。自己故障診断機能及び故障予知機能を有すること。
(6) 塵埃等の処理	(6) 入力時に発生した塵埃等を自動クリーニング機能等により容易に処理する機能を有すること。
(7) プログラム	(7) プログラム • 入力帳票に合わせた入力・編集プログラムを容易に定義作成できる簡易言語（ジェネレーター）を有すること。 • イメージリスト（マークポジションごとのマークの有無，濃度レベルのプリント）とポジション別マークプリント等の出力ができること。 • マークありと判定される濃度レベルをプログラムにより任意に選択可能なこと。 • 任意の時点で業務を中断し，テストデータにより各マークごとの読み取り精度のチェックを行い，再び業務に戻れること。 • 入力作業がトラブルにより異常中断した場合に，出力データ（磁気テープを指す）をホストコンピュータで正常に読み取れるように，最後のレコードの次でファイルをクローズする（テープマーク等を書く），また，直前の区切り（調査区の切れ目）までクローズする等の機能を有すること。 • 出力レコードへ特定情報（入力年月日，集計区分コード，エラーシンボル，作業区分コード等）を入力レコードの先頭に付加して出力すること。 • エラーカウント（例 タイミングマークの多い，少ない）に指定した一定間隔内で，指示した値を超えた場合はフィードを停止し，理由及び前述の読取状況チェックカウントリストを出力すること。
(8) その他	(8) その他 本仕様書における仕様項目の詳細及び，本仕様書に指定されていない事項については，当局からの指示によるものとする。

（注） 本入力機器を運用するための周辺装置は、発注の対象となる機器には含まれない。

N7237 OMRシステム

1. システム構成



※ OMR (Optical Mark Reader)
GPP (General Purpose Peripheral Processor)

2. 主な性能及び機能

区 分	性能及び機能
記憶容量	64 Kword
読取帳票サイズ	最大B4判～最小B5判
読取帳票紙質	OCR規格用紙 B全判90～110 kg
読取速度	200 枚/ 分(B4判ｻｲｽﾞ : 両面同時読取)
	250 枚/ 分(B5判ｻｲｽﾞ : 両面同時読取)
マーク数	32個(ﾃﾞｰﾀ・ﾏｰｸ) 最大60行 2個(ﾀｲﾐﾝｸﾞ・ﾏｰｸ) 1個だけ使用している
マーク枠の大きさ	4mm× 1～ 2mm
マークピッチ	7mm
ホッパー容量	1000枚
スタッカー容量	500 枚 (ｱｸｾﾌﾟﾄ) 200 枚(ﾘｼﾞｪｸﾄ)
外形寸法(OMR)	横 220cm 縦 76.2 cm 高さ 130cm
異種帳票の読取	最大５種類まで可能
濃淡比較機能	ダブルマークを検出したとき，そのマークの濃淡を比較して，反射率の差が３０％以上ある場合には，濃いマークだけをマークとして読み取る。

12. Issues Related to Data Processing System of Population Census

Eleventh Population Census Conference
9-13 February 1987
Sydney and Canberra

ISSUES RELATED TO DATA PROCESSING SYSTEM OF POPULATION CENSUS

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Abstract

The Statistics Center has introduced several kinds of approaches or procedures for the data processing of the 1985 Population Census. This paper presents the experience and some analysis on these approaches or procedures in four stages out of all the tabulation procedures in the Statistics Center.

Part I: Quality control in processing census data

Quality control approaches have been introduced in coding work of industry and occupation. The complete verification in the early stage and the sampling inspection in the later stage have been carried out to prevent possible errors and to check the level of error rates. The final figures of error rates in the one-percent sample tabulation are below the control levels in both classifications, and show the success of the quality control approaches in the tabulation. The paper shows that there are certain correlations between the productivity and the quality of work, and between quality of work and the level of interest in the regular team meetings and weekly Quality Control Newsletters. The tendency of coding errors in industry and occupation is also shown by the results of the sampling inspection in the one-percent sample tabulation.

Part II: Optical Mark Reader

The Optical Character Readers or Optical Mark Readers have been used as the input equipment for the censuses in Japan since the 1965 Census. The four sets of OMR systems have been installed for the 1985 Census. Besides explaining the features and the function, the paper also shows the five-year development plan and the basic specifications on input equipment for the next 1990 Census. The basic design proposals from major manufacturers will be submitted to the Statistics Center in March, 1987.

Part III: Data correction by on-line procedures

In the previous censuses, correction of errors and omission of individual data had been mainly conducted by batch procedures using the corrected OMR sheets. The OMR correction procedures have been changed to the on-line procedures to increase efficiency and to overcome the reduction of human resources available for the tabulation work. The paper shows the operation procedures, and the results of the comparison between the OMR procedures and the on-line procedures on productivity.

Part IV: Examination of statistical tables

The tabulated statistical tables need to be examined from various points of view before the official release. There are two types of examinations of statistical tables. The first type is the mechanical examination within or between tables of the census such as verification of the total figures, or comparison of related figures between tables. The second type is the analytical examination such as comparison with data in the previous census, or comparison with data of related statistics. The paper introduces the procedures of both examinations.

Through all these efforts, the tabulation work of the 1985 Census has been performed without sacrificing the quality of census results nor the timeliness of the publication within very limited human resources.

The 1985 Population Census of Japan

1. The quinquennial population census was taken as of 1 October 1985 covering the total population of 121 million. The field enumeration of the census was carried out by about 800,000 enumerators hired on a temporary basis for this purpose. One enumeration district (ED), covering 50 households on the average, was assigned to each enumerator. The enumerator distributed the mark sheet-type census questionnaire to every household in the ED during the week prior to the census date and asked the households to complete the questionnaire. The enumerator then collected the completed questionnaires from the households and made on-the-spot checks. The enumerator prepared the List of Households, giving the name of household heads, the number of household members by sex and other necessary items, and drew the Summary Map of the Enumeration District, showing the location of households and landmarks.

2. Supervisors were appointed, one for each 15 enumerators, to supervise the enumerator's work. They thoroughly scrutinized the entries of questionnaires submitted by enumerators. Completed questionnaires were then sent to the municipal offices, where the household and population counts in each ED were checked on the List of Households and the entries of questionnaires. Municipal offices compiled the Municipal Summary Sheets which gave the numbers of households and population by sex for every ED. The prefectural governments collected all the questionnaires and relevant documents from the municipal offices and checked those materials. After careful checking of the household and population counts, the prefectural governments compiled the Prefectural Summary Sheets, giving the number of households and population by sex for every city, town and village.

3. All the questionnaires were then submitted to the Statistics Center for processing. The Statistics Bureau of the Management and Coordination Agency is responsible for the execution of the census, and the Statistics Center of the same Agency is responsible for the tabulation of census data. The work of field operations is entrusted to the prefectural governments and municipalities. Processing of census data at the Statistics Center will be carried out in several phases, as follows;

(1) Prompt tabulation

(1.1) Population counts from summary sheets
Preliminary counts of households and population by sex for all Japan, prefectures, cities, towns and villages, based on the municipal and prefectural summary sheets compiled by local governments.
Date of release: 24 December 1985

(1.2) Prompt sample tabulation
One-percent sample tabulation of basic tables for all Japan and for each prefecture, covering all topics including minor groups of industrial and occupational classification.
Date of release: 30 May 1986

(2) Basic complete tabulation

(2.1) First basic complete tabulation

Final counts of households and population as well as basic demographic and household characteristics for up to the level of municipalities.

Date of release: June - Nov. 1986

(2.2) Second basic complete tabulation

Basic results concerning economic characteristics including major groups of industrial classification for the level of municipalities.

Date of release: Dec. 1986 - Sept. 1987

(2.3) Third basic complete tabulation

Basic results concerning economic characteristics including major groups of industrial and occupational classifications for the level of municipalities.

Date of release: Feb. - Sept. 1988

(3) Detailed sample tabulation

Detailed sample tabulation with a sampling ratio of approximately 20 percent, covering multiple cross-classified tables including minor groups of industrial and occupational classification for up to the level of prefectures in principle.

Date of release: Feb. - Nov. 1989

(4) Tabulation on commuting

Tabulation of data on place of schooling and place of work will be made in the second and third basic complete tabulations and in the detailed sample tabulation.

(5) Tabulation by enumeration district

Tabulation of data on enumeration districts will be made in the first and second basic complete tabulation.

(6) Mesh statistics tabulation

(7) Census tract tabulation

(8) Special tabulation

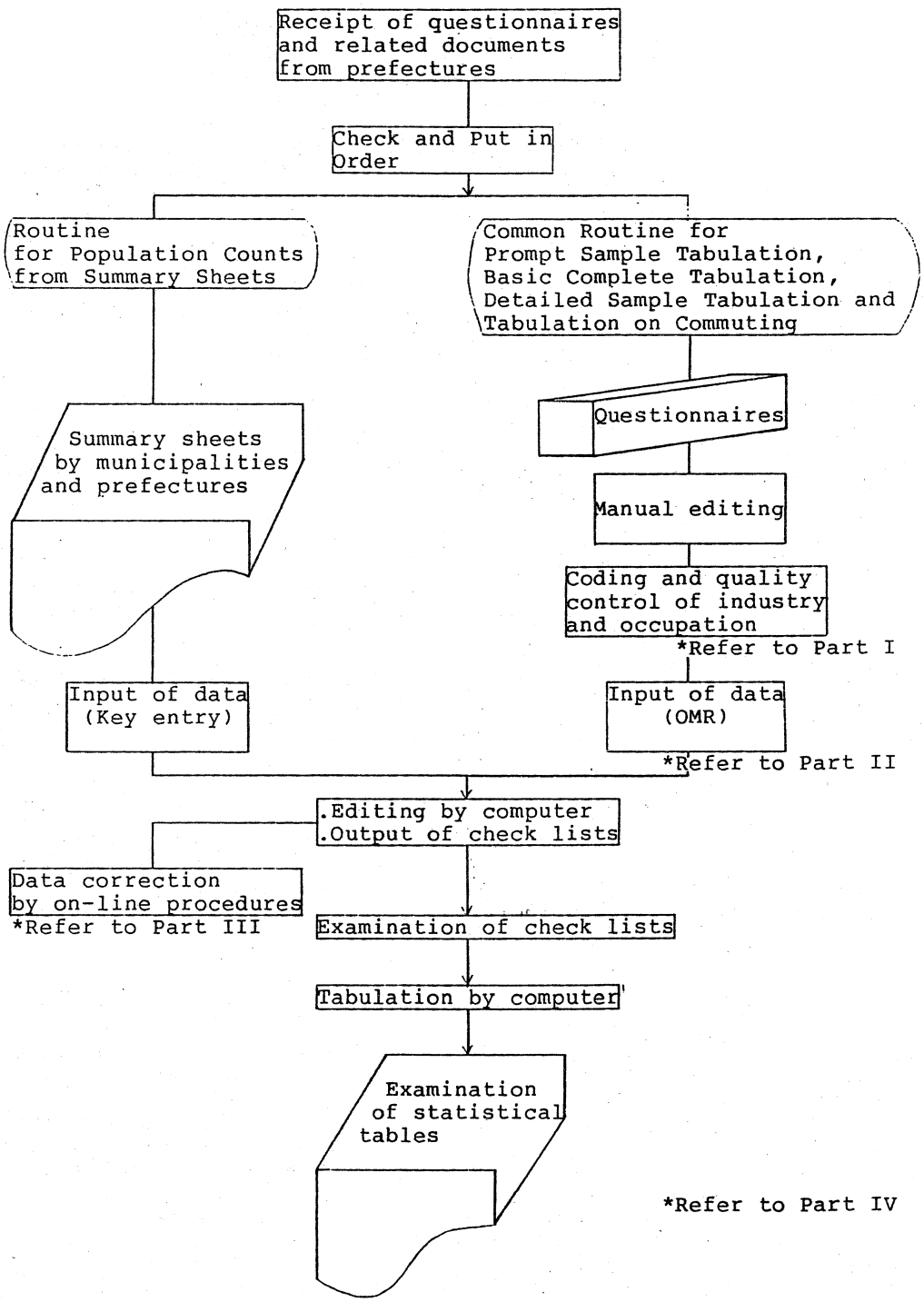
4. The Statistics Center accomplishes the vast amount of the tabulation work according to the priorities which have been assigned to statistical tables, taking into consideration its personnel and computer resources as well as various needs for the data.

To obtain the final population figures as promptly as possible, the OMR questionnaires to the computer before the stage of coding on the industrial and occupational classifications, to get the data on basic demographic and household characteristics. The second and third OMR inputs are then made after coding industrial and occupational activities respectively.

The tabulation of the 1985 Census has been processed as the following figure 1. This paper presents the experience and some analysis on new system in four stages out of all the tabulation procedures.

Part I Quality control in processing census data
Part II Optical Mark Reader
Part III Data correction by on-line procedures
Part IV Examination of statistical tables

Figure 1. Tabulation procedures



Part I: Quality control in processing census data

1. The Statistics Center has introduced quality control approaches in processing the 1985 population census data. In designing a quality control plan for processing the 1985 census data, it was considered desirable to adopt total quality control approaches in tabulation work to the greatest extent possible. It was thought essential for achieving a high quality of data that everyone engaged in the census tabulation should be conscious of the importance of the quality of statistics. The quality control plan has been implemented in the following three stages:

(1) Detailed analysis of data on coding errors of industry and occupation in the 1980 Census and pilot surveys for 1985 Census,
(2) Formulation of measures to be taken in the preparatory stage, and
(3) Formulation of measures to be taken in the coding work.

It was decided that quality control approaches in processing the 1985 census data should be introduced only in coding work of industry and occupation, because errors in data on other topics could be almost completely detected and corrected through off-codes and consistency checks by computers.

2. In the 1980 Census, quality control approaches were used in a limited scope to assess the degree of accuracy in coding industry and occupation by sampling inspection and to obtain data which might be useful for future plans of quality control. Based on the experiences gained in the 1980 Census, quality control approaches in the 1985 Census were carefully planned and implemented. In the quality control approaches in the 1985 Census, more emphasis has been placed on prevention of possible errors in the early stages of the operation than on detection and correction of errors by sampling inspection in the later stages. In the coding work of industry and occupation, the importance of prompt feedback of information to coders on coding errors and relevant instructions based on the analysis of the type and nature of errors is emphasized.

3. After editing the questionnaires and coding industry and occupation have been conducted, the Evaluation Group carries out a sampling inspection of codes. The Evaluatin Group is composed of 15 staff members who have sufficient knowledge and experience in industrial and occupational classifications. The Group is responsible for the following activities:

(1) Sampling inspection of industry and occupation codes and compilation of data on coding errors,
(2) Dealing with questionable cases of coding and answering questions raised by coders but not solved by their leaders,
(3) Establishing standard rules for coding, and
(4) Conduct of training of coders.

The Group works very closely with the Classification Unit.

The Group keeps detailed records of errors detected by sampling inspection and analyses their nature and cause. Based on the analysis, the Group prepares supplementary instructions for coding, including examples of typical or serious errors and

remarks on treatment of doubtful cases. These instructions are distributed to coders.

4. Each unit in charge of editing and coding consists of 3 or 4 teams. Each team composed of 6 to 8 persons is encouraged to hold a brief meeting of 15 minutes every Wednesday morning to discuss problems pertinent to coding industry and occupation. The aim of the meeting is to increase the coders' knowledge and capability through discussions among themselves. Reference materials prepared by the Evaluation Group and examples of common errors are provided for the teams as working papers for discussion. Questions raised by members but unsolved at the meeting are referred to the Evaluation Group for clarification.

5. Another method of disseminating information is the distribution of the Quality Control Newsletter to coders. The newsletter is prepared by the QC Team and has been issued every Monday since January 1986. The newsletter reports on the degree of accuracy in coding achieved with the data on error rates during the last week and the week before last, examples of typical errors detected during the last week, and topics which may help coders in understanding the classification of certain industries or occupations. The newsletter thus provides useful information for discussion in the regular team meetings.

6. The Quality Control Committee, the Quality Control Team and the Evaluation Group have been set up in the Statistics Center to introduce and effectively implement quality control in processing work of the 1985 Census.

The QC Committee is chaired by the Director-General of the Statistics Center, and is composed of the Directors of the 3 Departments and the 2 Divisions concerned. The functions of the committee are:

(1) Decision-making on policy matters of quality control,
(2) Evaluation of accuracy of census data,
(3) Review of fundamental matters concerning contents of reference materials provided for the staff and tabulation methods, and
(4) Review of quality control approaches.

The committee meets once or twice a month.

The QC Team serves as the secretariat of the QC Committee. This project team is composed of the Assistant Director of the First Population Statistics Tabulation Division, the Chief of the Research Unit in charge of quality control, the chief of the Evaluation Group and the Chief of the Classification Unit. The QC Team performs the following functions:

(1) Examination of quality control policies,
(2) Analysis of coding errors on the basis of the results of inspection, assessment of the degree of accuracy achieved, and preparation of control charts,
(3) Promotions of improvements of materials on coding and methods of tabulation, and formulation of proposals for improvements,
(4) Analysis and evaluation of quality control activities, and
(5) Preparation of working documents for the QC Committee and implementation of instructions given by the Committee.

7. One problem is how to define control levels. For industry and occupation data, it is the degree of accuracy of data on the employed persons by industry or occupation that has to be controlled. However, it is too complicated to use those measures in practice. It was considered more practical to use the rates of occurrence of errors in coding for all industries or occupations as a whole. In the one-percent sample tabulation, the control levels of error rates were set as follows:

2.0 percent for minor groups of industry, and
1.5 percent for minor groups of occupation.

Corresponding error rates achieved in the 1980 Census were 2.30 percent for minor groups of industry and 1.79 percent for minor groups of occupation in the one-percent sample tabulation, and 1.33 percent for industry and 1.05 percent for occupation in the twenty-percent sample detailed tabulation.

8. The upper control limit (UCL) is calculated by the following formula:

$$UCL = Po + 3 \times \sqrt{Po(1-Po)/n}$$

where Po is a control level and n is the number of estimated employed persons in a sample lot for coding inspection.

When any of the following cases occur while calculating the error rate from a lot from the results of the sampling inspection, appropriate measures are taken.

(1) The error rate exceeded the UCL, and
(2) Even though the error rate remained below the UCL, the rate showed an increasing trend or the rate close to the UCL appeared consecutively.

In these cases, the causes of errors are investigated and an interim training session is organized to give special instructions to coders. However, even though the error rate exceeded the UCL for a certain lot, there was no time allowed to reject the lot and have the coding redone.

Quality control in the one-percent sample tabulation

9. The one-percent sample tabulation covers approximately 410,000 questionnaires. Each questionnaire has columns for five persons. These questionnaires are kept separetely from the remaining 99 percent of questionnaires. Manual work before data entry by Optical Mark Readers involves data editing and coding of minor groups of industry and occupation (See table 1 for the number of codes). About 120 persons of 6 units were engaged in this work. Each unit consists of 3 or 4 teams, each composed of 6 to 8 persons.

10. After editing of questionnaires and coding of minor groups of industry and occupation had been conducted, coding staff in different teams of the same unit verified the codes on a complete basis (complete verification). Those who verify the codes were asked to keep records of the original and the corrected codes when corrections have been made.

The Evaluation Group then carried out a sampling inspection of codes on a 20 percent sample basis.

11. Manual editing and coding work in the one-percent sample tabulation started in November, 1985 and continued through April, 1986. Table 2 shows the error rates of industry and

occupation codes in the one-percent sample tabulation. Error rates detected by complete verification were 1.97 percent for minor groups of industry and 2.33 percent for minor groups of occupation. But after corrections by complete verification, error rates detected by sampling inspection for corresponding questionnaires went down to 1.42 percent for industry and 1.44 percent for occupation respectively. These final figures of the coding of the one-percent sample tabulation, which are below the control levels of both 2.0 percent for industry and 1.5 percent for occupation, show the success of the quality controls.

12. Table 3-1 shows the trend of error rates by period. In the first term during November and December 1985, error rates detected by complete verification (A) were 1.95 percent for minor groups of industry. Error rates detected by sampling inspection (B) in the same term were 1.85 percent for industry. This means that the error rate for original codes was estimated to be 3.80 percent (A+B) for industry, and the error rate after corrections by complete verification was 1.85 percent (B) for industry. In the same manner, 4.07 percent (A+B) in the first term was the error rate for original codes for occupation, and 1.87 percent (B) was the error rate after corrections by complete verification for occupation. There was a slight decline in error rates for original coding of both industry and occupation (A+B) under the influence of the decline in error rates detected by sampling inspection (B). Error of coding was detected and corrected in more than half of the cases by complete verification, 51.3 - 60.7 percent for industry and 54.1 - 60.7 percent for occupation. As a consequence, clear improvements in the accuracy of coding were finally achieved within the control levels of both industry and occupation.

The estimated error rate based on the results of the sampling inspection achieved lower levels than the control level of 2.0 percent for industry codes. For occupation codes, however, the weekly rates were higher than the control level of 1.5 percent until the week from the 20 to the 25 of January, 1986, as you can see in table 3-2, the second interim training session was conducted. Since the last week of January, 1986, the error rate declined below the control level of occupation.

13. Table 4-1 shows the error rates of industry and occupation codes for five units engaged in manual editing and coding work in the one-percent sample tabulation. Error rates in every unit were decreasing period by period in either industry and occupation codes, but the error rates in Units 1 and 2 were high compared with the other three units. Error rates of occupation codes in Units 1, 2 and 3 exceeded the control level of 1.5 percent for minor groups of occupation.

Table 5 shows the data on productivity by unit. The average number of questionnaires processed per day per coding staff member was 77 for editing and coding and 143 for complete verification of codes, yielding the average of 50. The average productivity was highest for Unit 5, followed by Units 3 and 4, and lowest for Units 1 and 2. On the other hand, error rates by sampling inspection was lowest in Unit 5 and highest in Unit 1 for both industry and occupation codes. Therefore, it seems that there is a slight positive correlation between productivity and accuracy of coding work. This suggests that there seems to be a differential in the capability of coding work among the units.

14. The effectiveness of regular team meetings and the usefulness of the weekly Quality Control Newsletter in coding work was assessed on the basis of the coders' opinions. As can be seen in table 6-1, most coders felt strongly to moderately that the QC Newsletter is useful for their work. The effectiveness of team meetings was also acknowledged by the coders. But at the early stage of coding in the one-percent tabulation, there were diverse opinions among coders in different units as shown in table 6-2. All coders except those in Unit 1 felt that the team meeting was effective in their work. After completion of the one-percent sample tabulation, the Unit 1 coders felt that the QC Newsletter was ineffective.

From those findings, it was felt that the lack of interest of the members of Unit 1 in making collective efforts to achieve a high quality of coding work might be relevant to the poor performance of the Unit and appropriate measures such as staff retraining will have to be taken in order that this Unit improve its productivity and quality of work.

Tendency of coding errors in industry and occupation

15. Coding errors by major groups of industrial classification in the one-percent tabulation are shown in table 7 by corrected codes. The total number of errors was 1,578 of which 630 were in (F) Manufacturing, 403 in (I) Wholesale and Retail Trade, and Eating and Drinking Places and 310 in (L) Services.

70 percent of all coding errors occurred in those 3 major groups of industry due to the number of employed persons in these groups.

The total number of errors, 1,578, was divided into 573 errors between major groups, 638 errors between medium groups and 367 errors between minor groups. Correction from original codes of major groups to different codes of major groups of industry was about one-third of the total number of errors. The remaining two-thirds consisted of the errors in the codes of medium groups and minor groups within major groups of industry, and they were not influential in the tabulation resutls by major groups of industry.

16. Influence over the tabulation results in each major group (for example, A) owing to coding errors is the difference between (1) the number of errors coded a certain major group (for example, A) although the correct response should have fallen into the category of other major groups (for example, B-L), and (2) the number of errors coded to other major groups (B-L) although the correct response should have fallen into a major group (A). To make sure of this point, occurrences of mutual coding errors between major groups of industry are shown by the combination of the original codes and corrected codes in table 8. Most occurrences of coding errors between major groups are 141 (=73+68) those between (F) Manufacturing and (I) Wholesale and Retail Trade, and Eating and Drinking Places. Net errors in (F) Manufacturing caused by mutual coding errors between (F) and (I) major groups was only 5 (=73-68). Next to this combination, 53 (=31+22) errors between (F) and (L) Services, 48 (=26+22) errors between (I) and (L) and 33 (=20+13) errors between (L) and (M) Governments not Elsewhere Classified follows.

Table 9 shows the total net increases of coding errors in each major group by mutual coding errors between major groups.

Rates of net increases of coding errors are only 0.07 percent in (F), 0.10 percent in (I), 0.14 percent in (L), etc..

Tables 10, 11 and 12 are prepared for occupation in the same manner as industry.

17. Although it is not appropriate, for various reasons, to analyse data on coding errors by individual coders, it seems necessary to identify problems which each unit may have, and to take appropriate measures for improving the quality of coding work unit by unit. Retraining of unit chiefs and team leaders will also have to be considered.

In the second and the third basic complete tabulation, industry and occupation are coded at the major group level, respectively, and in the detailed sample tabulation, industry and occupation are coded at the minor group level. The second basic complete tabulation is now under way. A larger number of regular staff and temporary employees are engaged in coding work than in the one-percent sample tabulation. Similar quality control approaches have been adopted in the tabulation. On the basis of the analysis of data on coding errors and the information on difficult problems encountered by coders in the one-percent sample tabulation, instructions and contents of training have been improved. Because of the tight time schedule for tabulation, further improvements in original coding are needed in order to eliminate the complete verification of original codes at an early stage.

Table 1 Number of items in Industrial and Occupational Classifications

Industrial Classification			Occupational Classification		
Major groups	medium	minor	Major groups	medium	minor
A. Agriculture	1	2	A. Professional and Technical Workers	11	53
B. Forestry	1	1			
C. Fisheries	2	2			
D. Mining	1	4	B. Managers and Officials	3	7
E. Construction	1	1			
F. Manufacturing	22	83	C. Clerical and Related Workers	4	9
G. Electricity, Gas, Water and Heat Supply	1	4	D. Sales Workers	2	13
			E. Agricultural, Forestry and Fisheries Workers	3	14
H. Transport and Communication	8	9			
I. Wholesale and Retail Trade, and Eating and Drinking Places	9	41	F. Mining Workers	2	8
			G. Workers in Transport and Communications Occupations	5	16
J. Financing and Insurance	1	4			
			H. Craftsmen, Production Process Workers and Labourers	22	148
K. Real Estate	1	3			
L. Services	24	53			
M. Government not Elsewhere Classified	2	2			
			I. Protective Service Workers	1	5
N. Establishments not Adequately described	1	1	J. Service Workers	3	19
			K. Workers not Classifiable by Occupation	1	1
TOTAL	75	210		57	293

Table 2 Error rates of industry and occupation codes in one-percent sample tabulation

	Industry codes (minor groups)	Occupation codes (minor groups)
Error rates in 1985 Census		
A-Error rates detected by complete verification	1.97	2.33
B-Error rates detected by sampling inspection by classification specialists	1.42	1.44
Error rates in 1980 Census	2.30	1.79
Error rates in 1975 Census	1.56	2.42
Error rates in 1970 Census	1.27	1.68

Table 3-1 Error rates of industry and occupation codes in the one-percent sample tabulation

Period	Number of questionnaires	Industry codes				Occupation codes			
		A	B	A+B	A/A+B	A	B	A+B	A/A+B
First term (Nov.-Dec. 1985)	90,000	1.95	1.85	3.80	51.3	2.20	1.87	4.07	54.1
Middle term (Jan. -Feb.1986)	150,000	2.04	1.38	3.42	59.6	2.43	1.37	3.80	59.6
Last term (Mar.-Apr. 1986)	170,000	1.93	1.25	3.18	60.7	2.32	1.27	3.59	60.7
TOTAL	410,000	1.97	1.42	3.39	58.1	2.33	1.43	3.76	58.1

A - Error rates detected by complete verification
B - Error rates detected by sampling inspection by classification specialists
A+B - Estimated error rates of original coding

Table 3-2 Error rates of industry and occupation codes in the one-percent sample tabulation

Period	Industry codes			Occupation codes		
	A	B	A+B	A	B	A+B
Nov. - Dec. 1985 1986	1.95	1.85	3.80	2.20	1.87	4.07
1/6 - 1/11	2.10	1.41	3.51	2.53	1.93	4.46
1/13 - 1/18	2.27	1.25	3.52	2.57	1.44	4.01
1/20 - 1/25	1.67	1.03	2.70	2.15	1.52	3.67
1/27 - 2/1	1.69	1.35	3.04	2.02	1.25	3.27
2/3 - 2/8	2.28	1.40	3.68	2.46	0.92	3.38
2/10 - 2/15	2.03	1.62	3.65	2.23	1.30	3.53
2/17 - 2/22	2.17	1.58	3.75	2.53	1.32	3.85
2/24 - 3/1	1.97	1.40	3.37	2.76	1.46	4.22
3/3 - 3/8	1.59	1.53	3.12	2.05	1.17	3.22
3/10 - 3/15	1.56	1.03	2.59	2.01	1.14	3.15
3/17 - 3/22	1.87	0.98	2.85	2.34	1.16	3.50
3/24 - 3/29	2.10	1.02	3.12	2.44	1.12	3.56
3/31 - 4/5	2.23	1.25	3.48	2.53	1.46	3.99
4/7 - 4/12	2.30	1.53	3.83	2.64	1.45	4.09
TOTAL	1.97	1.42	3.39	2.33	1.43	3.76

A - Error rates detected by complete verification.
B - Error rates detected by sampling inspection by classification specialists.
A+B - Estimated error rates of original coding

Table 4-1 Error rates of industry and occupation codes by unit in one-percent sample tabulation (sampling inspection by classification specialists)

Unit	Industry codes				Occupation codes			
	First term (Nov.- Dec. 1985)	Middle term (Jan.- Feb. 1986)	Last term (Mar.- Apr. 1986)	TOTAL	First term (Nov.- Dec. 1985)	Middle term (Jan.- Feb. 1986)	Last term (Mar.- Apr. 1986)	TOTAL
Unit 1	2.35	1.76	1.49	1.77	2.54	1.78	1.40	1.78
Unit 2	2.04	1.45	1.17	1.50	2.00	1.35	1.53	1.59
Unit 3	1.76	1.36	1.18	1.36	1.68	1.75	1.41	1.56
Unit 4	1.87	1.24	1.30	1.41	2.00	1.20	0.89	1.25
Unit 5	1.43	1.16	1.07	1.19	1.41	1.04	1.08	1.14
TOTAL	1.85	1.38	1.25	1.42	1.87	1.37	1.27	1.44

* Unit 6 is excluded because of the short term of its coding

Table 4-2 Error rates detected by sampling inspection by unit

(%)

Period	Total	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
		(Industry codes)					
Nov.-Dec. 1985	1.85	2.35	2.04	1.76	1.87	1.43	-
1986							
1/6 - 1/11	1.41	2.74	1.73	1.33	0.83	0.80	-
1/13 - 1/18	1.25	2.38	1.06	1.61	0.69	1.04	-
1/20 - 1/25	1.03	0.92	1.31	0.74	2.22	0.77	-
1/27 - 2/1	1.35	1.01	1.17	0.61	1.82	1.73	-
2/3 - 2/8	1.40	1.78	1.15	1.61	0.74	1.41	-
2/10 - 2/15	1.62	2.54	2.00	1.66	1.48	0.91	-
2/17 - 2/22	1.58	1.61	2.29	2.08	1.57	0.85	-
2/24 - 3/1	1.40	1.78	1.18	1.59	0.85	1.48	-
3/3 - 3/8	1.53	1.52	1.78	1.60	0.80	2.03	-
3/10 - 3/15	1.03	1.11	1.14	1.61	1.18	0.39	1.09
3/17 - 3/22	0.98	0.91	1.05	0.87	1.76	0.28	0.83
3/24 - 3/29	1.02	1.27	0.44	0.47	1.20	1.20	1.33
3/31 - 4/5	1.25	1.32	1.61	0.53	1.00	0.91	1.87
4/7 - 4/12	1.53	2.32	1.05	1.23	1.68	1.40	1.55
TOTAL	1.42	1.77	1.50	1.36	1.41	1.19	1.37
		(Occupation codes)					
Nov.-Dec. 1985	1.87	2.54	2.00	1.68	2.00	1.41	-
1986							
1/6 - 1/11	1.93	3.79	2.96	1.55	1.66	0.62	-
1/13 - 1/18	1.44	2.38	2.43	1.21	0.28	1.04	-
1/20 - 1/25	1.52	1.53	1.57	0.55	3.33	1.38	-
1/27 - 2/1	1.25	1.41	0.93	1.61	1.72	0.86	-
2/3 - 2/8	0.92	1.33	0.89	1.82	0.37	0.44	-
2/10 - 2/15	1.30	1.27	1.11	2.03	1.29	1.01	-
2/17 - 2/22	1.32	1.75	1.26	1.94	0.52	1.11	-
2/24 - 3/1	1.46	1.52	0.85	3.01	1.16	1.53	-
3/3 - 3/8	1.17	1.64	1.22	1.38	0.55	1.20	-
3/10 - 3/15	1.14	0.86	1.86	0.92	0.78	1.06	1.13
3/17 - 3/22	1.16	1.01	1.61	1.19	1.15	0.55	1.11
3/24 - 3/29	1.12	1.06	1.48	0.82	1.02	1.88	0.89
3/31 - 4/5	1.46	1.94	1.21	1.48	1.00	0.97	1.93
4/7 - 4/12	1.45	1.70	1.50	2.08	0.96	1.13	1.39
TOTAL	1.43	1.78	1.59	1.56	1.25	1.14	1.32

Table 5 Productivity* and error rates by unit of work force

Unit	Productivity*			Error rates by sampling inspection		
	Average	Editing & Coding	Verification of codes	Industry codes (1)	Occupation codes (2)	(1)+(2)
Unit 1	48	74	136	1.77	1.78	3.55
Unit 2	48	71	149	1.50	1.59	3.09
Unit 3	51	76	152	1.36	1.56	2.92
Unit 4	51	83	129	1.41	1.25	2.66
Unit 5	52	81	147	1.19	1.14	2.33
Unit 6	50	77	142	1.37	1.32	2.69
TOTAL	50	77	143	1.42	1.43	2.85

* Productivity: Average number of questionnaires processed per day per coding staff

Table 6-1 Appraisal of effectiveness of regular team meetings and Quality Control Newsletter by coding staff of units
(after completion of one-percent tabulation)

Unit	Number of coding staff	Team meeting					QC Newsletter				
		Effective	A little effective	Not very effective	Not effective	Unknown	Effective	A little effective	Not very effective	Not effective	Unknown
Unit 1	18	1	15	2	-	-	-	1	9	7	1
Unit 2	17	1	11	2	-	3	3	9	4	1	-
Unit 3	16	4	12	-	-	-	1	10	5	-	-
Unit 4	14	8	5	1	-	-	4	3	6	-	1
Unit 5	21	2	17	2	-	-	-	11	10	-	-
Unit 6	22	10	12	-	-	-	3	14	4	-	1
TOTAL	118	26	82	7	-	3	11	48	38	8	3

Table 6-2 Appraisal of effetiveness as of February 1986

Unit	Number of coding staff	Team meeting				QC Newsletter			
		Effective	A little effective	Not very effective	Not effective	Useful	A little useful	Not of much use	Of no use
Unit 1	15	-	-	10	5	2	10	2	1
Unit 2	12	5	6	-	1	4	6	2	-
Unit 3	19	-	15	4	-	9	6	3	1
Unit 4	12	3	5	4	-	6	6	-	-
Unit 5	13	2	6	5	-	-	8	5	-
TOTAL	71	10	32	23	6	21	36	12	2

Table 7 Coding errors by groups of industrial classification in one-percent sample tabulation
(sampling inspection by classification specialists)

Industrial classification (Major groups) by corrected codes	Estimated employed persons	Number of errors classified by corrected codes	Error rates (%)	Number of errors by classification groups		
				between major groups	between medium groups	between minor groups
TOTAL	110 846	1 578	1.42	573	638	367
A. Agriculture	9 247	18	0.19	14	-	4
B. Forestry	266	4	1.50	4	-	-
C. Fisheries	829	5	0.60	5	0	-
D. Mining	181	5	2.76	5	-	0
E. Construction	10 114	33	0.33	33	-	-
F. Manufacturing	26 347	630	2.39	141	329	160
G. Electricity, Gas, Water and Heat Supply	633	5	0.79	5	-	0
H. Transport and Communication	6 751	69	1.02	31	38	-
I. Wholesale and Retail Trade, and Eating and Drinking Places	25 668	403	1.57	134	146	123
J. Financing and Insurance	3 325	20	0.60	11	-	9
K. Real Estate	925	9	0.97	2	-	7
L. Services	22 736	310	1.36	127	119	64
M. Governments not Elsewhere Classified	3 623	36	0.99	30	6	-
N. Establishments not Adequately described	201	31	15.42	31	-	-

Table 8 Number of errors by original codes and corrected codes of industrial classification in one-percent sample tabulation
(sampling inspection by classification specialists)

Major groups by corrected codes	Major groups by original codes															
	TOTAL	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Others
TOTAL	1 578	12	9	.	5	43	612	7	71	377	17	20	278	24	.	103
A	18	4	.	.	.	1	1	.	1	.	.	.	.	.	.	11
B	4	.	.	.	.	.	3	.	.	.	.	.	.	.	.	1
C	5	.	.	.	1	.	2	.	1	.	.	.	1	.	.	.
D	5	.	.	.	.	.	3	.	.	2	.	.	.	.	.	.
E	33	1	1	.	.	.	7	1	6	6	.	3	5	.	.	3
F	630	2	.	.	3	13	489	2	6	73	.	.	22	.	.	20
G	5	.	.	.	.	1	1	.	.	.	.	.	.	3	.	.
H	69	.	.	.	1	4	7	.	38	2	.	1	10	1	.	5
I	403	2	1	.	.	8	68	.	8	269	1	3	26	.	.	17
J	20	.	.	.	.	.	.	.	1	3	9	.	5	1	.	1
K	9	.	.	.	.	.	.	.	.	.	.	7	2	.	.	.
L	310	3	7	.	.	15	31	4	9	22	6	6	183	13	.	11
M	36	.	.	.	.	1	.	.	1	.	1	.	20	6	.	7
N	31	.	.	.	.	.	.	.	.	.	.	.	4	.	.	27

Table 9 Net increases of coding errors between major groups of industrial classification in one-percent sample tabulation
(sampling inspection by classification specialists)

Industrial classification (Major groups)	Estimated employed persons (1)	Number of correction from other major groups (2)	Number of correction to other major groups (3)	Total (2)+(3)	Net increases by correction (4)=(2)-(3)	Rate of net increases by correction (4)/(1) (%)
TOTAL	110 846	573	573	-	-	-
A. Agriculture	9 247	14	8	22	6	0.06
B. Forestry	266	4	9	13	-5	-1.88
C. Fisheries	829	5	0	5	5	0.60
D. Minig	181	5	5	10	0	0
E. Construction	10 114	33	43	76	-10	-0.10
F. Manufacturing	26 347	141	123	264	18	0.07
G. Electricity, Gas, Water and Water Supply	633	5	7	12	-2	-0.32
H. Transport and Communication	6 751	31	33	64	-2	-0.03
I. Wholesale and Retail Trade, and Eating and Drinking Places	25 668	134	108	242	26	0.10
J. Financing and Insurance	3 325	11	8	19	3	0.09
K. Real Estate	925	2	13	15	-11	-1.19
L. Services	22 736	127	95	222	32	0.14
M. Governments not Elsewhere Classified	3 623	30	18	48	12	0.33
N. Establishments not Adequately described	201	31	0	31	31	15.42

Table 10 Coding errors by groups of occupational classification in one-percent sample tabulation (sampling inspection)

Occupational classification (Major groups) by corrected codes	Estimated employed persons	Number of errors classified by corrected codes	Error rates (%)	Number of errors by classification groups between major groups	between medium groups	between minor groups
TOTAL	110 846	1 591	1.44	593	531	468
A. Professional and Technical Workers	11 605	218	1.88	117	44	57
B. Managers and Officials	4 386	50	1.14	21	26	3
C. Clerical and Related Workers	20 450	86	0.42	54	12	20
D. Sales Workers	15 440	201	1.30	92	42	67
E. Agricultural, Forestry and Fisheries Workers	10 230	47	0.46	19	4	24
F. Mining Workers	116	7	6.03	3	0	4
G. Workers in Transport and Communications Occupations	4 524	25	0.55	15	6	4
H. Craftsmen, Production Process Workers and Labourers	34 513	820	2.38	162	382	276
I. Protective Services Workers	1 508	20	1.33	17	-	3
J. Services Workers	7 874	87	1.10	63	15	9
K. Workers not Classifiable by Occupation	199	30	15.08	30	-	-

Table 11 Number of errors by original codes and corrected codes of occupational classification in one-percent sample tabulation (sampling inspection)

Major groups by corrected codes	Major groups by original codes												
	TOTAL	A	B	C	D	E	F	G	H	I	J	K	Others
TOTAL	1 591	158	67	141	187	35	4	37	803	10	80	.	69
A	218	101	7	22	1	2	.	6	64	1	8	.	6
B	50	3	29	10	3	.	.	.	4	.	1	.	.
C	86	11	6	32	9	.	.	4	12	5	4	.	3
D	201	3	14	30	109	.	.	3	23	.	16	.	3
E	47	3	.	1	2	28	.	1	10	.	.	.	2
F	7	1	.	.	.	.	4	.	1	.	.	.	1
G	25	3	1	2	1	.	.	10	6	.	2	.	.
H	820	29	8	21	43	5	.	9	658	1	22	.	24
I	20	.	1	9	.	.	.	3	3	3	1	.	.
J	87	4	1	13	19	.	.	1	21	.	24	.	4
K	30	.	.	1	.	.	.	.	1	.	2	.	26

Table 12 Net increases of coding errors between major groups of occupational classification in one-percent sample tabulation (sampling inspection)

Occupational classification (Major groups)	Estimated employed persons (1)	Number of correction from other major groups (2)	Number of correction to other major groups (3)	Total (2)+(3)	Net increases by correction (4)=(2)-(3)	Rate of net increases by correction (4)/(1) (%)
TOTAL	110 846	593	593	–	–	–
A. Professional and Technical Workers	11 605	117	57	174	60	0.52
B. Managers and Officials	4 386	21	38	59	-17	-0.39
C. Clerical and Related Workers	20 450	54	109	163	-55	-0.27
D. Sales Workers	15 440	92	78	170	14	0.09
E. Agricultural, Forestry and Fisheries Workers	10 230	19	7	26	12	0.12
F. Mining Workers	116	3	0	3	3	2.59
G. Workers in Transport and Communications Occupations	4 524	15	27	42	-12	-0.27
H. Craftsmen, Production Process Workers and Labourers	34 513	162	145	307	17	0.05
I. Protective Services Workers	1 508	17	7	24	10	0.66
J. Services Workers	7 874	63	56	119	7	0.09
K. Workers not Classifiable by Occupation	199	30	0	30	30	15.08

Part II: Optical Mark Reader

History of Optical Mark Reader

1. Tabulation of census returns is carried out centrally at the Statistics Center, Management and Coordination Agency. The use of computers at the Statistics Center dates back to as early as 1961, when an IBM705 was installed to process the 1960 Population Census returns. In the 1965 Census tabulation, IBM Optical Character Readers (OCRs) were fully used for the first time as mark readers to replace key-entry equipment, greatly saving time and labour.

The census questionnaire used in the 1965 Census was the "household schedule" designed to include seven individuals on one sheet. The "individual enumeration card" (mark card, size: 17.5 cm x 9 cm) was used for the tabulation. The individual enumeration card was made for each household member by the enumerator, transcribing from the household schedule filled in by household respondent. However, the work of classification of industry and occupation was done by the Statistics Bureau based on the entry on the individual enumeration card.

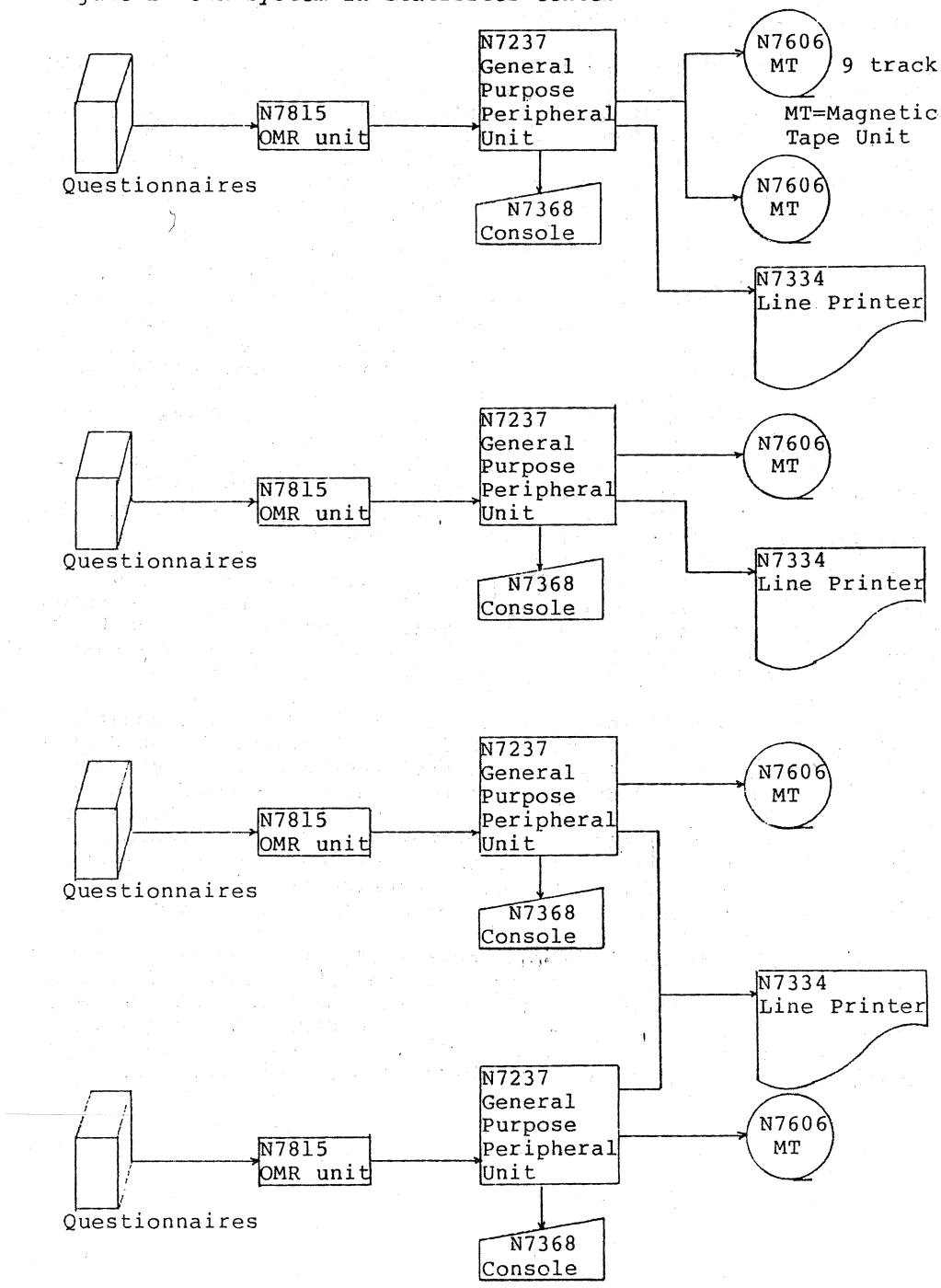
The same procedure was followed in the 1970 Population Census, but the size of the "individual enumeration card" increased to 29.6 cm x 21.0 cm for two persons. The NEC Optical Mark Readers (OMRs) were used for this census.

2. The mark sheet-type questionnaire, 36.4 cm x 25.7 cm, was used in the 1975 Population Census. This questionnaire, printed on one side, was the "household schedule" designed to report four individuals on one sheet. This was the first census that mark sheet-type questionnaires were filled in directly by respondents.

In the 1980 full-scale census, the mark sheet-type questionnaire of the same size, but printed on both sides, was used in order to accommodate a large number of topics in the questionnaire. The OMRs were designed to read the data recorded on both sides of the questionnaires in one operation; this features was also used for the questionnairs of the 1985 Census. Compared with the questionnaire of the 1980 Census, on which up to four persons could be entered, the questionnaire of the 1985 simplified census was designed to have columns for five persons.

3. Input of individual data on mark sheet-type questionnaires is processed by N7237 OMR system. In the 1985 Census, four sets of OMR (N 7815) are used. Original input data is loaded through the OMR onto magnetic tapes and then onto disks in the hierarchical order of prefectures, municipalities, enumeration districts, and households with serial numbers of households.

Figure 1 OMR system in Statisitcs Center



Features and Function

4. The N7237 OMR system with four N7815 OMR units for the 1985 Census was installed in September, 1985. The features and function of the N7815 OMR are as follows:

4.1) Simultaneous High-Speed Reading of Both Sides

The maximum reading speed of documents is 250 sheets per minute, and both front and back side marks can be read simultaneously.

4.2) Free Document Design

It permits free mark definition, change and switching of read modes, ensuring diversified document designs.

The OMR unit is capable of optically reading marks on documents with over 34 rows by 96 columns, which are either hand-written or printed by the line printer on both front and back sides.

4.3) Improved Maintainability

Its maintainability is extensively improved by the automatic diagnostic function, which controls the unit's operating condition.

4.4) Highly Flexible System Configuration

With general-purpose peripheral devices this OMR unit can be directly connected to NEC ACOS System 300/900 or can be organized in the offline organization where the data output is recorded on magnetic tapes.

4.5) Data Accuracy

The mark reading operation is backed up by the concentration comparison, validity check and format check in order to ensure data accuracy. Any unreadable documents can be selected and stacked by its program for re-processing.

4.6) Specification and Performance

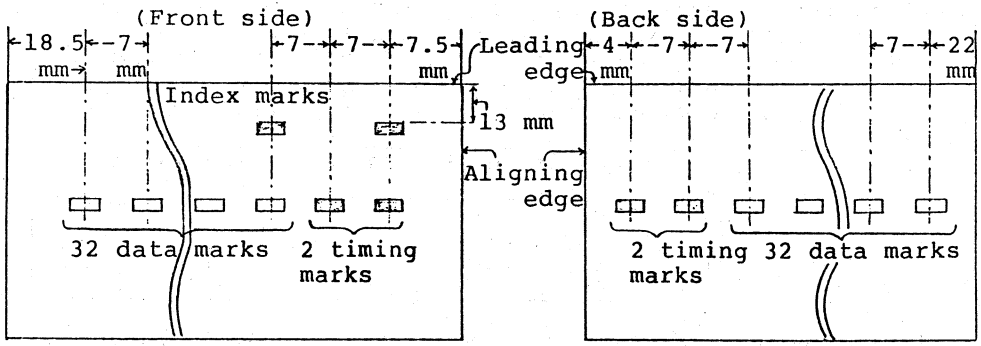
Reading Speed: 200 to 250 sheets/minute, variable with sheet sizes
Sheet Size: 182 mm to 257 mm high
257 mm to 364 mm wide
0.125 mm to 0.140 mm thick
Width/Height Ratio: 1/2 (1=Width, 2=Height)
Number of Marks: 34 rows by 96 columns at maximum
Hopper Capacity: approximately 1,000 sheets x 1
Stacker Capacity: approximately 500 sheets x 2
Output: Magnetic tape unit

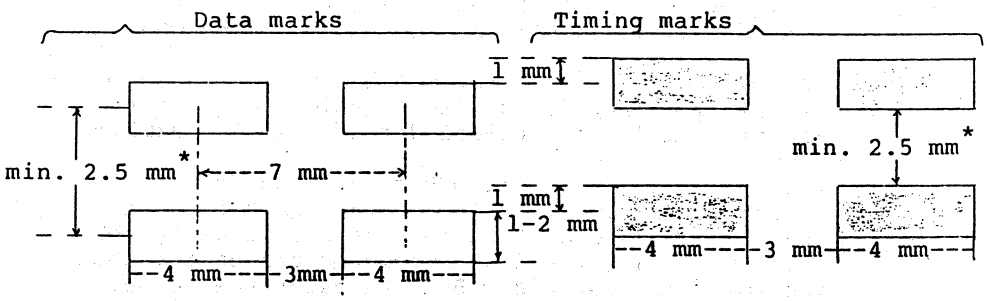
4.7) Standard of OMR

Dimension: 2,000 mm wide
762 mm long
1,300 mm high
Weight: 700 kg
Supply Voltage: 3 phases, 200 V
Frequency: 50/60 Hz
Power Dissipation: 3.5 KVA
Temperature Requirement: 15 to 32 ^{o}C
Humidity Requirement: 30 to 70 %
Calorific Factor: 3,000 Kcal/hour

4.8) Mark

Mark position: Maximum 32 positions for data in width
Maximum 2 positions for timing marks in width, fixed wide pitch 7 mm





*For next column using the function of comparison of dark levels between 2 marks, minimum 3.5 mm is necessary.

Type of Marks: (1) Index marks in the first column for identification of different sheets,
(2) Timing marks for indication of data mark column, and
(3) Data marks for entry of answer

4.9) Read Mode

Users can set the following 2 Read Modes at one's convenience in any division when designing the mark sheet.

-<u>One Mark Read Mode</u>: In this mode, each column can be used for up to 26 data mark positions. The 26 data mark positions are divided into 2 divisions with 13 data mark positions each. One Mark Read Mode can be set in each division of a column. In this mode, 2 or more data marks are considered an error. But in the case of double marks, the darker mark is read if the difference of the two dark levels (reflexibilities = PCS*) is 30 or more percent by using the function of comparison of the dark levels between both marks.

*Calculation formula of Print Contrast Signal (PCS):

$$PCS_p = \frac{Rw-Rp}{Rw}$$

where Rw is the maximum reflexibility index of the blank part of the paper by a round shape light having a diameter of 0.2 mm, and Rp is a reflexibility index at any point p.

-Binary Read Mode: In this mode, each column can be used for up to 32 data mark positions. The 32 data mark positions are divided into 2 divisions with 16 data mark positions each. Binary Read Mode can be set in each division of a column. In this mode, all data marks are read in a division just as they are. This Binary Read Mode is used in a multi-answers division.

In these 2 modes, the dark level of any mark is checked and the information is recorded on. A software programme for the OMR can decide how to treat the information of the dark level.

Dark level	level code	Condition of data mark	PCS Values
Level 3	11	dark mark	0.55 - 1.0
Level 2	10	ordinary mark	0.4 - 0.55
Level 1	01	light mark	0.3 - 0.4
Level 0	00	quite light mark	0.0 - 0.3

5. The OMR among available input equipment will still be either too expensive or too difficult to use. According to our experience, the following should be paid attention to when using the OMR.

5.1) The quality of paper for OMR documents should be checked carefully for surface tension for both the horizontal and the vertical directions on a sample basis.

5.2) The printing colour of OMR sheets should be considered carefully as there are some "drop out colours", which cannot be read as any marks by OMR equipment. Pale (or light) colours are better than dark (or deep) colours. But the paler the colour used for OMR sheets, the more difficult it will be to read by the respondents and the census takers.

5.3) In addition to the difficulties in printing OMR sheets, we should pay attention to (a) mark positions, (b) intervals between mark positions, and (c) positions of timing marks.

5.4) Comparison of dark level

The function of dark level comparison of marks should be built-in to the OMR. When two or three marks sometimes appear for one enumeration item, for example when the respondents or the census takers rewrite a mark after erasing their mistake, the OMR must be able to compare their dark level and select the darkest mark from the several marks.

5.5) Daily Test

It is always necessary to watch and adjust the reading condition because of the difficulties of adjustment and maintenance of the reading level of the OMR equipment. For that reason, in Japan reading tests are done three times daily, namely in the morning, at noon and in the evening, using one hundred test sheets to check the reading condition of the OMR equipment. Half of the one hundred test sheets have printed marks and the other half have handwritten marks.

If the reading condition of the OMR equipment does not work well, adjustment operation for the OMR will be carried out by Customer Engineers dispatched by the manufacturer of OMR. Two customer engineers are

always present at our computer section in order to ensure the smooth operation of the OMR equipment.

5.6) Regular maintenance checks

In Japan, besides these daily tests, regular maintenance checks by Customer Engineers are conducted twice a month to adjust the reading level and to clean OMR equipment.

Rejection rate by OMR operation

6. The number of input questionnaires until the end of 1986 totalled 80,182,711 sheets, see table 1 and the input time totalled 8,123 hours and 23 minutes. The rejection rates of questionnaires for the period was 0.05 percent in total. But in the early stage of OMR input operation, the rejection rates showed relatively high figures such as 0.15 percent in November and 0.10 percent in December, 1985. Accordingly average inputs per minute were lower in the early stage of OMR input operation.

The results of analysis on the cause of rejection by OMR equipment are not yet available for the 1985 Census, but table 2 shows the results of the 1980 Census. In the 1985 Census, the same type of OMR equipment was used as in the 1980 Census, therefore the figures of the 1980 Census on the cause of rejection are considered to be similar to the figures of the 1985 Census. The major reason for rejections (70%) was due to inferior conditions of the input questionnaires such as folds, waves, curls, wrinkles or damages. The second most common reason for rejection was due to stains or irrelevant marks on the questionnaires, for example a respondent jotted down memos or used a stamp on the questionnaire. Of course we made the best use of the analysis on the cause of rejection in the 1980 Census for the training of census takers in the 1985 Census.

Table 1 Input by OMR equipment in the 1985 Census until the end of 1986

	Number of questionnaires (1)	Input hours (2)	Rejection rates	Average inputs per minute (1)/(2)	Kinds of input questionnaires
	sheets	hours:minutes	%	sheets	
November 1985	2 562 401	387:46	0.15	110	1% sample data
December	4 313 281	476:26	0.10	151	
January 1986	6 065 168	629:28	0.06	161	99% data for the first basic tabulation
February	7 252 942	732:15	0.07	165	
March	6 554 785	629:41	0.05	173	
April	6 853 452	680:47	0.04	168	
May	6 641 298	658:57	0.06	168	
June	6 708 724	664:44	0.05	168	
July	6 261 792	600:21	0.04	174	
August	4 732 206	471:21	0.04	167	
September	5 284 274	529:35	0.05	166	
October	5 689 413	566:26	0.04	167	
November	5 737 105	561:45	0.03	170	
December	5 525 870	533:51	0.04	173	99% data for the second basic tabulation
TOTAL	80 182 711	8123:23	0.05	165	

*Average inputs per minute were below the nominal reading speed, 200 sheets per minutes, because the input hours included the handling time of OMR operators.

Table 2 Cause of rejection by OMR equipment in the first basic complete tabulation of the 1980 Census

Cause of rejection (Condition of questionnaires)	All Japan (%)	Data of some prefectures (%)				
		Aichi	Okinawa	Fukui	Tottori	Kagawa
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0
1. Inferior conditions	71.2	89.1	73.5	84.0	72.3	77.6
Folds	25.1	33.6	14.1	43.8	21.1	26.5
Waves & Curls	16.8	4.0	21.2	22.6	31.0	30.0
Wrinkles	27.0	51.2	37.4	14.0	18.3	18.9
Damages	2.3	0.2	0.8	3.5	1.9	2.3
2. Stains	17.8	9.4	17.7	8.0	21.3	15.9
Jotting down memos	9.7	5.4	12.5	4.3	13.0	6.6
Using stamps	3.0	2.3	0.3	0.6	0.6	-
Ink blotting and others	5.0	1.7	4.9	3.2	7.8	9.4
3. Stickings	9.3	1.4	6.8	7.1	5.3	5.9
Boiled rice-grains	0.9	0.0	0.3	0.9	0.3	0.2
Paper fastener & clips	0.3	0.1	0.5	-	-	-
Refuse of eraser	5.5	0.7	3.9	3.7	1.7	4.3
Others	2.6	0.5	2.1	2.4	3.3	1.4
4. Upside down operation	1.6	0.2	2.0	0.6	1.1	0.5
5. Inferior printing	0.1	-	-	0.4	-	-

Input equipment for the next census

7. Although the NEC OMRs now installed have been used as the input equipment in both the 1980 and 1985 censuses, the manufacturer of the OMR has decided to discontinue production of this model.

The larger size of the questionnaire in the 1990 Census should be looked into in order to accommodate the large number of topics in the questionnaire of the full-scale census. The questionnaire could be folded to keep inside the information given by the respondent for protection of the respondents' privacy.

NEC and three other outstanding manufacturers in the field of OMR are currently competing to make a new model or are improving their current model for the 1990 Census questionnaires.

8. **Five-year development plan for the 1990 Census**

A. Development policy

Development of the new model should be done in principle by improving the existing models on the market in order to reduce the time and cut down the expenses for development. A prototype model of the new input equipment must be produced at least by the middle of the 1988 fiscal year to thoroughly check the function of the model. Based on the results of several tests,

such as processing the questionnaires of the pilot surveys for the next census, the prototype model will be improved upon for the final input equipment.

B. Development schedule

(Fiscal 1986)

The Statistics Center sets the basic necessary specifications for the input equipment of the next census, and makes 2 or more manufacturers formulate the basic design proposal according to the specifications. The Statistics Center also carries out research on the estimated cost for improvement of the current NEC OMR, and on input equipment which will be on the market in the near future. The most appropriate equipment is selected by receiving all these proposals and findings, and the fundamental direction of development of input equipment is then decided. NEC, TOSHIBA Corporation, SEKONIC Co., Ltd. and SHIMA RIKA KOGYO are participating to make the development plan for the input equipment of the next census.

(Fiscal 1987)

The Statistics Center chooses the most appropriate basic design proposal from those submitted in the previous year by the participating manufacturers. Detailed design is then carried out on the adopted basic proposal. A prototype model based on the detailed design is developed and the function and performance of the new model is examined by using the questionnaires expected for next census.

(Fiscal 1988)

The first improvement on the prototype model is done according to the assessment and problems pointed out on the prototype model in the previous year. The second improvement on it is done based on th results of the test run using questionnaires for the pilot surveys of the 1990 Census.

(Fiscal 1989)

The final improvement of the input equipment is carried out after repeating the test for the pilot survey questionnaires. A new improved input equipment is finally installed to provide for the 1990 Census.

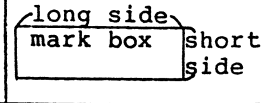
(Fiscal 1990)

The new pieces of input equipment are installed, adjusted and operated for the 1990 Census returns.

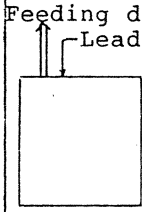
C. Basic necessary specifications shown to manufacturers

In regards to the folding 42.0 cm x 29.7 cm questionnaires, which could be cut in half and fed to the input equipment, or the 36.4 cm x 25.7 cm questionnaires, which could be fed as they are, the following basic specifications were shown to the four manufactures mentioned above. They will submit their basic design proposal to the Statistics Center in March, 1987.

Basic specifications requested for input equipment of the 1990 Census

Item	Specifications requested for input equipment of the 1990 Census	Specifications of the OMR for the 1985 Census
1. Questionnaire		
(1) Kind of paper	(1) The standard papers for OMR is to be used.	(1) ditto
(2) Size of sheet	(2) Sheet size should be from 257 mm x 182 mm to 364 mm x 257 mm.	(2) ditto
(3) Printing colour	(3.1) PCS value of the printing colour, or drop out colour is to be 0.2 mm or less.	(3.1) PCS value is 0.1 mm or less.
	(3.2) Various kinds of drop out colours can be used.	(3.2) Drop-out colours are limited to red, yellow, brown, violet, etc.
(4) Cutting errors	(4.1) The permitted limit of cutting errors in printing of questionnaires is to be 0.3 mm or less.	(4.1) The permitted limit is 0.2 mm or less.
	(4.2) Supposing the opposite side of the aligning edge in a questionnaire is cut by a cutting machine, or is separated manually along with holes made in advance before feeding to the input equipment. In this case, the permitted limit of cutting errors is to be 1.5 mm or less.	(4.2) Leave them out of consideration.
(5) Design of questionnaire		
(a) Size of mark box, etc.	(5.1) Size of a mark box is to be between (3-4 mm)x (1.5-2 mm).	(5.1) Size of a mark box is 4 mm x (1-2 mm).
	(5.2) The questionnaire should be designed so that different sizes of mark boxes can be used.	(5.2) ditto
	(5.3) Questionnaires should be designed in which the long side in a mark box is at right angles to the aligning edge, or is parallel to the aligning edge. In this case, the direction of mark boxes on one side of a questionnaire should be the same.	(5.3) Long side of a mark box is at right angles to the aligning edge in a questionnaire. 

	(5.4) The shortest interval between the centers of the long sides in mark boxes is to be between 5-6 mm, and in 1 mm between mark boxes for the short side direction. In this case, the interval of mark boxes on one side of a questionnaire should be the same.	(5.4) A fixed interval of 7 mm between centers of long side is used, and 3.5 mm or more between centers for short sides.
	(5.5) The shape of the mark is in principle a dash or line [-] from edge to edge of a mark box along the longside. Mark boxes which are completely filled in should also be able to be read.	(5.5) ditto
	(5.6) The writing utensil for marks is a pencil in principle, but the use of black ball point pens will be studied.	(5.6) Pencils and designated ball point pens can be used.
	(5.7) To distinguish between questionnaires, an area for index marks can be set up.	(5.7) ditto
(b) Timing mark	(5.8) To provide for a bigger users' area in a questionnaire, the timing mark should be omitted or the area for timing marks should be made as small as possible. An area for index marks mentioned in (5.7) should also be made as small as possible for the same reason.	(5.8) Omission of timing mark is not allowed.
	(5.9) In case the area for timing marks is set up along the aligning edge, the area should be set up within 15 mm from the aligning edge.	(5.9) Two positions for timing marks are set up 15 mm from the edge.
	(5.10) In case the area for index marks is set up along the leading edge, the area should be set up within 15 mm from the leading edge.	(5.10) Area for index marks is set up 15 mm from the leading edge.
2. Reading method (1) Reading by division	(1) It should have the function of reading by division of a rectangular or square shape which consists of several rows and/or several columns.	(1) Division is only set up by column.

	Around 100 or more divisions should be established on the front or back side of a questionnaire respectively.	
(2) Comparison of the dark levels between marks	(2) In One Read Mode, the darkest mark is to be made an output after comparison of the dark levels between marks in a division where there are 2 or more marks. But in case the 2 or more marks have dark levels above a certain standard level, all marks above the level are to be made an output as multi-marks. In Binary Read Mode, all data marks above a certain dark level are to be read just as they are.	(2) ditto
(3) Dark level	(3) Information of dark level is to be recorded on by 4 dark level groups. The dark level can be adjusted if necessary. Each dark level can be checked by the standard test sheets.	(3) ditto
(4) Reading of several kinds of sheets simultaneously	(4) Several kinds of questionnaires which have different index marks respectively, should be able to be read simultaneously.	(4) ditto
(5) Others	(5) Questionnaires should be fed lengthwise into the input equipment.	(5) ditto Feeding direction Leading edge  Aligning edge
3. Mechanical specification		
(1) Reading speed	(1) Reading speed is to be 180 sheets or more per minute for sheets of 297 mm x 210 mm, and 150 sheets or more per minute for sheets of 364 mm x 257 mm. It is acceptable for the reading speed to be slowed down up to a certain point if the	(1) Reading speed is about 165 sheets per minute in reality, in spite of the nominal reading speed of 200 sheets per minute

	dimension of the machine is made in a smaller size.	for sheets of 364 mm x 257 mm.
(2) Reading accuracy	(2) Rejection rate for normal sheets is to be 0.01 percent or less.	(2) Average rejection rate until the end of 1986 was 0.05 percent.
(3) Reading of both sides simultaniously	(3) Data recorded on both sides of questionnaires should be read in one feeding to the input equipment.	(3) ditto
(4) Output media	(4) Magnetic tape unit is to be used.	(4) ditto
(5) Stain, etc. of sheets	(5) The machine should read sheets with small stains without rejecting them, and should read folded and/or wrinkled sheets correctly.	(5) OMR is weak in reading sheets with stains, folds and/or wrinkles.
(6) Hopper capacity	(6) A hopper with a capacity of 1,000 sheets or more is to be provided. The supply of questionnaires to the hopper must be done without a break of input operation of the machine.	(6) A hopper with the capacity of 1,000 sheets is provided. Supply of questionnaires is done without a break of the operation.
(7) Stacker capacity	(7) Three stackers are to be provided with the following capacities. 1) First stacker for accepted sheets with a capacity of 500 sheets or more 2) Second stacker for accepted sheets with a capacity of 500 sheets or more 3) A stacker for rejected sheets with a capacity of 200 sheets or more	(7) Two stackers are provided with a capacity of 500 sheets each one for accepted sheets, and one for rejected sheets.
(8) Sequence of sheets	(8) Sequence of sheets must be in the same order and facing the same direction.	(8) ditto
4. Function for check		
(1) check of different kinds of sheets	(1) Its function is to check the different kinds of sheets, read all sheets simultaneously and enter the sheets to the designated stacker.	(1) 5 kinds of sheets can be checked, but selection of the stacker cannot be done.

(2) Check the number of timing marks	(2) The machine should be able to check the number of timing marks by the kind of sheets, enter the sheets to the designated stacker and add the symbol mark by equal, more, less and no exist on the number of timing marks to the output records.	(2) ditto
(3) Mechanical check	(3.1) When sheets jam in the machine, the mechanical check must stop the feeding. If the jammed sheet has already passed the reading section of the machine, a certain symbol mark will be put on the output record.	(3.1) ditto
	(3.2) The mechanical check should also check the double-feeding, which means that 2 sheets are fed at the same time. When double-feeding occurs, the sheets should be separated into a designated stacker, and the operation of the machine should be stopped by a certain instruction. The operator's instruction will determine whether or not output of the records is made on the magnetic tapes. If record of the output is made, it will be marked by a particular symbol.	(3.2) ditto
	(3.3) If a hopper is empty or a stacker is full, the feeding operation should stop and the condition should be indicated by a light.	(3.3) ditto
(4) Check of reading condition	(4.1) Outputs of several kinds of check counts should be made at regular intervals and at the end of input operation to a console display or to an operator's printer in order to supervise or watch the reading affairs. (Kind of check counts) -Total number of input, -Number of input by kind of questionnaires,	(4.1) Total number of these kinds of check counts are printed out, but the fitures at regular intervals are not available.

	-Number of sheets by stacker, -Number of sheets by symbol mark (equal, more, less and no exist) on timing mark check, -Number of occurrences of jams, and -Number of occurrences of double-feeding (Regular intervals) -A regular interval is a period for input of 500 sheets as a rule, but it should be able to be changed as the operator wishes according to the condition of the machine, sheets and others.	
	(4.2) It should make a printer output of the number of records which are written on the magnetic tape. -Several kinds of check counts for records -Option counts by certain instruction: 1) number by existence of marks, and 2) number by dark level by kind of questionnaires, by front or back side, and by mark position	(4.2) not available
5. Others		
(1) Operation of machine	(1) The machine should be safe and easy to operate and a non-specialist should be able to operate it. The tape unit should adopt the autoloading method on tape.	(1) Two male operators operates one OMR unit.
(2) Dimension	(2) The smaller the size of the machine, the better. (example dimensions) 1,500 mm wide 650 mm long 1,300 mm high	2,000 mm wide 762 mm long 1,300 mm high
(3) Conditions for installation	(3) It is to be installed and operated in an ordinary office environment. In particular lower noise and heating values would be desirable, preferably on the level of ordinary OA equipment.	(3) OMRs are installed in a computer room because the noise and the heating value are high.

(4) Maintenance and durability	(4) The regular maintenance, half a day check by Customer Engineers is to be a maximum of twice a month. The machine should be of superior durability.	(4) ditto
(5) Settling of machine troubles	(5) The machine should be able to be repaired easily.	
(6) Settling of dust	(6) The machine's input operation should have an automatic cleaning function for the settling of dust.	(6) Settling of dust is done by automatic cleaning using vacuum mechanism.
(7) Programme	(7.1) It should have simple language and generator, which can easily prepare programmes for input operation and compilation in accordance with input sheets.	(7.1) Input programme is fixed, the formats of input sheets are given by constant tables.
	(7.2) The output of mark prints by mark position and an "image list" which is the list of mark occurrences and dark levels by mark position, should be made.	(7.2) ditto
	(7.3) Selection of dark level for mark recognition is to be done by a software programme. A mark with a level of the designated dark level or more will be recognized as a mark by the machine.	(7.3) Selection of dark level for mark recognition is done by hardware.
	(7.4) The machine should be able to be stopped at any time in order to check the reading condition by test sheets, and then re-continued.	(7.4) Check procedure of reading condition by by test sheets is done after the end of some working units.
	(7.5) When input operation is interrupted by some troubles, it will have a function by which the following can be done: Output records on magnetic tape concerned are closed by a tape mark after the last record, or after the last working	(7.5) OMR is capable of this function. But closing of records after the last ED is done at the time of data processing in

	unit (enumeration district).	the host computer.
	(7.6) The machine should be able to make an output with specific information such as date of input, code of tabulation unit, error symbols, codes of working units, etc. to the head of the input records concerned.	(7.6) ditto
	(7.7) The machine should be able to check the number of error counts at designated intervals, break the operation in case the number of errors exceeds the designated number, and print out the reason for the break as well as a list of all check counts for reading condition mentioned above.	(7.7) none
(8) Alternative	(8) Manufacturers are encouraged to examine the possibility of development of input equipment and use new technology and innovations besides the current technology of OMR beyond the limit of the specifications described above.	

Part III: Data correction by on-line procedures

1. In the previous censuses, correction of errors and omissions of individual data had been mainly done by batch procedures using the corrected OMR sheets besides ordinary computer editing and imputation. The correction procedures are changed into on-line procedures to increase the efficiency and overcome the reduction of human resources available for the tabulation work.

Correction of errors detected by computer editing is made manually referring to original questionnaires, and necessary corrections are recorded on the error lists. Then, corrected data replaces the erroneous data in the disk through display terminals.

In the 1980 Census, only 12 display terminals were available for on-line data correction, but for the occasion of the 1985 Census, 55 display terminals for on-line data correction have been installed so that most correction procedures can be done on-line quickly and efficiently. The software programmes for the on-line correction system developed for the 1980 Census were improved for the 1985 Census in terms of response time and display designing.

2. Based on the experiences gained in the 1980 Census, on-line correction procedures were seriously discussed and carefully examined by the Statistics Center for the use of many display terminals and all workers concerned. To efficiently deal with data correction of the questionnaires of the 1985 Census by on-line procedures, the Committee on Correction by On-line Procedures for the 1985 Census was set up in July 1984 in the Statistics Center. The Committee is composed of 13 staff members belonging to the Administration Division, the Data Processing Division and the First Population Statistics Tabulation Division. The functions of the Committee are as follows:

(1) Deliberation of fundamental maters on data correction by on-line procedures,
(2) Picking out problems awaiting solution in on-line procedures,
(3) Preparation and analysis of the experimental tests, and
(4) Examination of the detailed working plan for on-line procedures

Experimental test

3. Three experimental tests were conducted on the basis of the results of the study in order to improve the system by using the questionnaires of the fourth pilot survey, dress rehearsal as of 26 June 1984, for the 1985 Census. Major aspects of those experimental tests are as follows:

(1) First experimental test
Time: August to November 1984
Number of display terminals used: 2 terminals
Persons engaged: 12 persons from 2 units were divided into 2 teams with 6 persons each
Purpose of experiment: (1.1) Preparation, analysis and modification of editing procedures and software programmes for on-line data correction

(1.2) Check of adequacy of working system
(1.3) Feasibility of using on-line method together with batch method
(1.4) Check of time-quota method and list-quota method (refer to para. 8)
(1.5) Measurement of productivity in on-line procedures

(2) Second experimental test
Time: April to May 1985
Number of display terminals used: 1 terminal
Persons engaged: 7 persons from 5 units
Purpose of experiment:
(2.1) Simplification of operation method on keyboard of display terminals
(2.2) Measurement of productivity and response time in on-line procedures

(3) Third experimental test
Time: August 1985
Number of display terminals used: 12 terminals
Persons engaged: 13 persons from 5 units
Purpose of experiment:
(3.1) Picking out the problems on correction by many display terminals at the same time
(3.2) Check of settling of problems as described above
(3.3) Measurement of productivity and response time in on-line procedures
(3.4) Check of adequacy of software programmes and data correction method

4. Through these experimental tests, three reports on the results of the tests were submitted to the Committee on Correction by On-line Procedures, and other personnel in the Statistics Center for their deliberations:
(1) First report was released in December 1984,
(2) Second report was released in May 1985, and
(3) Third report was released in August 1985
after their respective experimental tests. The Committee on correction by on-line procedures was dissolved on 5 August 1985 when the fundamental problems of on-line procedures were almost solved. All affairs for on-line procedures thereafter have been done in the First Population Statistics Tabulation Division.

Training on data correction system by on-line procedures

5. Training of personnel was organized in two stages: the first stage for leaders and the second stage for other engaged personnel.

(1) Training of leaders
The principal purpose of this training was to train Chiefs of units and other senior personnel concerned in on-line procedures to understand the correction method, the mechanism and the detailed operation process of on-line procedures. The purpose of this training was

to make leaders who play a leading part in the normal exercises or the trial exercises at training meetings of general personnel, and to take leadership and solve simple problems that may occur during the period of actual tabulation.

Table 1. Number of leaders trained by division

Division or Section	TOTAL	Chief of unit	Leader	General personnel	Total number of personnel as of Oct. 1 1985
TOTAL	96	26	36	34	1,087
First Population Statistics Tabulation Division	45	10	21	14	276
Second Population Statistics Tabulation Division	30	8	13	9	162
Entrusted Tabulation Section	3	1	-	2	140
First Economic Statistics Tabulation Division	12	4	2	6	253
Second Economic Statistics Tabulation Division	6	3	-	3	256

Training of leaders was carried out for 11 days from 19 September to 3 October 1985. The major subject matters of the training were as follows:

.Consideration points on operation of VDT (Visual Display Terminal)
.Outline of data correction system by on-line procedures
.Operation of display terminal
-Class room training
-Paper exercises
-Actual experience

(2) Training of general personnel

Training was conducted in every Division or Section engaged in data correction by on-line procedures. The major subject matters of the training were alike in training of the leaders. The trained leaders acted as trainers for general pesonnel and the terminals installed in each Division or Section were used as the display terminals for training.

Allocation of terminal displays

6. General administration of display terminals has been carried out by the Planning Unit in every Division or Section. The display terminals with a designated registration number have been allocated to every unit. Each unit carries out its on-line procedures by the display terminals allocated to its own unit. When the terminals of a unit are unable to temporarily bear a burden because of excess data correction, the adjustment on the operation will be done in the Division. When there are not

enough display terminals in a Division to process their operation for the same reason, the adjustment between Divisions is done.

Table 2 Number of display terminals for on-line procedures by Division or Section

Division or Section	August 1984			December 1984			Jan. - Mar. 1985			April 1985-		
	W	T	P	W	T	P	W	T	P	W	T	P
TOTAL	24	3	4	30	4	5	50	7	7	55	6	8
First Population Statistics Tabulation Division	8	1	1	10	1	1	23	3	2	23	3	2
Second Population Statistics Tabulation Division	8	1	1	9	1	1	16	2	2	16	2	2
Entrusted Tabulation Division	-	-	-	-	-	-	-	-	-	2	-	1
First Economic Statistics Tabulation Division	4	1	1	4	1	1	4	1	1	5	1	2
Second Economic Statistics Tabulation Division	4		1	4		1	4		1	5		1
Administration Division (for common use)	-	-	-	3	1	1	3	1	1	4	-	-

*W = Number of display terminals, T = Number of terminal controllers and P = Number of printers
*Display terminals in the Administration Division are terminals for common use.

Registration of user's codes

7. In order to avoid any confusion or error operations in the data correction system by on-line procedures, each personnel member engaged in data correction has a user's code registered as an operator. Each personnel member has to enter his/her own registered code at the first picture in the display terminal for the start of data correction. The closing of operations for data correction is done by a chief of unit or a personnel member designated by the chief who has a special code as an authorized person.

Time-quota method and List-quota method

8. Two methods are introduced for the use of display terminals according to the condition of works in progress. In the first time-quota method, a working time of 45 - 55 minutes is assinged in advance to each personnel member and the on-line procedures are carried out in rotation of personnel. In the second list-quota method, a personnel member examines the check lists allotted to him/herself, and corrects error data at any time if a terminal display is unoccupied after the completion of examination of the check lists by computer.

Comparison of productivities between on-line procedures and OMR procedures for data correction

9. Although the tabulation plan for the first basic complete

tabulation had been prearranged to jointly use on-line procedures and OMR procedures for data correction, the rate of productivity of data correction by on-line procedures exceeded the expected level in the one-percent sample tabulation. In the first basic complete tabulation accordingly it was decided to carry out data correction mainly by the same on-line procedures as the prompt one percent sample tabulation. Data correction by OMR procedures is a method adopted by the 1980 Census. In OMR procedures, errors detected by examination of check lists were corrected on the original OMR questionnaires, and the corrected questionnaires were read by OMR equipment.

In order to collect information on both procedures using the same questionnaires of the 1985 Census, data correction of 4 blocks in Osaka and 6 blocks in Wakayama prefecture were done by OMR procedures. Information on data correction by on-line was taken from 1 block in Aomori prefecture and 1 block in Tokyo. A block in each prefecture was a working unit of questionnaires of about 60,000 households. In case the number of households in a municipality was less than 60,000, a block was set up for the municipality.

10. Table 3-1 shows the basic number at the first round editing by computer. And Table 3-2 shows the rate of productivity between both procedures. The average rates of productivity per person-day in examination of check lists were 26.6 sheets in OMR procedures and 33.6 sheets in on-line procedures respectively. The average rate of productivity including the on-line operation in on-line procedures was 29.3 sheets per person-day. Table 3-2 shows that productivity of on-line procedures exceeded the productivity of the other method.

Table 3-1 Number of check lists and corrected questionnaires at the first round

Kinds of data	Number of Input questionnaires (1)	Number of check lists (2)	Number of corrected questionnaires** (3)	Rate of check lists (2)/(1) (%)	Rate of corrected questionnaires (3)/(1) (%)
OMR procedures					
TOTAL	928 677	24 700	53 533	2.66	5.77
Osaka (4 BLKs)	569 129	14 522	34 427	2.55	6.05
Wakayama (6)	359 548	10 178	19 126	2.83	5.32
On-line procedures					
TOTAL	129 340	3 943	7 134	3.05	5.52
Aomori (1 BLK)	44 631	1 479	2 368	3.31	5.31
Tokyo (1)	84 709	2 464	4 766	2.91	5.63
All Japan*	39 921 187	919 924	1 528 413	2.30	3.83

* All Japan in on-line procedures excludes the 4 blocks in Osaka and the 6 blocks in Wakayama used OMR procedures.
**Corrected questionnaires means the questionnaires which need some correction after the examinatin of check lists.

Table 3-2 Comparison of rate of productivity between on-line procedures and OMR procedures

	Required person-days			Productivity per person-day			Number of days		
	TOTAL	Examination of check lists (4)	on-line operation (5)	TOTAL	examination of check lists (2)/(4)	on-line operation (3)/(5)	TOTAL	examination of check list	on-line operation
OMR procedures									
TOTAL	928.0	928.0	-	26.6	26.6	-	60.5	60.5	-
Osaka (4BLKs)	578.0	578.0	-	25.1	25.1	-	26.5	26.5	-
Wakayama (6)	350.0	350.0	-	29.1	29.1	-	34.0	34.0	-
On-line procedures									
TOTAL	134.5	117.5	17.0	29.3	33.6	420.0	13.5	9.5	4.0
Aomori (1BLK)	48.5	43.0	5.5	30.5	34.4	430.5	5.0	4.0	1.0
Tokyo (1)	86.0	74.5	11.5	28.7	33.1	414.4	8.5	5.5	3.0
All Japan	22 540.0	19 964.0	2 576.0	40.8	46.1	593.3	11 932.0	-	-

11. The number of corrected questionnaires at the first and the second round is shown in Table 4. Efficiency rates of data correction at the first round in both procedures showed almost similar figures: 97.5 percent in OMR procedures and 97.3 percent in on-line procedures. This means that there is no difference in efficiency rates of data correction at the first round as shown in Table 4.

Table 4 Efficiency rates of data correction at the first round

	Number of corrected questionnaires		Efficiency rates at the first round (1)/[(1)+(2)] (%)
	First round (1)	Second round (2)	
OMR procedures	34 427	865	97.5
On-line procedures	7 139	194	97.3
All Japan	1 528 413	43 010	97.2

Type of errors on check lists

12. Table 5-1 and 5-2 show distribution by type of errors on check lists. Households having errors on their questionnaires were 12.82 percent in the one percent samples and 10.26 percent in the remaining 99 percent data respectively. Households in which some imputation by computer was carried out were 10.06 percent out of the 12.82 percent households having errors in the

one percent samples. In the 99 percent data, households in which some imputation by computer was carried out were 5.60 percent out of the 10.26 percent households having errors. Households having some off-code errors were 7.53 percent in the one percent sample, and 4.83 percent in the 99 percent data. And households having some cross check errors were 6.58 percent and 6.35 percent respectively.

The percentage of questionnaires, which the computer showed to have doubtful data, through dumped records on the check lists, was 7.12 percent and 6.52 percent respectively.

Table 5-1 Number of basic counts on check lists at the first round

	1% sample questionnaires				99% questionnaires for the first basic complete tabulation			
	Number of Enumeration districts	Number of Households	Number of Question-naires	Number of Individuals	Number of Enumeration districts	Number of Households	Number of Question-naires	Number of Individuals
(Number)								
Input data	361,469	363,640	393,593	1,139,258	808,085	37,711,320	40,832,031	118,582,977
.With errors	46,665	46,634	47,529	48,396	711,380	3,870,290	3,980,892	3,328,963
.Without errors	314,804	317,006	346,064	1,090,862	96,705	33,841,030	36,851,139	115,254,014
Off-code errors ((1+2+3)*	27,330	27,371	27,611	31,625	548,071	1,821,513	1,839,890	1,929,108
Cross errors (4+5+6+7)	24,010	23,925	24,486	19,333	648,375	2,396,035	2,481,224	1,515,446
Dumps (1+2+4+5+7)	25,954	25,877	26,525	24,963	659,537	2,459,945	2,555,456	2,109,976
.Errors to be comfirmed (2+5+7)	19,934	20,002	20,517	19,025	601,241	1,659,886	1,721,382	1,422,403
.Others (1+4)	9,552	9,181	9,274	8,543	435,085	1,040,767	1,071,352	826,055
Imputation (2+3+5+6)	36,501	36,591	36,978	35,791	585,063	2,111,611	2,138,122	1,628,490
(1) Off-codes...dump	7,190	7,197	7,230	7,119	340,607	639,244	644,130	645,342
(2) Off-codes...temporary imputation	7,694	7,698	7,747	7,653	174,400	248,186	249,181	178,193
(3) Off-codes...imputation	16,842	16,855	16,969	20,225	443,542	1,149,421	1,158,497	1,262,218
(4) Cross-errors...fatal errors	3,626	2,459	2,515	1,441	285,459	472,532	498,251	182,958
(5) Cross errors... temporary imputation	6,395	6,454	6,457	2,790	175,004	247,254	247,362	38,723
(6) Cross errors...imputation	10,212	10,220	10,262	7,052	308,274	669,107	670,611	172,673
(7) Cross errors...confirmation	9,251	9,259	9,706	9,891	563,560	1,401,818	1,460,496	1,249,079
(8) Extra entries...blank	14,604	14,673	14,766	13,191	106,143	346,011	346,160	22,316
(A) Off-codes...Unknown	2,740	2,476	2,478	2,860	102,280	147,794	148,446	171,121
(B) Cross errors...Unknown	28	28	28	32	-	-	-	-

*Notes: (1+2+3) = (1) off-codes + (2) off-codes + (3) off-codes
(2+5+7) = (2) off-codes + (5) Cross errors + (7) Cross errors

Table 5-2 Distribution ratio of basic counts on check lists at the first round

	1% sample questionnaires				99% questionnaires for the first basic complete tabulation			
	Number of Enumeration districts	Number of Households	Number of Question-naires	Number of Individuals	Number of Enumeration districts	Number of Households	Number of Question-naires	Number of Individuals
(Distribution ratio)								
Input data	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
.With errors	12.91	12.82	12.08	4.25	88.03	10.26	9.75	2.81
.Without errors	87.09	87.18	87.92	95.75	11.97	89.74	90.25	97.19
Off-code errors ((1+2+3)*	7.56	7.53	7.02	2.78	67.82	4.83	4.51	1.63
Cross errors (4+5+6+7)	6.64	6.58	6.22	1.70	80.24	6.35	6.08	1.28
Dumps (1+2+4+5+7)	7.18	7.12	6.74	2.19	81.62	6.52	6.26	1.78
.Errors to be comfirmed (2+5+7)	5.51	5.50	5.21	1.67	74.40	4.40	4.22	1.20
.Others (1+4)	2.64	2.52	2.36	0.75	53.84	2.76	2.62	0.70
Imputation (2+3+5+6)	10.10	10.06	9.39	3.14	72.40	5.60	5.24	1.37
(1) Off-codes...dump	1.99	1.98	1.84	0.62	42.15	1.70	1.58	0.54
(2) Off-codes...temporary imputation	2.13	2.12	1.97	0.67	21.58	0.66	0.61	0.15
(3) Off-codes...imputation	4.66	4.64	4.31	1.78	54.89	3.05	2.84	1.06
(4) Cross-errors...fatal errors	1.00	0.68	0.64	0.13	35.33	1.25	1.22	0.15
(5) Cross errors... temporary imputation	1.77	1.77	1.64	0.24	21.66	0.66	0.61	0.03
(6) Cross errors...imputation	2.83	2.81	2.61	0.62	38.15	1.77	1.64	0.15
(7) Cross errors...confirmation	2.56	2.55	2.47	0.87	69.74	3.72	3.58	1.05
(8) Extra entries...blank	4.04	4.04	3.75	1.16	13.14	0.92	0.85	0.02
(A) Off-codes...Unknown	0.68	0.68	0.63	0.25	12.66	0.39	0.36	0.14
(B) Cross errors...Unknown	0.01	0.01	0.01	0.00	-	-	-	-

*Notes: (1+2+3) = (1) off-codes + (2) off-codes + (3) off-codes
(2+5+7) = (2) off-codes + (5) Cross errors + (7) Cross errors

Part IV: Examination of statistical tables

1. The tabulated statistical tables need to be examined from various points of view before their official release. After checking the consistency of data among different tables using the automated checking system, the principal figures in the census results are compared with the time series data and/or the related statistical tables. When some doubtful figures are found, their validity should be verified by referring to summary data or individual data, which was often time-consuming in the past censuses.

For the 1985 Census, some of these examination processes are computerized. The new system developed for this purpose has the following functions:

(1) Rearrangement of summary data with the previous census data, data of the previous tabulations in the 1985 Census, and/or related statistical data; and
(2) Retrieval of ED data and individual data

2. There are two type of examination on statistical tables. The first type is the mechanical examination within or between the tables of the census such as verification of total figures, or comparison of related figures between tables. The second type is the analytical examination such as comparison of figures in time series of the census, or comparison with figures of other related statistics.

In the 1980 Census, the mechanical examination was automated by computer as much as possible, and the great majority of human resources available for examination of statistical tables was appropriated to the analytical examination. In the 1985 Census, the mechanical examination has been automated completely, and the analytical examination has been mainly carried out by using analytical tables prepared by computer with the aim of checking the census results. Manpower concerned has been fully for inspection of extraordinary or doubtful values. For preparation of analytical tables, a data base for analysis is set up from data of the previous census and the related statistics, and analytical tables are made more effective by computer using the data base.

For verification of extraordinary values, retrieval of data of the Enumeration Districts and individual data is possible at display terminals.

Mechanical examination

3. The necessary parameters for automated examination in every tabulation group is given to the computer. The subjects of the mechanical examination are as follows:

(1) Verification of total figures in each table,
(2) Comparison of figures in two cells in each table; Three types of comparison, namely equal, larger and smaller, can be indicated by parameters.
(3) Check a cetain cell in where some figure is impossible,
(4) Comparison of related figures between tables; Three types of comparison mentioned in (2) is done on related figures between tables.

Results of verification and comparison by the mechanical examination are prepared as check lists for manual confirmation.

Analytical examination

4. Analytical examination is carried out after the manual confirmation of the results of mechanical examination. The data base for analytical examination is made up of the following data:

(Census data)
(1) Results of the 1980 Census, and
(2) Results of the previous tabulations of the 1985 Census.

(Data of related statistics)
(1) Projections of population,
(2) Labour Force Survey,
(3) Employment Status Survey,
(4) Establishment Survey,
(5) Housing Census,
(6) Basic Survey for Health and Welfare Administration,
(7) Annual reports on city planning, and
(8) Others

Analytical tables using the above data base are produced for manual examination. See Annex 1 for analytical tables for the prompt sample tabulation.

In comparison with data of the previous census and the previous tabulations of the 1985 Census, the number of differences in certain topics, increasing rate or decreasing rate in them and percentages of distribution are examined and checked between related figures. The increasing rate or decreasing rate in a prefecture or a municipality is compared with the figures in all Japan, the prefecture concerned, or the neighbouring prefectures and municipalities.

The differences and different rates in certain topics in comparison with other related statistics in the 1985 Census are compared with the related figures in the previous 1980 Census.

The distribution of data is compared and checked with figures from urban areas, rural areas, the previous census, the related statistics, or the other prefectures or municipalities.

In case it is necessary to see the questionnaire concerned and confirm a certain figure from the results of the manual inspection on the analytical tables, the retrieval operation is done on data of the Enumeration Districts or individual data if necessary at display terminals.

Examination Committee

5. The summary on the results of examination of statistcal tables, graphs of some major topics and case history sheets are submitted for approval to the Examination Committee which is presided over by the Director of the First Population Statistics Tabulation Division.

After the approval of the Commitee, the statistical tables are printed out by the Kanji (Chinese characters) printing system and sent to the Population Census Division of the Statistics Bureau for their official release. The printing papers that are printed out by the Kanji printing system are used as block copies for offset printing.

Annex 1 Analytical tables for the prompt one-percent sample tabulation

1. Comparison in time series of the censuses
   - Table 1 Population
   - Table 2 Number of households
   - Table 3 Cohort by five-year age groups and sex
   - Table 4 Population 15 years of age and over by marital status, five-year age groups and sex
   - Table 5 Population 15 years of age and over by employment status, five-year age groups and sex
   - Table 6 Employed persons 15 years of age and over by employment status, five-year age groups and sex
   - Table 7 Employed persons 15 years of age and over by industry (medium groups), employment status and sex
   - Table 8 Employed persons 15 years of age and over by industry (minor groups) and sex -- Japan
   - Table 9 Employed persons 15 years of age and over by occupation (medium groups), employment status and sex
   - Table 10 Employed persons 15 years of age and over by occupation (minor groups) and sex -- Japan
   - Table 11 Employed persons 15 years of age and over by industry (major groups), occupation (major groups) and sex
   - Table 12 Private households by size of household members
   - Table 13 Population 15 years of age and over by socio-economic groups and sex
   - Table 14 Private households by family type of household
   - Talbe 15 Private households by economic type of hosehold
   - Table 16 Private households living in dwelling, by tenure of dwelling and type of building
   - Table 17 Private households living in dwelling by tenure of dwelling and number of rooms
   - Table 18 Private households living in dwelling, by number of Tatami
   - Table 19 Private households, household members and average number of rooms and Tatami per household, by tenure of dwelling
   - Table 20 Population by usual place of residence and place of work or schooling

2. Comparison with figures of other related statistics
   - Table 21 Comparison with Projection of population:
     -Population by five-year age goups and sex
   - Table 22 Comparison with Employment Status Survey:
     -Population 15 years of age and over by marital status, five-year age groups and sex
   - Table 23 Comparison with Labour Force Survey:
     -Labour force population by labour force status, five-year age groups and sex
   - Table 24 Comparison with Employment Status Survey:
     -Employed persons 15 years of age and over by industry (major groups) and employment status
   - Table 25 Comparison with Labour Force Survey and Employment Status Survey:
     -Employed persons 15 years of age and over by industry (major groups) and occupation (major groups)

Table 26 Comparison with Basic Survey for Health and Welfare Administration:
-Private households by family type of households
Talbe 27 Comparison with Housing Census:
-Private households living in dwelling and average number of rooms and Tatami per household
Table 28 Comparison with Housing Survey:
-Principal households living in dwelling by type of building and size of household members
Table 29 Comparison with Housing Survey:
-Principal households living in dwelling and average number of Tatami, by tenure of dwelling and number of Tatami

Issues related to data processing system of population census

Summary

The quinquennial population census in Japan was taken as of 1 October 1985 covering the total population of 121 million. The Statistics Center of the Management and Coordination Agency is responsible for the tabulation of the census data. The Statistics Center has introduced several kinds of approaches or procedures for the data processing of the 1985 Poulation Census.

The paper presents the experience and some analysis on these new approaches and procedures in four stages out of all the tabulation procedures.

Part I: Quality control in processing census data

1. In planning the tabulation of the 1985 Census, a detailed analysis was made of data on quality control in tabulation work, and the quality control approaches were carefully planned and implemented. It was decided that quality control approaches should be introduced only in coding work of industry and occupation, because errors in data on other topics could be almost completely detected and corrected through off-codes checks and consistency checks by computers.

2. The Quality Control Committee, the Quality Control Team and the Evaluation Groups have been established in the Statistics Center for the effective implementation of quality control in the processing work of the 1985 Census.

3. Code checks in two stages are carried out to prevent possible errors and to check the level of error rates. The first is the complete 100 percent verification performed in early stage just after coding by different coding staff from the same unit; the second is the 20 percent sampling inspection performed in the later stage by the Evaluation Group composed of 15 experts.

4. Prompt feedback of information to coders on coding errors of the previous week and relevant instructions are given to coders by the Quality Control Newsletters issued every Monday by the Quality Control Team. Every unit in charge of editing and coding has 3 or 4 teams, and the team has a team meeting of 15 minutes every Wednesday morning to discuss coding problems.

The QC Newsletter provides useful information for the discussion in the regular team meetings.

5. The control levels of error rates in coding were set at 2.0 percent for minor groups of industry, and 1.5 percent for minor groups of occupation for the one-percent sample tabulation, considering the error rates in the 1980 Census. The final figures of error rates are below the control levels, and show the success of the quality control approaches in the one-percent sample tabulation.

6. It was found in the editing and coding operation of the one-percent sample tabulation that there is a certain correlation between the productivity and quality of work, and between quality of work and the level of interest in the regular team meetings and weekly QC Newsletters. Appropriate measures such as staff retraining for those personnel who show a lack of interest in the regular team meetings and the QC Newsletters and who have lower productivity and poor quality of work, should be taken in order to arouse their interest and to improve their

productivity and quality of work.

Although it is not appropriate, for various reasons, to analyse data on coding errors by individual coders, it seems necessary to identify problems which each unit may have, and to take appropriate measures for improving the quality of coding work, unit by unit. Retraining of unit chiefs and team leaders should be considered.

The tendency of coding errors in industry and occupation are shown in tables 7 to 12 by the results of sampling inspection in the one-percent sample tabulation.

Part II: Optical Mark Reader

7. In place of time-consuming key-entry machines, Optical Character Readers or Optical Mark Readers have been used as the input equipment for the censuses sence the 1965 Census. The OMR input equipment for the census has been extensively improved in regards to the function of the machine and the size of questionnaire. Since the 1980 Census, the OMR has the function of reading the data recorded on both sides of the 36.4 cm x 25.7 cm questionnaires in one operation. The same mark sheet-type questionnaires in the 1985 Census were filled in directly by respondents. Each questionnaire now has columns for five persons as compared with the 1980 Census questionnaires which had columns for only four persons.

8. The four sets of OMR systems have been installed in the Statistics Center for the 1985 Census. The OMR equipment is still either too expensive or too difficult to use compared with other available input equipment.

Careful attention should be paid to the quality of paper and printing colour for OMR sheets. Another noteworthy item is the design of the questionnaire in regards to mark positions, intervals between mark positions and position of timing marks.

9. Regarding the input operation of the OMR equipment, it is always necessary to watch and adjust the reading condition. In Japan, tests for reading are done three times daily, and regular maintenance checks by Customer Engineers of the manufacturer are conducted twice a month to adjust the reading level and to clean the OMR equipment.

10. The nominal reading speed of the OMR installed in the Statistics Center is 200 sheets per minute, but the actual average input speed, including the handling time of OMR operators, is about 165 sheets per minute.

11. Analysis regarding the cause of rejection by the OMR equipment is not yet available for the 1985 Census, but the results of analysis for the 1980 Census are shown in table 2.

12. The manufacturer of the OMRs used for the 1985 Census has decided to discontinue the production of this model.

The introduction of a new model of OMR system or another system of input equipment for the next 1990 Census should be considered.

The development of input equipment for the next census will be done by the five-year program during the fiscal 1986 to 1990. The basic specifications for the new equipment have been shown to several major manufactures. Four outstanding manufactures in the field of the OMR are currently participating to make their basic design proposal to the Statistics Center in March 1987.

Part III: Data correction by on-line procedures

13. In the previous censuses, correction of errors and omissions of individual data had been mainly done by batch procedures using the corrected OMR sheets besides ordinary computer editing and imputation. The OMR procedures have been changed to the on-line procedures to increase efficiency and overcome the reduction of human resources available for the tabulation work.

Correction of errors is made through display terminals. Few display terminals were available in the 1980 Census, but in the 1985 Census 55 display terminals have been installed for the on-line procedures so that most of the correction procedures can be done on-line quickly and effectively.

14. The "Committee on correction by on-line procedures for the 1985 Census" was established to deal with data correction by on-line procedures smoothly.

15. The software programmes for the on-line system for the 1980 Census were improved through three experimental tests using the data of the fourth pilot survey, dress rehearsal for the 1985 Census, in terms of response time and display designing.

16. Two phases of training on data correction by on-line procedures were organized for leaders and other general personnel concerned.

17. Reading the use of display terminals, each personnel in charge of data correction has a user's code in order to avoid any confusion. Furthermore, either the time-quota method or the list-quota method has been adopted for the use of display terminals depending on the condition of a unit or a division.

18. As the productivity rates of on-line procedures in the one-percent sample tabulation exceeded the expected level, the data correction for the first and second basic tabulations have been carried out mainly by the same on-line procedures in spite of the prearrangement of the joint use of OMR procedures and on-line procedures.

19. The data correction by the OMR procedures using a part of the questionnaires of the 1985 Census, was done to take information for comparison with data correction by on-line procedures.

The results of the comparison showed that the productivity of on-line procedures exceeded the level of the OMR procedures. But the efficiency rates regarding data correction at the first round showed almost similar figures in both procedures.

Part IV: Examination of statistical tables

20. The tabulated statistical tables need to be examined from various points of view before their official release. In the 1985 Census, some of the examination processes of the statistical tables are computerized.

21. There are two types of examinations of statistcal tables. The first type is the mechanical examination within or between tables of the census such as verification of total figures, or comparison of related figures between tables. The second type is the analytical examination such as comparison with data in the time series of the census, or comparison with data of other related statistics.

22. The mechanical examination in the 1980 Census was automated by computer as much as possible, but in the 1985 Census, it has been completely automated.

23. The analytical examination has been carried out in principle by using analytical tables printed out by computer. The analytical tables are prepared more effectively by computer using a data base composed of data of the previous census, the related statistics, etc.. 29 analytical tables were printed out by computer for the one-percent sample tabulation.

24. When any doubtful or extraordinary figures are found, their validity should be verified by referring to summary data or individual data by display terminals. These referrals in the past censuses were done manually and it was often time-consuming.

25. The summary on the results of the examination of statistical tables, graphs of some major topics and case history sheets are submitted to the Examination Committee for their approval. After the approval of the Committee, the statistical tables are printed out by the Kanji printing system and sent to the Population Census Division of the Statistics Bureau for their official release.

26. Through all these efforts, the tabulation work of the 1985 Population Census has been performed without sacrificing the quality of census results nor the timeliness of the publication within very limited human resources.

Ⅲ. 美國의 1980年 센서스 現況 및 1990年 센서스 準備

1. 1980年 센서스 調査方法과 調査範圍 및 Computer活用度에 關한 硏究

1980年 美國 人口 및 住宅 Census調査方法과 調査範圍, 그 Computer活用度에 關한 硏究

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7. 結　　論

1. 人口 Census의 槪念

(1) 人口 Census의 槪念과 定義

人口 Census 調査는 오늘날 世界 여러 나라에서 實施하고 있는 國家의 基本的 統計收集 活動의 하나이다. 이 人口 集計는 古代에도 實施된 바 있지만 近代에 들어와서 世界 여러 國家에서 實施하기 始作했는데, 그 來歷을 살펴보면 다음과 같다.

近代에 들어와서 가장 일찌기 人口 Census調査를 실시한 나라는 18세기에 Scandinavia 국가에서 始作했고, 그 後 곧 이어 German 계통 국가와 Italian 계통 國家가 18世紀에 Census를 시작한 국가들이다. 이것을 年代順으로 살펴보면 Iceland의 最初 Census는 1703年에 실시되었고, Hesse-Darmstadt는 1742年에, Hesse-Cassell은 1747年에, Sweden은 1748年에, Norway는 1760年에, Denmark는 1769年, Bavaria는 1777年에, Spain은 1787年, Siclies는 1788年에 실시한 바 있다.

이런 傾向에 따라서 美國의 最初 全國 Census는 美國이 1776年에 獨立한 후인 1790年에 처음으로 실시하게 되었던 것이다. 그리고 英國과 프랑스는 1801年에 그들의 最初 Census를 실시한 바 있다. 이렇게 해서 시작된 Census는 19세기에는 모든 유럽의 국가들이 週期的 人口 Census

를 시작하게 되었다.

그리고 20世紀에는 特히 世界 2次大戰 以後에 Census는 世界의 거의 모든 나라에 普及되어 실시하게 되었던 것이다. 특히 注目할 만한 事實은 全世界 人口의 $\frac{1}{4}$을 차지하는 中國도 이 때부터 Census 조사를 實施하게 되었던 것이다. 一般的으로 使用되는 Census의 定義는 다음과 같다.[1]

"Census는 特定한 時期에 限定된 領土內에 (a defined territory) 있는 모든 人口에 關한 人口 統計 (demographic data)를 收集하고 整理하며 (compiling), 그것을 印刷物로 發行하는 (publishing) 全體過程 (the total processes)을 말한다"고 한다.

Census의 重要한 特徵은 Census 조사는 週期的 (periodicity)으로 實施해야 하고, 普遍性 (universality)을 갖고 있어야 한다. 이것은 주어진 地域에 있는 모든 개인을 다 包含해야 된다는 것을 意味한다.

이 Census approach의 槪念은 두 가지로 區分해서 볼 수 있다. 英國에서 쓰이는 de facto approach에 따르면 각 개인은 Census 조사 當時에 있던 그 場所에서 記錄된다는 槪念이고, 그 反面에 美國에서 使用하는 de Jure approach는 각 사람은 그들의 平常時의 居住地에 따라서 集計記錄 되어야 한다는 槪念이다. Brazil과 같은 나라는 이 두 가지 方法을 다 사용하는 나라이다. 세계의 여러 국가들이 그들의 Censuses 에서 取扱하는 data의 種類와 規模 (quantity)는 각각 나라에 따라서 크게 다르다. 어떤 나라는 단지 12種類의 data만 調査하는가 하면, 어떤 나라는 24種類의 data를 取扱하는 나라도 있다. 그러나 大部分 Census는 그 主要內容으로 다음과 같은 事項을 調査한다. 즉 地理的 位置 (geographic location), 年齡 (age), 性別 (sex), 結婚關係 (marital status), 國籍 (citizenship), 出生地 (place of birth), 世代主와의 關係 (relation - ship to the head of household), 宗教 (religion) 教育水準 (educational characteristics), 職業 (occupation), 製造業등에 관한 deta를 조사한다.

또 境遇에 따라서는 Census의 內容으로서 産出力 (fertility), 結婚關係 (nuptiality), 副業 (secondary occupation), 所得 (income), 言語 (language), 人種 (ethnic characteristics), 風習 (native customs), 身體障碍 (disabilities) 와 移住 (migration)도 包含하기도 한다.

結局 最近에 United Nations는 Census는 다음 事項에 關한 內容을 取扱해야 한다고 했다.

(a) 全體 人口 (total population)
(b) 性別 (sex), 年齡 (age), 結婚 關係 (marital status)
(c) 出生地 (place of birth), 國籍 (citizenship 또는 nationality)
(d) 國語 (mother tongue), 教養 (literacy), 教育水準 (educational qualification)
(e) 經濟的 地位 (economic status)
(f) 都市 또는 農村別 居住地 (urban 또는 rural omicile)
(g) 世代, 家族 構造 (household structure)
(h) 産出力 (fertility)

結局 人口 Census는 各 國家가 그 全國에 걸쳐서 以上과 같은 事項에 대하여 가장 實際에 가까운 資料 (information)를 얻기 위하여 實施하는 것이며, 이런 情報를 國家가 必要로 하는 理由는 여러가지가 있겠지만 그 중 特히 國家의 여러가지 機能遂行, 또 그 政策 樹立과 實行 등에 매우 重要한 情報가 되기 때문이다.

本 硏究에서는 이 人口, 住宅 Census 調査 內容과 方法 節次에 相當한 經驗을 갖고 있는 美國의 人口, 住宅 Census 調査 方法과 內容, 또 그 情報 資料의 整理와 分析, 그리고 그 Census 情報를 利用하기 위하여 使用하는 Computer 의 活用을 分析하고 硏究하는 것이다.

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1) Clark, John I., 1965, ***Population Geography,*** Pergamon Press, Oxford, p. 8.

2. 美國의 人口, 住宅 Census調査 背景과 調査 目的

美國 人口, 住宅 Census 는 美國 商務省 Census 局에 依하여 每10年마다 그해 4月1日 에 實施하는 10年 週期 Census 를 말하는 것이다. 이 Census 는 美國 50개 州와 District of Columbia, Puerto Rico, Guam, the Virgin Islands, American Samoa, the Canal Zone, the Trust Territory of the Pacific Islands 와 기타 美國 主權과 管割權下에 있는 地域을 實施 對象 地域으로 하고 있다.

이 Census 는 美國 憲法 Article I, Section 2 의 規定에 따라 實施되는 것인데, 그 條項은 다음과 같이 規定하고 있다.

"議會의 議員과 直接 課稅가 聯邦에 包含된 州들에게 그들 各 州의 人口數에 따라서 割當되어야 한다. 그리고 實際 集計는 美合衆國의 議會가 처음 開催된 後 3年 以內에 實施되어야 한다고 했다. 그리고 그 後 每 10年마다 實施하는데, 그 Census 는 法에 따라 계속 實施되어야 한다."

이렇게 하여 美國 最初 Census 는 1790年에 始作했고, 그 後 끝자리 숫자가 "0"으로 되는 해인 每 10年마다 人口가 集計되어 왔다.

The United States Code의 Title 13은 1954年에 의회가 制定했는데, 이것은 Census 局의活動에 關한 그 前의 法을 모두 모아서 整理하여 制定한 것이다. 따라서 그후의 每 10年마다 실시하는 Census 는 이 法에 그 施行 根據를 두고 있는 것이다.

이 Census 는 議會의 議席 割當에 使用하는 것 外에 그 人口 숫자는 각 選擧區의 境界線을 定하는 데에 聯邦政府, 州政府, 地方政府에서 各各 使用하게 된다. Title 13에서 規定한 바와 같이 이 10年 週期 Census 는 全國 (nation), 地域 (region), 州 (state), 郡 (county) 그리고 地方小區域 (local areas)에 대한 人口, 住宅 狀態에 對하여 방대하고 詳細한 統計 資料를 提供하게 되는 것이다. 이 Census 統計表 (tabulations) 는 Computer Tape와 印刷物 (printed publications), 그리고 Microfilm으로서 可能한 한 가장 廣範圍하게 Census 使用者들이 利用할 수 있게 해 주고 있다.[2]

最近 (1970, 1980) Census Program은 Washington D.C. 外廓의 Maryland 州 Suitland 本部에서 主管한 바 있다. 그리고 統計整構 (Processing Centers)는 Indiana 州의 Jeffersonville과 Kansas 州의 Pittsburg와 12개의 地域事務所 에서 處理하고 있다.

3. 美國 人口, 住宅 Census (1980) 調査 方法

(1)郵便 調査 方法 (Mail Census System)

1980年 Census data를 收集하는 方法은 역시 잘 알려진 郵便 調査 方法 ("Mail Census System")을 주로 使用하였는데 이것을 "Mail-Out/Mail-Back System"이라고 부른다. 이 方法으로 전체 人口의 90%에 해당하는 部分을 調査하였고 그 나머지 人口는 "傳統的인 戶別 訪問 調査 方法"을 (conventional door to door canvassing system)을 사용하였다.

결국 "Mail Census System"으로 288 Standard

2) 이 10年週期 Census는 Bureau of the Census의 중요업무 中의 한 業務이다. 이 Bureau (局)는 기타 여러가지 週期的 Census조사도 담당하는데 그 中 重要한 Census를 紹介하면 다음과 같다. Construction Census, Transportation Census, Business Census, Governments Census, Mineral Industries Census, 그리고 Manufactures Census등이 있다.
그리고 Census局은 Currnet Statistical Survey도 取扱하고, foreign trade에 대한 統計도 收集한다. 또 Bureau는 聯邦政府機關의 여러가지 Special Projects에 따라 活動하는데 그 예로서 revenue sharing, health, energy conservation등의 計劃事業도 담당한다.

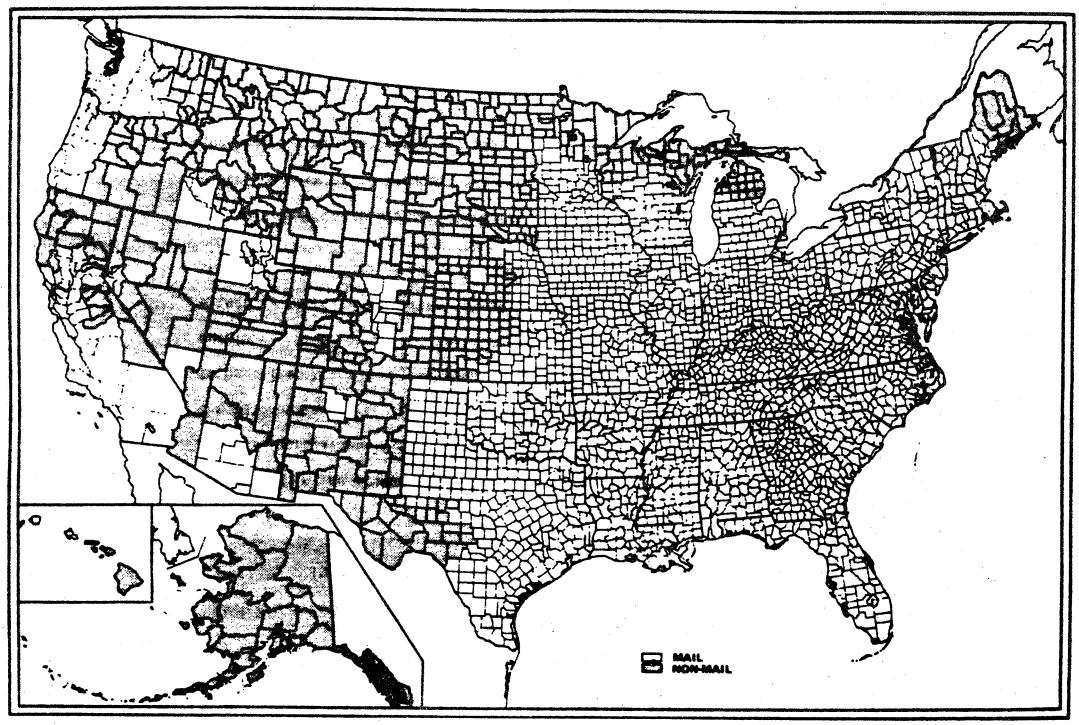


Figure 1. 1980 Census Mail/Non-Mail Areas

Mertropolitan Statistical Areas 中 275 SMSA와 기타 大都市 地域이 아닌 다른 지역에도 一部 사용한 바 있다. 이 "Mail Census System"은 1980年 조사 때는 1970年 Census조사 때 보다도 더 큰 比重으로 사용한 바 있다. 예로서 1970年 Census 조사는 전 人口의 60%에 해당하는 부분만이 郵便 調査 方法을 사용하였던 것이다. 이렇게 郵便 調査 方法을 더 좋은 方法으로 利用하고 依存하는 理由는 設問紙에 대한 應答의 質을 더 높일 수 있기 때문이다.

이 方法으로 調査 內容의 質을 높일 수있다고 하는 理由로서 첫째는 설문지 응답자가 便利한 時間에 充分한 時間을 갖고 그것을 作成할 수 있기 때문이다. 그 둘째 理由는 Mail Census System은 빼놓기 쉬운 각 住宅에 대한 住所를 여러번 點檢하므로 누락되는 조사 대상자를 最小限度로 줄이게 되는 利點이 있다. 그 첫째 이유는 標本調査 設問紙(sample questionaire)를 받게 되는 住宅數의 選擇을 偏見없는 표본으로 선택하기에 容易하다는 利點이 있게 된다.

(2) 傳統的 集計 方法 (Conventional Enumeration)

美國 Census Bureau (局)는 Census 收集을 爲해서 郵便調査 方法 다음으로 傳統的 調査 方法(conventional system)을 美國의 人口 密度가 낮은 地域에 使用하고 있다. 이 方法의 調査活動을 爲해서 37個의 地區 調査 事務所(conventional district office)가 設置되어 이것을 擔當하고 있다. 이 方法의 調査 活動은 그 地域 郵遞局이 1980年 3月에 설문지(short form)를 받게 되고, 이것을 郵遞局이 同年 3月 28日에 그 地域 住民에게 배달한다. 따라서 住民은 그 調査 設問紙를 作成한 後 Census 調査者가 戶別 訪問할 때까지 기다려야 한다. 同年 3月 31日에 조사 담당자(enumerator)가 이 설문지를 收集하러 家家 戶戶 訪問한다. 이때 조사 담당자들은 이 설문지(form)의 설문 中 대답이 안 된 부분이 있으면 그

家族에게 直接 물어보고서 그 설문지를 作成하게 된다. 이렇게 하여 Census 조사 담당자들은 每 6번째家口나 두번째 家口마다 (그 地域의 표본 조사율에 따라 결정) 표본조사 설문지에 대한 인터뷰를실시한다. 이렇게 설문지를 收集하고 인터뷰를 실시함과 同時에 地圖에 그 집 位置를 標示하고그 住所를 그 調査地域(fnumeration district)의 總住所録(master address register)에 記録한다.

(3) 特別 集計 調査 (Special Enumeration)

이 方法은 標準 Census 節次(standard census procedure)가 適當하지 못한 곳에서의 集計를위하여 使用하는 調査 方法이다. 즉 기숙사에 거주하는 大學生, 형무소의 죄수, 유랑자(street people) 그리고 기타 人口를 조사하는 방법이다. 이런 人口를 조사하기 위하여 Census Bureau는 特別한 節次에 따라 조사를 실시한다. 이 調査 方法은 다음과 같다.

1) 一般 集團 居住地 (General Group Quarters) 人口 調査

集團 居住地, 病院, 寄宿舍, 養老院, migrant camp 나 下宿집(rooming houses)의 人口를 調査하기 위하여 담당자(enumerator)가 그 곳을訪問하고, 個人別 Census 報告書(Individual Census Report-ICR)인 調査書(Form)를 配付한다. 이 調査書는 일반 Census 설문지와 비슷한데 단지 住宅에 관한 質問을 包含하지 않고 있다. 이 調査書를 配付한 후 며칠 지나서 조사 담당자가 방문하여 그것을 수집하고 그 응답을 하지 않은 사람에 대해서 다시 조사한다.

이때 조사가 不可能한 사람에 대해서는 그 居住地에서 얻을 수 있는 記録이나 그 職員으로 부터 그 정보를 얻을 수 있는 만큼만 수집한다.

2) 軍人 (Military Personnel)

陸地 勤務 軍人에 대한 人口 data 收集도 1980년 Census 조사의 重要 部分을 차지한다. 이들 軍人에 대한 人口 Census 조사를 하기 위하여 각 基地마다 (military installation) 그 Census 담당 장교가 있어서 그가 軍人 Census 報告書 (Military Census Report) 를 人軍이 兵舍 (barracks) 에 거주하든지 또는 基地 內나 또는 基地 外의 住宅에 居住하든지 이 조사서 (form)를 나눠주고 수집하게 된다. 軍人 中에서 集團 宿所인 (group quarters) 兵舍 (barracks)에 居住하는 軍人은 그 居住 人口로 報告되고, 기타 基地 內나 基地 外의 住宅에 가족을 거느리고 있는 軍人은 일반 Census 설문지를 우편으로 받게 된다. 따라서 그들은 그설문지에도 記載되고 軍人 Census 報告書 (Military Census Report) 에도 보고하게 한다. 이렇게 軍人 Census 報告書 (Military Census Report) 에 보고된 軍人은 後에 재점검을 한 후 그들 個別 居住地 人口로 보고된 사실을 확인하고는 그 보고서 (report) 를 말소시키게 된다.

海上 勤務 軍人 (해군) 또는 해안경비대 소속중 해상 근무자 (crews) 들은 乘般 Census 報告書 (Shipboard Census Report) 로서 조사하도록 되어 있다. 이 조사서 (form)는 직접 모든 般舶의 司令官에게 우송되고 그후 乘般 Census 조사 담당관이 配付하고 수집하는 일을 담당한다. 이러한 海上 乘務員 人口 統計에 대한 居住地 決定 規定은 그 人口는 그 般舶 소속 항의 人口로 取扱하고 있다. 단 Census 조사일에 美海軍 6艦隊와 艦隊에 소속된 승무원들은 海外 居住 人口로 取扱하고 있다.

3) 商船 乘務員 (Crews of Merchant Vessels)

이 系統의 人口 調査는 먼저 美國 해무청 (Marine Administration) 에서 美國籍旗艦 (U.S.Flag Merchant Vessels)의 名單 (list)을 얻어서 乘船 Census 報告書(Shipboard Census Report)를 그 船主나 管理人을 통하여 그 승무원에게 우송한다. 이 경우 만약 Census Day 에 그 船舶이 美國 領海 內에 있으면 그 승무원은 ⓐ 그 行般 目的地가 美國內 港口이면 그 目的地 港口의 人口로 집계되고 ⓑ 만약 그 目的地가 美國 外의 港口이면 그 승무원은 그 般舶의 母港 (homeport)의 人口로 집계된다. 만약 美國籍 船舶이 公海上에 있는 경우에는 그 승무원은 1980년에는 Census 人口로 집계되지 않았다.

4) **海外 居住 美國人 (U. S. Citizen Abroad)**

海上에서 勤務하는 美國 聯邦政府 職員, 軍人과 그 家族은 海外 居住 美國人으로 報告되었다. 따라서 그 人口 數는 美國 政府의 行政 記錄에 依存한다. 이 海上 居住 美國人 總數는 1980 Census of Population, Volume 1, U. S. Summary Report에 보고되어 있다.

5) **學生 (Student)**

大學生 人口는 그들이 在學하고 있는 곳의 居住地 人口로 보고한다. 대학생이 아닌 학생으로서 자기 집이 아닌 곳에서 학교 다니는 학생 人口는 그 父母가 거주하는 居住地 人口로 보고한다.

4. 美國 人口, Census (1980) 調査 區域 單位 (1980 Census Geographic Areas)의 設定과 그 構成

Census 調査를 위한 地理的 單位 設定 作業은 行政區域의 境界線을 規明하고 設定하는 作業이다. 이 作業에는 Census 調査 區域에 對한 地圖 作成과 그와 관련된 Computer File 을 作成하는 작업도 포함한다.

이렇게 Census 調査區域을 設定하면 그 地理的 單位地記號 (geographic area codes) 를 各 住所別 設問紙에 指定하는데 利用하게 된다. 이 作業 (process)을 地記號 作業 (geocoding) 이라고 부른다. 이 作業의 結果로 Census Bureau는 Census data 利用者들에게 매우 有用한 많은 地理的 資料들을 (geographic products) 産出하고 있는 것이다. 이런 지리적 資料 (products)로서 잘 알려진 것은 地圖 (maps), 地理記號表 (geographic code scheme), 地理的 基礎 File (geographic base files) 등이 있다. 특히 1980年 Census 어떤 主要 data source 보다 더 많은 종류의 地理 區域 (geographic area) 에 대한 통계를 提供해 준다.

따라서 Census Bureau는 行政區域인 (governmental unit) 州, 郡, 市에 대한 data의 공급은 물론 통계 수집 목적으로 설정한 統計 區域에 대한 data도 提供한다. 즉, 이런 統計區域으로 잘 알려진 것으로 Standard Metopolitan Staistical Areas, Census Blocks 등의 區域 單位가 이 統計 區域에 해당한다 따라서 Census 조사에는 이러한 統計資料 收集을 위한 地理的 區域 單位에 對한 組織과 그 構造에 對한 研究가 必要하고 그 設定의 問題가 대두된다.

그러므로 이 研究에서는 1980年의 Census 資料 (data) 가 수집되었던 여러가지 Census 地理區域 (census geographic areas)의 主要 形態 (種類)를 分析한다. 이 Census data수집을 위한 調査區域으로 크게 2가지로 區分되는데 그 중 하나는 行政區域에 속하는 單位 區域이고, 또 다른 하나의 調査 區域으로는 統計 區域에 속하는 單域이 있다. 이들 여러 區域의 相互關係는 〈Fig. 2〉에 표시되어 있다

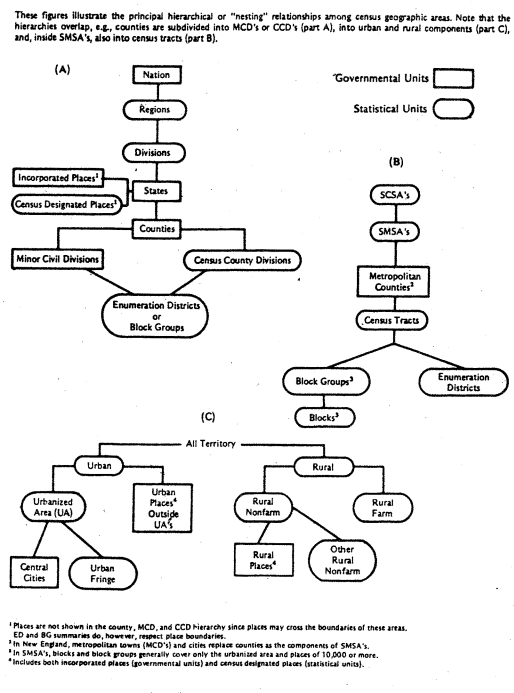


Figure 2. Principal Hierarchical Relationships Among Geographic units

이들 各 區域의 特徵과 內容은 다음과 같다.

(1) Census 行政區域 (Political Governmental Areas)

1) 州와 Columbia 特別 區域(States와 the District of Columbia)

이 區域에 屬하는 것은 美國의 50個 州와 行政首都인 Washington 地域을 말한다. 그리고 州와 同等한 地域으로 取扱되는 곳은 다음과 같다.

Puerto Rico, Guam, the Vigin Islands, American Samoa, the Trust Territory of Pacific Islands (the Northern Mariana Islands 포함)

2) 國會議員 選擧 區域(Congressional District)

이 지역의 경계선은 每 Census가 실시된 후 州政府가 調整한다.

3) 郡 (Counties)

4) 小單位 行政 區域(Minor Civil Divisions—MCD's)

郡 單位 以下에 속하는 行政區域이다. 이 행정단위는 30개 州에서 사용한다. 이 구역의 예는 Town (邑 해당)이나 Township (面 해당)이 이에 속한다. 1970年과 1980年 사이에 몇 개의 州에서 이 行政區域에 相當한 變更이 있었다.

5) 市制上 認可都市 (Incorporated Places)

市와 같은 人口 集中 地域은 法制上 規定된 境界線, 行政力 (power), 그리고 機能 (function)이 있다. 거의 70%에 해당되는 人口 25,000명 이상의 市制上의 都市가(Incorporated muncipalities) 1970年代의 行政區域 境界線에 변경이 있었다.

6) 美國 인디언 保護地區(American Indian Reservations—Alaska Natural Village)

인디언 保護地區 (Indian Reservation)의 境界線은 聯邦政府, 州政府, 內務省과 國務省의 協助로 決定된다.

Alaska Native Village 는 Alask 州 政府가 Census Bureau 를 代身해서 規明해 주고 있다.

7) 選擧 地區(Election Precincts)

이 地區는 選擧를 目的으로 州政府나 地方自治團體가 定하는 區域이다. 이 地區는 다른 名稱으로 選擧 區域 (Election District)이나 投標區 (Voting District)라고도 부른다. Census Bureau 와 州政府의 共同事業으로 聯邦法 PL 94-171에 따라 Bureau 가 23州에 대해서 全部 또는 一部 地域을 위한 Election Precinct data를 마련하고 있다. 기타 州는 Election Precinct data (선거지구 통계)는 州 自體가 개별적으로 Census Block data 를 위해서 마련하고 있다.

(2) Census 統計 行政 區域(Statistical Administrative Areas)

1) Census 地理 地域과 分區(Census Geographic Region과 Division)

美國에는 4 개의 Census 地域 (census region) 이 있다. 그것은 West, South, Northeast 그리고 Northcentral 地域으로 되어 있다.

South 地域에는 3 개 分區 (divisions) 이 있고 기타 地域에는 各各 2 個의 分區는 서로 인접한 州가 몇개 합쳐어 구성되어 있다. 단지 Pacific Division 인 Alaska 와 Hawaii 그리고 西都 海岸에 位置한 州들은 例外的인 分區이다.

2) 大都市 標準 統計 地域(Standard Metropolitan Statistical Areas—SMSA's)

이 SMSA는 人口가 50,000 이상인 都市와 그 郡을 말한다. 그리고 社會的, 經濟的으로 聯關된 그 인접된 郡들도 이 中心都과 함께 같은 SMSA에 屬하게 된다. 1970年에 Census Bureau 가 통계를 수집한 SMSA는 247개였고, 1980年 Census 때는 323SMSA's가 통계구역으로 설정된 바 있다.

이 SMSA에 인접된 郡을 포함시키는 基準은 通勤形態 (commuting pattern) 에 대한 Census data 에 따라 결정된다. 여러 SMSA가 1970年 Census 後에 그 1970年 Census의 Commuting deta에 따라 그 구역이 재조정된 바 있다.

3) 都市 地域(Urbanized Areas—UA's)

이 地域은 한 都市와 그 周圍의 密度가 비교적 높은 地域 (교외지역)으로 構成된 地域이다.

Census에 나타난 人口와 人口 密度가 都市 地域 (UA)의 境界線을 결정하는데 쓰이는데 이 경계선이 바로 都市 地域과 農村 地域 (rural territory)을 구별하는 선 (dividing lines)이 된다.

4) Census 郡 分區 (Census County Divisions - CCD's)

이것은 약 20개 州에서 사용하는 통계구역 (statistical areas) 이다. 이들 州에서는 小單位 區域 (minor civil division)이 法的으로 區分되지 않았거나 또는 그 경계선이 수시로 변경되어 Census 목적에 적합하지 않은 곳이다.

5) Census 計劃地域 (Census Designated Places)

이 CDP는 法的으로 承格되지 않은 뚜렷한 住居地域 (residential nucleus) 으로 된 人口 密集地域을 말한다. 1970年에는 CDP를 "Unincorporated Places"라고 명명하였다.

이 區域의 숫자는 1970年에 약2,000개에서 1980년에는 약 3,000개 區域으로 증가하였다. 이 CPD는 人口 密度가 每 Sq. mile 당 1,000명 以上이고 CDP의 最小 人口는 1,000명이다.

6) Census 標準 區域 (Census Tracts)

Census Tract는 그 人口가 平均 約 4,000 명 規模의 統計區域이다.

SMSA의 郡들은 1980年에는 Census Tracts로 다시 細分되었다. 이와 함께 SMSA에 屬하지 않은 252 郡은 그 州의 全體를 Census Tract 로 細分한 바 있다. 이들 州는 Connecticut, Delaware, Hawaii, New Jersey 그리고 Rhode Island 州가 이에 해당한다.

이 Tracts의 총 숫자는 1970年에 약34,600 에서 1980年에는 43,300으로 증가한 바 있다.

Census의 比較性을 保存하기 위하여 Census Tract 경계선은 일반적으로 쉽게 변경되지 않는다.

7) 近隣住區 (Neighborhoods)

이것은 1980年 Census에서 새로 설정한 統計小單位 區域 (subareas) 인데 이 區域에 對한 Census 統計는 Census Block이 설정된 곳에서 그것을 基礎로 近隣住區 統計를 收集하도록 한 바 있다.

이 통계는 Program에 참가하도록 요구한 도시들에만 실시되어 이용할 수 있게 되었다.

8) 調査 集計 區域 (Enumeration District - ED's

1980年 Census에서 Bureau는 Census Blocks이 설정되지 않은 곳에서 deta를 수집하고 통계를 열거하기 위해서 (tabulating statistics) 사용한 구역이다. ED's는 그 人口 規模가 일정하지는 않지만 平均 600명 정도이다.

9) 街區群 (Block Groups)

이것은 人口가 平均 約 1,100으로 되어 있는 Block의 집단으로 되어 있는 구역이다.

Block 統計가 수집된 곳에서는 BG's가 data발표에 있어서 (data presentation) ED's 의 위치를 차지한다.

결국 Block Groups 와 Enumeration Districts가 全國을 取扱하는 基礎的 統計區域이다.

10) 街區 (Blocks)

Census 調査區域으로서 가장 작은 區域인데, Block은 平均 70명 人口를 갖고 있다. 이 區域은 道路로 境界된 작은 직사각형의 區域을 말한다.

1970年에는 이 Block 統計는 모든 都市地域 (U. A)에 조사, 수집되었고 그후 Block통계는 1976年 당시 人口 10,000이상의 모든 도시는 다 包含시키도록 확대 되었다.

11) 其他 區域 (other areas)

5. 美國 人口, 住宅 Census (1980年) 調査範圍

(1) Census 設問紙 作成 方法 (Questionaire Forms)

이 설문지 內容을 作成하는데에는 Bureau 가 決定하도록 그 權限을 부여받고 있는데 그 根據는 美國 法律 U. S. Code Title 13이다.

그 法律은 "商務長官이 Questionaire (설문지)를 作成하고 調査를 실시해야 하고, 그리고 統計調査에 對한 質問의 수효, 설문지 規格 (form), 其他 細部 事項을 決定해야 한다"고 規定하고 있다.

그런데 그 후 1942年에 制定된 Federal Reports Act는 Census Bureau가 설문지를 豫算管理廳에 提出해서 審査를 받도록 規定하고 있다.

그리고 Title 13法은 Census局이 Census 調査日 (census day) 3年 前에 포함될 題目 內容을 美國議會에 報告하고 2年 前까지는 Census

Table 1. Comparison of Items on the 1980 and 1970 Questionnaires

Item # on 1980 questionnaire		Percentage of the questionnaires including the item	
	Population Items	**1980**	**1970**
1.	Name	100%	100%
2.	Household relationship	100	100[1]
3.	Sex	100	100
4.	Race	100	100[1]
5.	Age	100	100
6.	Marital status	100	100
7.	Spanish origin	100	5[1]
8.	School enrollment and type	S[2]	15
9. 10	Years of school completed	S	20
11.	Place of birth	S	20
12a.	Citizenship	S	5
12b.	Year of immigration	S	5[1]
13a.-c.	Current language and ability to speak English	S	–
14.	Ancestry	S	–
15.	Residence 5 years ago	S	15
16.	Age screening question (items 17-33 are limited to persons 15 years old and over)	S	20
17.	Activity 5 years ago	S	20
18.	Veterans status and period of service	S	15[1]
19a.-b.	Work disability	S	5[1]
19c.	Public transportation disability	S	–
20.	Children ever born	S	20
21.	Marital history	S	5
22. 25. 26.	Employment status	S	20
22.	Hours worked last week	S	20
23.	Place of work	S	15
24a.	Travel time to work	S	–
24b.	Means of transportation to work	S	15[1]
24c.-d.	Carpooling	S	–
27.	Year last worked	S	20
28.	Industry	S	20
29.	Occupation	S	20[3]
30.	Class of worker	S	20
31b.	Weeks worked last year	S	20
31c.	Hours usually worked per week last year	S	–
31d.	Weeks unemployed last year	S	–
32. 33.	Income, by type	S	20[1]
Derived[4]	Family size and household size	100	100
Derived	Family type and household type	100	100
Derived	Poverty status	S	20
Derived	Type of group quarters	S	20
Derived	Spanish surname[5]	S	20
Derived	Spanish heritage	–	20
Derived	Foreign stock	–	15
	Mother tongue	–	15
	Birthplace of parents	–	15
	Vocational training	–	5
	Industry and occupation 5 years ago	–	5
	Duration of disability	–	5
	Housing Items		
H1. to H3.	Coverage questions[6]	100	100
H4.	Number of living quarters at address	100	100
H5.	Access to unit	100	100
H6.	Complete plumbing facilities	100	100[1]

Item # on 1980 questionnaire		Percentage of the questionnaires including the item	
	Housing Items—Continued	**1980**	**1970**
H7.	Number of rooms	100	100
H8.	Tenure	100	100
H9.	Condominium identification	100	100[1]
H10.	Acreage and commercial establishments	100	100
H12.	Contract rent	100	100
C1. C2.	Vacancy status	100	100
C3.	Boarded-up status	100	–
D.	Duration of vacancy	100	100
H13.	Units in structure	S	20
H14a.-b.	Stories in structure and presence of elevator	S	5
H15.	Farm status	S	20[1]
H16. H17	Source of water and sewage disposal	S	15
H18.	Year structure built	S	20
H19.	Year householder moved into unit	S	15[1]
H20.	Heating equipment	S	20
H21a.-c.	Fuels used for house heating, water heating, and cooking.	S	15
22a.-d.	Cost of utillities and fuels (component of gross rent and selected monthly owner costs)	S	20
H23.	Complete kitchen facilities	S	100
H24.	Bedrooms	S	5
H25.	Bathrooms	S	15
H26.	Telephone	S	100[1]
H27.	Air conditioning	S	15
H28.	Automobiles available	S	15
H29.	Vans or light trucks available	S	–
H30. to H32.	Selected shelter costs for homeowners	S	–
Derived	Persons in unit (household size)	100	100
Derived	Persons per room	100	100
Derived	Gross rent	S	20
Derived	Selected monthly owner costs	S	–
	Basement	–	100
	Clothes washing machine	–	5
	Clothes dryer	–	5
	Dishwasher	–	5
	Home food freezer	–	5
	Television	–	5
	Battery radio	–	5
	Second home	–	5

[1]1980 version is significantly changed from 1970 version in concept or amount of detail.

[2]"S" indicates sample information asked on the long-form questionnaire. 1980 items asked on a sample basis are asked of 16 2/3 percent of all housing units, EXCEPT for governmental jurisdictions of less than 2,500 inhabitants where this sampling rate is changed to 50 percent of all housing units. In combination, the two sampling rates produce a national sampling rate of approximately 19 percent.

[3]The question is not significantly different; the classification system (which is independent) is very different.

[4]"Derived" refers to items which do not appear on the questionnaire but, instead, are callculated by combining information from other items. For example, while no question specifically asks family size, family size can be determined based on responses to the household relationship question.

[5]In five Southwestern States only.

[6]These questions help ensure that the coverage of household members is complete.

局이 개별 설문 항목을 의회에 提出해야 한다.

따라서 이 問項 作成을 爲하여 1974年 10月부터 1975月 7月까지 Census局에서는 全國 73個 市에서 개최하여 1970年 Census를 批判하고, 그 기회를 통하여 1980年 Census의 절차와 내용을 토의한 바 있다.

이와 더불어 Census局은 1974年 11月과 1975年 12月 사이에 모든 州의 高位 計劃關係 (planning) 實務者들과 地域會議 (Regional-Meeting)를 가지고 그들로부터도 Census 조사 내용 항목에 대한 견해를 상의한 바 있다.

이렇게 이 局에서는 1976年과 1977年에 걸쳐서 이 문항에 대한 제안을 계속 수집하였다.

豫算管理廳 (Office of Management and Budget)에 設置된 常任 諮問機關인 人口 Census 聯邦機構協議會 (The Federal Agency Council for Demographic Censuses)도 이 1980年 Census 설문지 작성에 參與하고 있다.

이 Census (협의회)는 90개 이상의 聯邦政府 機關 代表로 構成되어 있다. 그 外에 Census Bureau의 常任 諮問委員會는 聯邦政府 外部 專門家들로 구성되어 있는데 이들이 1980年 Census의 조사를 위한 主 內容 (subject content)을 결정하는데 參與하고 있다.

Census Bureau의 職員 (staff)은 그 설문의 字句 決定에 主로 責任을 맡고 있다. 이 個別 設問紙에 對한 大部分 字句 決定은 約 14,000世代를 對象으로 1976年에 郵便으로 實施한 全國 內容 試驗調査 (National Content Test)로 廣範圍한 試驗을 실시하여 決定하게 된다.

그러나 重要한 事實은 1980年 Census 設問紙의 內容은 그 前의 (1970年 Census) 內容을 고려하여 그것과 一貫性있는 方向으로 決定된다고 보아야 한다. 따라서 그 내용은 무엇보다도 조사 설문 내용의 安定性, 持續性등을 고려하여야 한다. 이때 安定性, 持續性의 維持가 重要한 理由는 時間의 經過에 따른 變化를 測定하기 위한 것이다.

다음에 紹介되는 〈table 1〉는 1970年과 1980年 설문지의 내용을 비교한 것이다.

(2) 人口 住宅 Census 調査 設問 內容

1) Short Form과 Long Form

1980年 Census에는 2가지 種類의 설문지를 使用하고 있다. 그 하나는 Short Form (間易調査書)다른 것은 Long Form (精密調査書)이다. 그런데 전체 世代數의 約 81%는 Short Form을 應答했고, 나머지 世代 約 19%는 Long Form을 應答했다. 이 Short Form에서는 각 世代의 個人別 調査에 對한 7個의 質問이 있고, 各 家屋 (housing unit)에 대한 9個의 질문이 句含되어 있다. 그리고 追加로 3個의 質問이 있는데 이것은 各 世代에서 누락된 人員이 없는지를 確認하는 질문인 것이다.

이들 조사 項目에서 얻어진 data를 100%精報, 또는 Complete Count data (전수조사정보) 라고 한다. 이 Short Form (間易調査書)에 使用한 調査 項目들은 물론 Long Form (精密調査書)에도 使用한다. 이 Long Form에는 追加로 26個의 人口 調査 問項과 20個의 住宅 調査 問項 (Subjects)이 있다. 이 Long Form의 調査 項目은 각 世代에서 추출한 표본 조사에서 使用되었는데, 全國的으로 平均 約 19%의 世代에 使用하였다. 물론 이 標本調査 方法 (Sampling)을 쓰는 理由는 Census Bureau가 全體的인 調査 費用을 最小限度로 줄이면서 補充 調査 事項 (additional subjeccts)에 대한 精報를 수집하기 위해서 쓰는 것이다. 이 標本調査는 (Sampling) Census Tract 보다 큰 地域인 Places, Counties, SMSA 그리고 州와 같은 지역에 대한 基礎 data를 산출하는데 適當한 方法이라고 한다. 그러나 Census 조사에서 가장 작은 地理的 調査 區域인 Blocks 조사에는 적당하지 않다. 따라서 Short Form으로 수집한 100% data는 Sample data 보다는 더 正確한 data이다. 그리고 이 100% data는 우선적으로 처리되므로 더욱 신속하게 利用할 수 있다. 人口 Census에 關한 調査 項目은 이미 소개된 〈table 1〉과 같다.

(3) 人口 住宅 Census 調査 項目 (100%정보) 內容 分析

1) 人口 Census 調査 項目 (100%調査)

人口 Census 調査 內容은 이미 지적한 바와 같이 Short From에서 사용된 7개 항목과 Long Form에서 사용한 7개와 추가 질문인 26개의 항목이 있는데 이 조사 항목 分析에서는 Short Form과 Long Form의 기초 조사 항목이라고 할 수 있는 처음 7개 人口 조사 항목만 분석하려고 한다.

이 人口 Census의 7個 人口 項目은 다음과 같다.

① 姓名 (name)
② 世代主와의 關係 (household relationships)
③ 性別 (sex)
④ 人種 (race)
⑤ 年齡 (age)
⑥ 結婚 關係 (marital status)
⑦ 스페인系 (spanish origin)

2) 住宅 Census 調査 項目

① 住宅 單位 (housing unit)란 家屋 (house), 아파트 (an apartment), 모빌홈 (amobile home), 또는 어떤 때는 단칸 방도 해당되고, 집배 (housseboat), 또는 휴가용 주거차량 (recreational vehicles)도 이에 해당된다. 그 居住人은 한 가족일 수도 있고, 독신인 개인도 되고, 2人이상의 친척 관계가 아닌 同居人도 된다. 따라서 住宅 調査 名單에는 占有된 家屋과 빈 건물도 包含되어 있다. boat, recreational vehicles는 그것이 그 居住者의 日常 거처이거나 그 居住者의 住居地가 다른 곳에 없을 때 그것을 住宅으로 취급한다. 建築中인 建物, 火災가 난 建物, 기타 建物, 그리고 非住宅 建物은 Census에 包含되지 않는다. 大學 寄宿舍, 養老院, 軍隊 兵舍, 친척 아닌 9명 以上의 集團 居住地는 住宅 名單으로 集計되지 않는다. 그것은 그 代身 集團 住居地로 取扱된다. Census는 이들 集團 住居地에 대해서는 如何한 住宅 情報도 提供하지 않는다. 그러나 집단 주거지에 居住하는 사람들은 人口 調査 統計表에는 集計된다.

② 住宅 Census 調査 項目 (100%조사) 住宅 Census 調査 內容도 人口 Census 調査 內容과 같이 Short Form과 Long Form에 使用 되는 調査 項目으로 區別되는데 우선 100% 調査 項目으로서 Short Form에 使用된 것은 9個의 項目과 追加 3項目이 있고, Long Form에는 이들 項目은 물론 包含되고 그 外에 20個의 調査 題目 (subjects)이 있다. 그 항목의 나열은 〈table 1〉에 소개된 바 있다.

따라서 이 分析에서는 Short Form에서 취급한 9개 항목을 分析하도록 한다.

이 住宅 Census의 9개 住宅 項目 다음과 같다.

i) H1-H3, 適用 範圍 問項 (coverage question)
ii) H4, 住所地의 總 居處數 (number of living quarters at address)
iii) H5, 住宅 接近 (access to unit)
iv) H6, 水道 파이프 施設 (complete plumbing facilities)
v) H7, 房數 (number of rooms)
vi) H8, 所有 條件 (tenure)
vii) H9. 콘도미니움 (condominium identification)
viii) H10, 商業用 垈地, 建物 (acreage and commercial establishment)
ix) H11, 不動産 價値 (value)

6. 美國 人口, 住宅 Census (1980年) 와 Computer 活用 方法

(1) 人口, 住宅 Census 調査書의 整理, 記録과 Computer Tapes 製作

1980年 Census data의 初期 段階의 整理는 (Processing) 3個의 Census 정리 담당 사무소에서 처리된다. 그 位置는 Indiana 州의 Jeffersonville (이곳에서 1970年 Census는 全部 정리·처리하였다.) Louisiana州의 New Orleans市, 그리고 California州의 Laguna Nigeul市이다.

이곳에서 Census 擔當 職員이 하는 일은 ①조사서를 수집, 정리, 보관 ② 필기로 應答한 項目에는 符號를 記入하고 ③ 모든 調査書를 Microfilm으로 찍고 ④ 이 Microfilm 한 調査書를 Computer로 自動 判續이 될 수 있는 電子記號 (ele-

ctroniic form)으로 전환하고 ⑤ 이 情報를 Census Bureau 本部로 送信하게 된다.

그 다음으로 Census Bureau 本部에서 이 Censsus data의 主要 정리 작업이 始作되는데 그 內容은 ① 資料의 Computer 編輯과 모든 世代別, 個人別 記錄을 Computer Tape 로 만드는데 이것을 Basic Record Tape라고 한다. ②이 Basic Record Tapes의 정보로서 統計表를 만든다. ③ 이 統計 資料를 다시 檢討하고, ④이 統計 資料(Summary statistics)로서 統計 報告書(Reports)와 Computer Tape와 같은 data 資料(data products)를 製作한다.

이러한 統料들資料(Summary Statistics) 들은 100% data에 해당되는 部分은 우선적으로 처리되어 最終 公式州別 人口 統計는 1981年 1月 1日까지 大統領에게 報告되어야 한다. 그리고 1975年 制定된 法에 따라 Census Bureau는 各 州政府에 그 州의 地理的 小單位地域에 對한 人口 統計를 1981年 4月 1日까지 報告해야 된다.

이렇게 짧은 時間內에 방대한 Census 資料를 처리하는 데에는 매우 능률적인 自動 處理 장치가 되어 있는데 그것을 소개하면 다음과 같다. 이 장치로서 잘 알려진 기계는 FOSDIC인데 (Film Optical Scnsing Device for Input to Computer) 이 기계는 1960年 Census 때부터 사용하기 시작한 것인데 그후 그 性能이 더 改良된 機械이다. 이 FOSDIC 機械는 microfilm을 判讀하여 (Scan) 그 microfilm으로 찍은 Census 조사서의 內容을 Computer Tape에 옮기는 作業을 하게된다. 따라서 Census 調査書는 FOSDIC 處理를 할 수 있도록 作成되었다.

그러므로 Short Form과 Long Form의 100% data 또는 Sample 조사 항목들은 最小限의 作業으로서 FOSDIC 判讀을 위하여 micro film을 찍도록 되어 있는 것이다. 이렇게 하여 Short Form과 Long Form 調査書는 ED別로 microfilm으로 찍어서 FOSDIC으로 判讀하게 된다. FOSDIC 作業은 data를 Computer가 判讀하고 처리할 수 있는 形態로 만드는 것이다.

따라서 Computer는 각 個人과 住宅別 data를 多樣한 편집 과정과 比重 作業(Weighting processes)을 거쳐서 처리하는 作業을 한다.

이러한 과정을 거쳐 個人別, 住宅別 그리고 그와 관련된 地理的 情報(Geographic Information)에 對한 整理된 data (edited data)는 Basic Record Tapes(BRT's)라고 부르는 Computer Tapes에 보관된다. 따라서 모든 100% 統計表와 표본조사 統計表는 이 Computer Tapes로 작성하는 것이다. 이 BRT's는 個人 姓名과 住所를 包含하지는 않지만 그것들은 개인과 細分된 地理的 符號를 (detailed geographic codes) 갖고 있으므로 그것은 非公開 資料이며, 統計資料(statistics products)를 作成하기 위하여 단지 Census Bureau 職員만 使用할 수 있다.

이렇게 BRT's에서 여러 地理的 單位 地域인 Blocks, Tracts, Places, Counties (郡)別로 된 tata內容(data summaries)을 다른 Computer Tapes로 옮겨서 整理하게 된다. 이렇게 여러 地域別 統計表를 包含하는 Tape를 "Internal Summary Tapes"라고 하는데, 이 Tapes들이 刊行物의 統計表, microfiche, 그리고 對外的으로 利用되는 Summary Tapes에 쓰이는 統計表를 만드는 基本資料 Tapes이다.

(2) 人口, 住宅 Census (1980) Data Products와 Computer Tape Files

Census Bureau는 1980年 Census data products로서 여러 가지 資料들을 製作하는 데 그 重要한 것들을 보면 다음과 같다.

ⓐ 刊行物 統計 報告書와 其他 統計 刊行物; 이 資料들은 各 州別로 또는 各 Standard metropolitan Statistical Area (SMSA) 別로 發行된다.

ⓑ microfiche; 이 資料는 刊行物 報告書로 구할 수 없는 資料들을 Card 모양의 Film으로 제작한 것이다. Computer Commary Tapes에 수록된 data도 이 microfiche로 제작되어 있다.

ⓒ Data內容 要約 Computer Tapes; 이 Tapes는 刊行物에 나타난 data와 비슷한 內容이지만 더 細密한 data이고 또 刊行物에서 取扱되지 않은 地域에 대한 統計資料를 提供해 주고 있다.

이들 資料中 어떤 資料를 利用할까 하는 문제는 各者가 決定할 문제지만 광범위한 資料를 大規模로 신속하게 이용하려면 무엇보다도 Computer Tape를 이용하는 것이 가장 效果的이고 적당하다고 한다. 그 이유는 多量의 data를 신속하고 正確히 처리하고 分析할 수 있기 때문이다.

1) Computer Tape에 收錄된 Data Files

이 Data Files은 Census data를 大規模로 利用하여 複雜한 硏究를 하기 위해서 利用되는 매우 적절한 資料이다. 또 이 Data Files의 資料들은 統計 刊行物이나 microfiche에 發表되지 않은 細部的인 統計이고, 또 自動 判讀(machine readable data) 이 可能한 資料이므로 매우 有用한 資料이다. 이 Computer Tape 資料가 매우 重要한 理由는 대체로 印刷費가 비싸므로 많은 Census data를 印刷하지 못하고 그 극소수만 印刷하고, 그 나머지는 tape에 收錄하게 된다. 따라서 印刷하지 못한 많은 data는 Computer Tape reels로서 사용하게 한다. Census局이 製作하는 Computer Tapes에는 두가지가 있다. 그 하나는 1980 Summary Data Files이고, 다른 하나는 Microdata Files이다.

①. Summary Data Files

1980年 Census에서는 더 광범위하고 방대한 規模로 製作되었다. 이 Summary Data Tape는 刊行物 報告書와 그 內容이 비슷하지만 그 差異는 더 細部的이고, 더 많은 地域區分에 대한 data를 提供해 준다. Census Bureau는 이 Summary Data Tape를 5個의 public use files로 提供하는데 그것을 Summary Tape Files 1부터 5라고 부른다.

이 Summary Data Files 1에서 5에 대한 內容을 〈Table 2〉에 소개한다.

그리고 〈Table 3〉는 각 Files에서 取扱되는 地理的 單位(Geographic Area)를 나타낸다. 대부분 STFSTF'S는 2가지 이상의 Files를 갖추고 있는데 ("A" "B" "C" 등)이 差異는 그 Files이 取扱하는 地理的 地域 單位 種類에 그 差異가 있다.

따라서 이 STF'S 1부터 5에 A, B, C 등의 그 地理的 區域이 다른 內容의 Files이 包含되므로 이 STF'S 使用者는 그가 원하는 Data가 그 地理的 單位地城이 어떤 地域인가에 따라서 必要한 STF의 種類와 ABC등의 내용을 決定하여 使用할 수 있는 것이다.

따라서 이 STF'S를 利用하기 위해서는 Census Geographic Areas에 대한 相當한 知識과 Data products의 內容을 相當히 잘 理解하여야만 그 資料들을 使用할 수 있는 것이다.

STF 5는 州, SMSA, 人口 50,000以上의 市, 郡 그리고 人口 250,000 以上의 SMSA 中心 都市(Central city)에 대한 자세한 人口, 住宅 統計를 提供한다.

〈Table 4〉에서 地理的 區域單位 序列 順序는 (Indentation)는 이 單位 地域의 階層組織을 意味하고 있다. 例로서 STF1, FileA (STF1A) 內容에서 "Places or Remainder of MCD/CCD는 "MCD 或은 CCD" 하부에 位置하고 만입되어 있는데 이것은 그 File은 Minor Civil Division이나 Census County Division 內에 있는 Place와 그 外部 地域(즉, Place나 Places의 外部 地域이지만 MCD나 CCD의 內部 地域)의 Summary Data를 包含하고 있다는 意味이다. 이러한 地理的 Summary 水準과 內容에 있어서 STF 1은 1970年 Census의 First와 Third Count의 內容과 一致 한다고 볼 수 있다. 그것은 Census에서 調査된 가장 細部的인 地理的 區域 內容을 提供해 준다. 즉 그것은 Blocks와 Enumeration Districts (ED'S) 이다.

STF'S 2와 STF'S 4는 地理的 單位와 內容面에서 1970年의 Second과 Fourth Count에 해당하고, STF'S 3은 1970年 Fifth count에 해당한다.

이 STF'S를 區別하는 다른 基準으로서 STF1과 STF 2는 모든 應答者가 대답한 그 調査 項目 內容에 (Complete Count) 基礎를 둔 Data를 提供하고 있다. STF 3, 4, 5는 Census의 直接 계수라기 보다는 推算인 Sample data를 包含하고 있는 것이다. 이 推算은 (estimate) 大部分 地域에서 每 6家屋中 1家屋을 택해서 Sample로 調査한 基礎하고 있다. 따라서 STF 3, 4, 5의 Data는 전체 人口를 나타내기 위

Table 2. Overview of 1980 Summery Tape Files (STF's)

STF*	1970 counterpart	Related report series	Smallest geographic unit	Data cells per record	Detailed summaries by:	Projectes release dates
STF 1	1st Count +3rd Count	PC80-1-A; PHC80-1; part of PHC80-3 and -4	Block/ED	321	Total	9/81– early 1982
STF 2	2nd Count	PC80-1-B; HC80-1-A; part of PHC80-2	Tract, MCD/CCD, place of 1,000+	1,330 (Record A) 962 (Record B)	Record A for total Record B repeated for: Total, race, Spanish origin	Early 1982– mid-1982
STF 3	5th Count (File C)	Part of PHC80-3 and -4	BG/ED	1,126	Total	Spring 1982– fall 1982
STF 4	4th Count	PC80-1-C; HC80-1-B; part of PHC80-2	Tract, MCD/CCD, place of 2,500+	5,000 (estimate for Record A) 3,500 (estimate for Record B)	Record A for total Record B repeated for: Total, race, Spanish origin, ancestry	Mid-1982– late 1982
STF 5	6th Count	PC80-1-D; HC80-2	Central city of SMSA, county of 50,000+, place of 50,000+	108,000 (estimate)	Repeated for: Total, race, Spanish origin	Mid to late 1983

For information on the component files (A,B,...) of STF's, see

하여 調整된 (weighted) Sample 情報에 根據하므로 이 Files의 data 內容은 (items) STF 1과 2의 그것에 對應하는 內容과 약간 差異가 있게 된다.

1980年 STF는 그것이 取扱하는 各 地理的 單位 地域內의 모든 地域의 記錄 (record)을 包含하고 있다. 예로서 한 州의 STF 1A는 그 州의 各 小單位 調査 區域 (enumeration district) 과 Block Group의 記錄을 包含하고 있고, 그리고 人口나 住宅이 없는 區域까지도 取扱하고 있다. 1970年 Tape는 人口나 住宅이 없는 區域의 記錄은 除外한 바 있었다.

② Microdata Files

이 Microdata Files 에는 두 種類가 있는데 그 하나는 Public use microdata이고, 또 하나는 Confidenal Microdata이다. 그런데 이 Confidential Microdata는 Census Basic Record Tapes를 包含하고 있는데 이것은 각 世代로 부터 수집된 調査書를 Computer에 收錄한 것이다. 물론 이것은 Census 處理 過程에서 編輯도 되고, 記號도 定해진 記錄이다.

Census Bureau는 이 Confidential Microdata를 利用해서 여러 刊行物에 發表되는 Summary data 統計表와 STF 들을 만들게 된다. 그리고 Public use microdata는 Confidential Microdata를 발췌한 것인데 (extracts), 그 理由는 個人이나 個別 世代가 判明되는 것을 防止하기 위하여 처리된 資料이다.

따라서 이 Public use microdata는 各 家屋 (housing unit)의 標本 (sample)에 對한 記錄을 包含하고 있는 Computer Tapes를 말한다. 이 記錄은 各 家屋과 그곳에 居住하는 人員 (people)에 대한 特徵에 對한 情報를 包含하고 있다. 따라서 各 應答者의 개인정보 (confidentiality)를 보호하기 위하여 Census Bureau는 그 기록에서 개인 판명에 대한 정보는 삭제한 바 있다. 따라서 이 File로서는 Sample size限度內에서, 그리고 그 地理的 事項 限度內에서 그 data利用者에게 그들이 원하는 어떤 種類 data의 統計表도 作成할 수 있는 利點이 있다. 이 1980年 Census의 Public use microdata files 製作과 판매는 1982年 후반기에 가야 준비되게 된다. 그런데 Summary Data 와 이 microdata와의 差異는 Summary Data 刊行物 報告書, Summary Files, Microfiche 其他 特

Table 3. Areas Summarized on 1980 Summery Tape Files (STF's)

	STF 1	STF 2	STF 3	STF 4	STF 5
U.S., regions, divisions	C	C	C	C	X
States	A,B,C	B,C	A,C	B,C	X
SCSA's	C	B,C	C	B,C	X
SMSA's	B,C	A,B,C	C	A,B,C	X
Urbanized areas	C	B,C	C	B,C	
Counties:	A,B,C,	A,B,C	A,C	A[1],B,C	X[2]
Rural population by county	([3])	B,C	([3])	B,C	
Farm population by county				B,C	
Places (by population size):					
Under 1,000	A,B		A		
1,000 to 2,500	A,B	B	A		
2,500 to 10,000	A,B	B	A	B	
10,000 to 50,000	A,B,C	A[4],B,C	A,C	A[4],B,C	
50,000 and over	A,B,C	A,B,C	A,C	A,B,C	X[5]
County Subdivisions:					
MCD's in 11 States[6]	A,B,C[7]	B,C[7]	A,C[7]	B,C[7]	X[2]
MCD's in 9 States[8]	A,B	B	A	B	
MCD's in 10 States & CCD's in 20[9]	A	B	A	B	
Census tracts	A,B	A	A	A	
Block numbering areas	A,B		A		
Block groups	A		A		
Blocks	B				
Enumeration districts	A,B		A		
ZIP code areas			([10])		
Congressional districts (97th)[11]	A,C		A,C		
American Indian reservations/ Alaska Native villages	([3])	B,C	([3])	B,C	

[1] Includes only counties in tracted areas.
[2] If 50,000 or more inhabitants.
[3] Derviable by addition of component enumeration districts of block groups.
[4] Includes only places in tracted areas.
[5] Also include SMSA central cities with fewer than 50,000 inhabitants.
[6] States in the Northeast Region plus Michigan and Wisconsin.
[7] Only MCDs with 10,000 or more inhabitants are included in the 'C' files.
[8] Illinois, Indiana, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Ohio, and South Dakota.
[9] Includes States not covered in footnotes 5 and 8.
[10] Plans to produce a ZIP code area file (STF 3B) as part of the regular tabulation program were cancelled because of budget constraints. It is likely that such a file will be prepared as a special tabulation sponsored by outside organizations.
[11] Data for districts of the 98th Congress will appear in Files 'D' of STFs 1 and 3.

Table 4. Geographic Structure of 1980 Summery Tape Files (STF's) 1 through 4*

STF's	FILE A (State-by-State Release)	FILE B (State-by-State Release)	FILE C (Nat'l. Files-Follow Release of All States for Each STF)
STF 1	State County MCD or CCD Place[1] or remainder of MCD/CCD Tract[1] or block numbering area (BNA)[1] if present BG[1] or ED Place (alphabetic sequence within State) Congressional district	State SMSA[2] or remainder of State County[3] MCD (20 Northern States only)[4] Place[1] or remainder Tract[1] or block numbering area (BNA)[1] if present Block[1] or ED	US Region Division State SCSA[6] SMSA[6] Urbanized area County Place of 10,000+ Town/township of 10,000+ (11 States only) Congressional district
STF 2	SMSA[2] or tracted remainder of State County[3] Place of 10,000+[1] or remainder of county Tract[1] Totals for split tracts	State Components[5] SCSA[2] Urban/rural components SMSA[2] Urban/rural components Urbanized area[2] County Rural component MCD or CCD Place of 1,000+ American Indian Reservation/Alaska Native Village County components	US Components[5] Region Components[5] Division Components[5] State Components[5] SCSA[6] SMSA[6] Urbanized Area[6] County Rural component Place of 10,000+ Town/township of 10,000+ (11 States only) American Indian Reservation/Alaska Native Village County components
STF 3	Same as STF 1A	(7)	Same as STF 1C
STF 4 (Tentative)	Same as STF 2A	Same as STF 2B, except for: (1) addition of rural farm summaries for States, SCSA's, SMSA's and counties; and (2) only places of 2,500+ are included	Same as STF 2C, with the addition of rural farm summaries for States, SCSA's, SMSA's and counties

This chart excludes STF's 1D, 3D, and 5. STF's 1D and 3D summarize data for Congressional Districts of the 98th Congress, and reflect redistricting based on 1980 census results. The file structure of STF 5 is still being planned.

[1]A data summary for only pont of an area will be shown if the area is subdivided by higher level geography. For example, in STF 1A, the summary for a place that crosses county of MCD lines would be presented in two or more parts.

[2]Summaries for SCSA's, SMSA's, and UA's crossing State boundaries apply only to that part of the area within the State, except in File C.

[3]In New England, where an SMSA may cover only part of a county, this summary will be for only that part of the county in the SMSA.

[4]This summary level will be absent for the 20 States with CCD's and the 10 States whose MCD's are not recognized for revenue-sharing purposes (i.e., all States in the south and West regions plus Iowa). In these States, places will be sequenced within county, followed by a record for the remainder of the county. In the STF 1B for Puerto Rico MCD-equivalent records will be present.

[5]Component summaries for United States, region, division, and State:

Urban
Inside urbanized areas
Central cities
Urban fringe
Outside urbanized areas
Places of 10,000 or more
Places of 2,500 to 10,000
Rural
Rural places of 1,000 to 2,500
Other rural
Rural farm (present on STF 4 only)
Inside SMSA's
Urban
Central cities
Not in central cities
Rural
Outside SMSA's
Urban
Rural

[6]Following the summary for each SCSAM, SMSA, or UA, the portions of each are within each applicable State are presented. On STF 2, SCSA and SMSA records are followed by urban and rural component summaries.

[7]Plans to produce a ZIP code area file (STF 3B) as part of the regular tabuation program were cancelled because of budget constraints. It is likely that such a file will be prepared as a special tabulation sponsored by outside organizations.

殊 統計表에 發表되는 data 이다. 特히 이 Summary Data는 그 分析의 基礎 單位가 地理的 單位 地域으로서 (예; Census Tract, County, State) 그 單位 區域別로 人口, 住宅 數가 收録되어 있다. 그러나 이 microdata는 그 分析 單位가 各 個別 家屋이고, 그곳에 居住하는 人口가 그 單位가 되고 있다. 따라서 이 Public use microdata files의 用途는 個人이 必要로 하는 어떠한 特殊 統計表도 作成할 수 있는 長點을 갖고 있는 것이다. 특히 1980年 files는 Census에 나타난 모든 詳細한 記録들을 充分히 提供하고 있기 때문이다.

따라서 Sample size 의 制限한 地理的 區域 規明에 대한 制限이 있지만 그 Files의 利用者는 各種 Variables을 相互 聯關시키는 거의 無制限한 (infinite variety of tabulations) 統計表를 作成할 수도 있는 것이다. 따라서 이 Files로 그 利用者는 自己들 自身이 直接 Survey를 實施하여 Data를 수집해야만 얻을 수 있을 程度의 Data를 자유자재로 이용할 수 있는 것이다. 그러나 이 data Files는 Census data 수집 技術의 正確性과 個人이 실시하는 Sample Survey보다 더 광범위한 Sample 規模로 수집된 data라는 利點이 있다.

7. 結 論

本 研究는 매우 광범위한 內容의 美國 人口, 住宅 Census (1980)를 取扱한 바 있다.

이미 分析한 바와 같이 本 研究에서는 Census의 調査 方法과 範圍도 取扱한바 있는데 그것은 매우 科學的 方法으로 組識되고 實施되는 것으로 規明된 바 있다. 그리고 이 人口, 住宅 Census 調査를 爲한 調査區域 單位의 設定과 그 階層的 構造도 分析했고, 또 統計資料를 活用하기 爲한 各種資料의 組織과 種類에 큰 力點을 두고 分析한바 있다.

그 理由는 우리가 必要로 하고 수집하려고 하는 統計資料는 그 規模가 큰 巨視的 調査區域의 統計資料도 重要하다고 할 수 있으나 실제적으로 統計資料의 有用性은 보다 小單位의 微視的 調査區域의 統計資料에 있다고 할 수 있다.

그리고 우리가 조심스럽게 이해하여야 될 이 Census 統計資料는 그 統計蒐集과 統計表 作成이 行政區域 單位 (governmental unit)와 統計區域 單位 (statisitical unit)로 構成되어 있는 사실이다.

特히 이 두가지 調査區域의 重要性은 人口, 住宅 統計資料의 원활한 調査, 수집 그리고 活用을 爲해서 이들 區域을 完完的으로 使用해야 된다는 것이다.

結局 이 방대한 規模의 統計資料의 正確性과 有用性은 바로 이 統計 調査 區域의 매우 細密한 組識에 크게 힘입은바 있다고도 할 수 있다. 特히 重要한 事項은 이들 行政區域 (governmental unit)이나 統計區域 (statistical unit)은 그 경계선이 그리 쉽게 변경되지 않는 매우 安定되고 固定된 調査區域 單位가 되고 있다는 사실이다.

그 理由는 過去에 수집된 統計資料와 最近에 수집된 統計資料를 比較하기 爲해서는 그 區域의 일관성을 유지해야 되기 때문이다. 따라서 이들 安定된 調査區域의資料를 比較하여 研究하므로써 어떤 特定한 地域에 있어서 變化하는 狀態나 過程을 매우 쉽게 理解할 수 있게 된다.

結局 이 人口 Census는 住宅 Census를 함께 실시하므로써 各 家屋의 數를 把握하고, 그 家屋의 住所録에 依하여 그 居住 人口를 細密히 把握하고 있는 事實을 이미 指摘한 바 있다. 이것은 人口 Census에 依한 人口 統計는 各 調査區域 單位의 組織은 勿論이고 궁극적으로는 그 調査 對象者 (人口)가 居住하는 家屋이나 居住地까지 確認해야만 調査가 된다는 것을 意味한다고 할 수 있는 것이다.

特히 이 Census Data를 利用하기 爲한 資料 (data products) 로서 多樣한 方法으로 그것이 提供되고 있는 事實도 規明한바 있다. 이미 指摘한 바와 같이 1980年 人口, 住宅 Census를 그 Census Report의 간행물로서는 매우 적은 部分의 Data만 提供하고 있다는 사실도 지적한 바 있다. 오히려 大部分의 Census Data는 Com-

puter Tapes에 수록된 Summary Data Files로서 提供되고 있는 것이다. 特히 注目할 사실은 Summary Data Tape가 5개의 public use files로서 제공되고 있는데 이것을 Summary Tape Files(1 - 5)로 부르며, 이 各各의 STF에 다시 A, B, C, 의 細分된 Tapes 種類로 區分되어 결국 Census Data는 매우 세부적이고, 매우 작은 小規模 調査區域 Data까지 모두 公開되어 쉽게 使用할 수 있도록 組織되어 있다는 사실이다.

結局 巨大한 國家인 美國 人口, 住宅 Census Data가 매우 주의깊게 計劃하여 상당한 正確性을 維持하며 조사하였을 뿐 아니라 그 결과로 얻어진 그 방대한 規模의 Data를 쉽게 이용할 수 있도록 Computer Data Files인 Summary Tape Files를 各各 다른 次元과 規模의行政區域(governmental unit)과 統計區域(statistical unit)을 총망라하여 제작하여 그 利用이 可能하다는 사실을 本研究에서 發見한바 있다.

따라서 美國 人口, 住宅(Census 1980)는 하나의 人口, 住宅에 關한 情報 體系로서 相當한 實用性을 實現시킨 人口, 社會, 經濟에 關한 統計 情報 組織이 될 수 있다고 할 수 있다. 또 그 情報가 치밀하게 組織된 調査區域과 결부되어 있다는 事實은 이 情報가 바로 地理的 情報體系(Geograpleic Information System)가 된다는 것을 發見하게 된다.

結局 오늘날 當面한 여러가지 計劃活動의 大部分이 이 地理的 情報 體系(geographic Information System)를 必要로 한다는 것을 認識할 때 美國 人口, 住宅 (1980)가 바로 이 地理的 情報를 樹立하여 組織하고 實踐한 그 實績을 本研究에서 規明한 바 있는 것이다.

따라서 이 研究는 앞으로의 美國 自體의 人口, Census 調査는 勿論이고, 다른 나라의 人口, 住宅 Census 調査 方法과 內容, 그리고 그 Census Data의 公開와 利用에 보다 積極的인 地理的 情報 體系로서의 制度的 向上이 必要하다는 事實을 規明한 것이다.

A Study of the Procedure and Survey of 1980 U.S. Census of Population and Housing and its Computer Application

Summary;

The 1980 U.S. Census of Population and Housing is considered to be very extensive and reliable statistical information on the population and housing collected by scientific survey method conducted by the Bureau of the Census. It is understood that the census survey is conducted in every 10 years to collect the data on population and housing that is essential to formulate most important national and local policies by various governmental agencies as well as much business planning by business firms in the country.

Since the census survey and report deal with the entire nation as a survey areas, it is quite clear that the census data is very extensive and substantial to handle and retrieve when any user try to use it. Therefore it is quite clear that in addition to developing sound scientific survey methodology of the census, there is another important aspect of the census methodology to develop how to disseminate available census data for various users as efficiently as possible.

In this study, it is attempted to analyze the survey methodology in order to identify if there is any significant scientific procedures to collect and compile the census data that is available for the entire country. For the study of the survey procedure and tabulating all the statistical information, much effort has been made to analyze the organization of the census geographic areas made up with two distinctive areas known as the governmental-administrative areas and statistical areas.

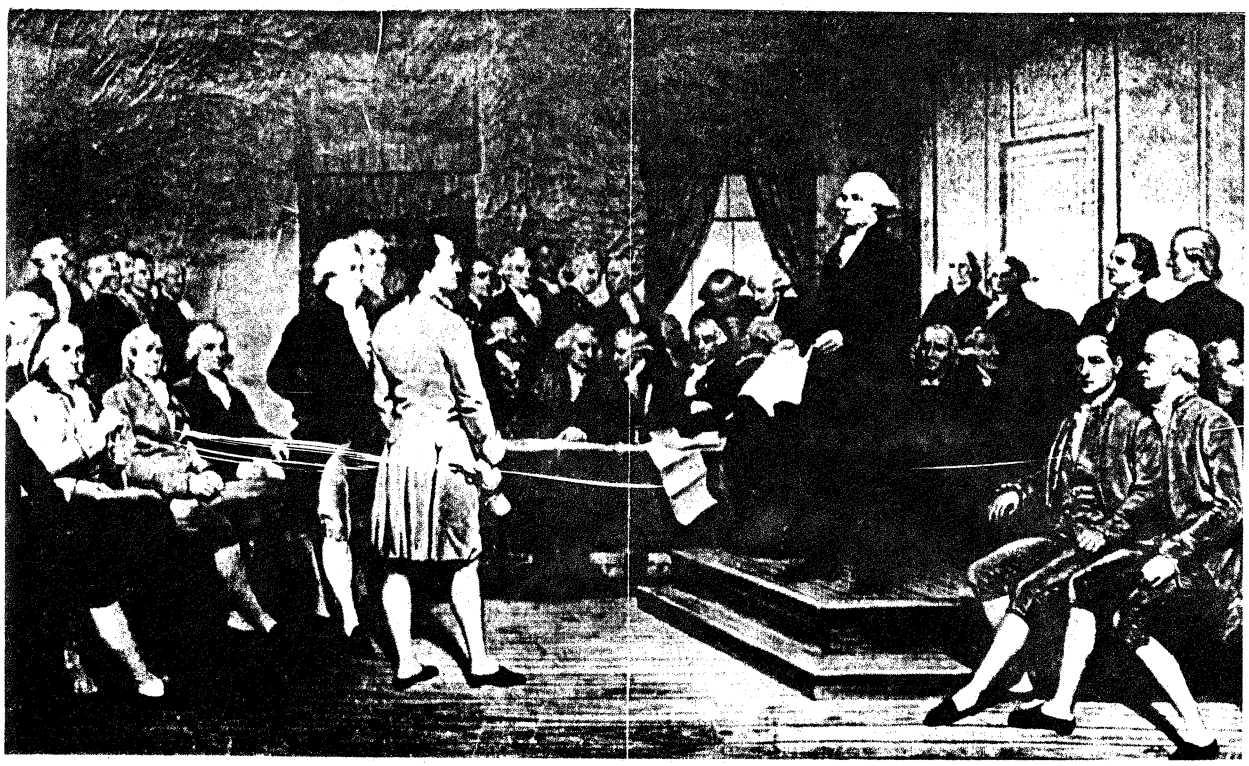
The U.S. Bureau of the Census has developed very effective method to disseminate the data products such as printed reports, microfiche and computer tapes, etc. Since the census data is statistical information, there is no question that how effective is can be when any user attempt to use census computer tapes known as Summary Tape Files prepared by the Bureau. It is to investigate the structure and components of the Summary Tape Files of the 1980 U.S. Census of Population and Housing.

2. Census U. S. A.

CENSUS USA

A thumbnail history of the Nation's Factfinder

U.S. DEPARTMENT OF COMMERCE
Bureau of the Census



Signing the Constitution

"Representatives and direct taxes shall be apportioned among the several States which may be included within the Union according to their respective numbers . . . The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years in such manner as they shall by law direct."

—Article 1, Section 2
Constitution of the United States

Thus, the framers of the Constitution established our Nation's statistical system at the same time that they founded our government. Provision for the Federal census was written into the Constitution as the basis for apportioning seats in the House of Representatives. This requirement laid the foundation for modern statistics gathering by the Census Bureau.

1790

THE FIRST ENUMERATION

Although apportionment required only a head count, some members of the Congress—notably James Madison—urged collection of additional facts about the people as a guide to future legislation. Their views did not prevail initially. Many Americans objected to answering questions they considered violations of their privacy. Others objected to the burden imposed by census reporting. Both objections are still heard today.

Consequently, only five questions were asked in the 1790 census. The count included the total of persons, male and female, free and slave, the total of males 16 and over, and the names of the heads of households. The names, incidentally, were posted in each town or city in a public place.

Secretary of State Thomas Jefferson was appointed to direct the census. He delegated the job to the 17 United States marshals who in turn hired assistants. This first enumeration was no easy task. There were no questionnaire forms, so the assistants had to supply their own paper, a substantial expense in those days. Many town and

county boundaries were vague or unknown. Roads and bridges were scarce, and travel was by foot, boat, or horseback. It took six days to travel from New York to Boston.

A few people refused to report, although the law provided that anyone refusing would "forfeit twenty dollars." Some were prosecuted, but history does not record whether any actually forfeited $20. The first census, for which nine months were allowed, was actually completed in 18. It showed a population of 3,929,326 for the 16 existing States plus the Southwestern Territory.

1800-1830

A VIGOROUS NATION OUTGROWS ITS CENSUS

The Nation grew mightily during 1800–1830 in territory, population and economic vigor. The census grew only slightly. Questions were added relating to physical disabilities and persons of foreign birth who had not been naturalized, but the data collected remained at a bare minimum.

Spurred by the international situation leading to the War of 1812, the Congress in 1810 asked for census inquiries concerning "the several manufacturing establishments and manufactures" within the Nation. This first attempt at an industrial census met with little success, however. Businessmen were and are major users of census data and were reluctant to report facts that might interest their competitors. These inquiries were dropped entirely in 1830, and the census retreated essentially to the same population questions used forty years earlier. The questionnaire carried seven population items that year.

At the time of the first census the Nation's population was 95 percent rural.

1840-1860

THE CENSUS CATCHES UP WITH THE NATION

Census taking forged ahead during the 1840–60 period, however. By 1860, six separate census questionnaires carried 142 items covering population, health, mortality, literacy, pauperism, occupation, income, wealth, agriculture, manufactures, mining, fisheries, commerce, banking, insurance, transportation, schools, libraries, newspapers, crime, taxes, and religion. In effect, it asked for a complete inventory of national activity.

As Madison had predicted, Congress found it impossible to legislate without facts. In addition, new States needed data on which to base their legislative and tax structures. And the expanding economy and social sciences created ever growing demands for economic and social data.

So much information was collected in 1860 that some could not be published before the next census was due. Moreover, hand tallying and lack of verification led to many errors. Census officials themselves testified to numerous weaknesses in census operations.

Still, a congressional committee described the 1860 count as "the most complete census that any nation has ever had." From the standpoint of coverage, it was indeed a landmark.

1870-1880

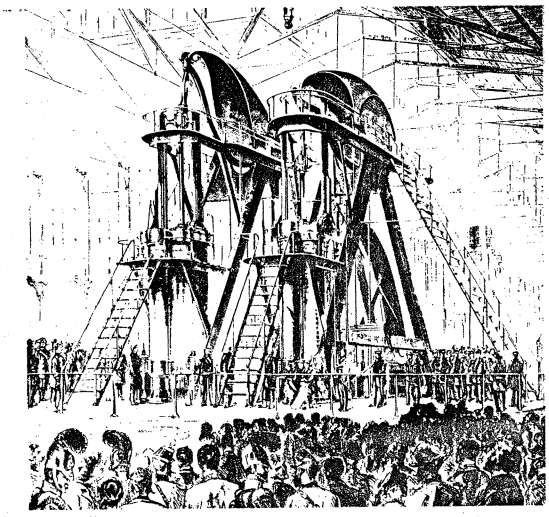
THE NATION'S CENTENNIAL

Although attempts to initiate a centennial census in 1875 failed, the census of 1880 was one befitting a centennial. Items of data collected reached the almost unbelievable total of 13,010.

The expansion focused even more attention on weaknesses already identified. There was no continuing census organization to provide advance planning. The volume of data swamped the marshals who, after all, had responsibilities other than the taking of the census. There still was no check of data for accuracy, and slow processing made some figures obsolete before they could be published.

The Congress ordered an exhaustive study of census operations by a committee headed by General James A. Garfield. The resulting legislation first affected the census of 1880 and constitutes a second landmark in census history. Marshals were replaced by civilian supervisors. Staffing and pay were liberalized, and checks of work were installed. "Special Agents"—professionally qualified people—were hired to collect and tabulate economic and social statistics.

Coverage, accuracy, and speed of enumeration were sharply improved, but the two major problems remained unsolved. The lack of a continuing organization still handicapped planning and some reports reached the public as late as 1887.



The Corliss engines of the Centennial Exposition dramatized the Nation's shift toward an industrial society.

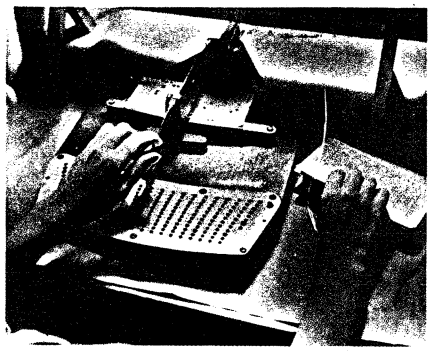
1890-1900

BREAKTHROUGHS: A PERMANENT BUREAU AND PUNCHCARD PROCESSING

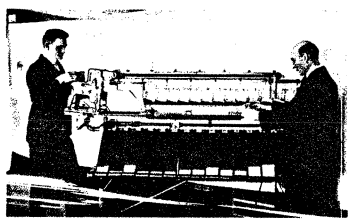
The basic solution of both these remaining problems makes the census of 1900 another landmark in the history of the Census Bureau. By an Act of Congress, approved March 6, 1902, the current census organization was continued as a Bureau of the Department of Commerce and Labor. Professional staff members, corresponding to the earlier "Special Agents," took charge of the special programs. A Census Geographer was appointed to tackle the long-standing problem of indefinite jurisdictions. A small research staff began collecting information on census methods all over the world.

Punchcard and mechanical tabulating equipment invented by former Bureau employee, Dr. Herman Hollerith, was first used in the census of 1890. These devices were greatly improved by 1900 and made it possible to publish the results of the census faster than ever before. Reports on manufactures, agriculture, and other fields were also completed much faster.

With these breakthroughs the Nation—for the first time in its history—had an organization and facilities to plan and carry out any large-scale statistical operation required by national interests. Moreover, the results could be reported to the people with reasonable speed.



Punchcard tabulation began with Hollerith's manual keyboard punch (above), and his electro-mechanical card sorter and tabulating machine (at right).



1910-1920

REFINING THE NEW CENSUS METHODS

As census planning improved, the collection system established in 1880 was refined and strengthened. By 1910 enumerators had maps of their districts. Data was checked in field and office reviews.

Significant improvements were made in data processing, many of them developed in the Bureau's own Engineering Laboratory. The tedious card punching process was speeded by devices punching a series of recurring items into whole stacks of cards. Mechanized punches replaced hand-operated models. Tabulating was much faster, with 1920 machines handling five times as many cards as those of 1900. A start was made toward mechanized quality control, as more sophisticated equipment was developed to reject enumeration and punching errors.

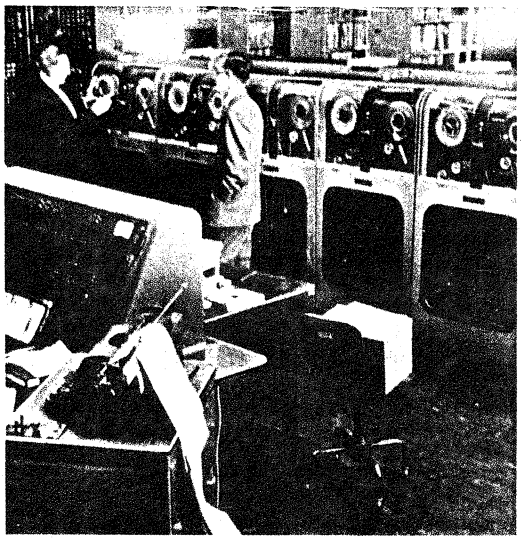
The census of 1910 included one of the Bureau's earliest research projects: an experiment with a mail census. Questionnaires were left at households by letter carriers. Although abandoned as unworkable, this sparked a series of studies eventually realizing the advantages of postal assistance in census taking. At the same time, much study was devoted to reducing collection and processing burdens. Specialized censuses such as those of manufactures and governments were scheduled apart from the population census and in different years.

1930-1940

THE CENSUS COMES OF AGE

With the census of 1940 came development and application of scientific sampling. Sampling is the technique of getting a clear statistical picture of a whole universe (*households, for example*) by obtaining data from a small representative sample of the whole. The sample must be drawn with mathematical precision. Techniques for accomplishing this had been developed by 1940. Use of sampling resulted in much additional information at a reduced cost and with a reduced reporting burden on the public. Sampling techniques were later applied to development of the Bureau's program of current surveys. These have allowed intercensal updating of information as well as current studies of a wide range of social and economic questions.

World War II brought another significant change in program structure. Bureau facilities were used for hundreds of one-time or special surveys of wartime manpower and industrial resources. After the war, this service was extended on a cost basis to other Federal agencies, State and local governments, universities, research institutions, and other non-profit organizations.



UNIVAC I was the first step toward a fully computerized census.

1950-1980

THE COMPUTER AGE

In the late 1940's, the Bureau helped to sponsor development of UNIVAC I, the first computer designed for mass data processing. Electronic data processing was first used in census processing in the early 1950's, but its application to major census projects was initially handicapped. The punchcard input system was still too slow and expensive for large scale processing. By the late 1950's, however, the Bureau, working with the National Bureau of Standards, developed the FOSDIC (Film Optical Sensing Device for Input to Computers) system for data input. FOSDIC transfers data directly from questionnaires to computer tape.

The computer also offered new capabilities in quality control. While mechanical tabulators could reject impossible answers, computers can recognize logically improbable answers and correct or neutralize them without human intervention.

Equally significant during this period was another experiment with the mail census. In 1960, enumerators left at each fourth household a second schedule covering such items as employment and income. The householder completed the form and held it to be collected by the enumerator. This was a necessary preliminary to the development of a full mail out/mail back census procedure.

1970 and beyond

LOOKING TOWARD 1980

The census of 1970 provided a full-scale test of the mail out/mail back procedure. The test covered about three-fifths of the population, mostly in metropolitan areas.

The mail census is simple in principle but involves tremendous detail. A list of mailing addresses is compiled for each area to be covered. Each address is coded as to State, county, city, census tract, and city block or similar area. This is checked and re-checked by the Bureau and the post office before and during the census. Procedures are provided to reach those with no mailing address. Forms are mailed to the various addresses and returned by mail. Households not responding or returning incomplete forms are contacted by telephone or personal visit. Quality control and processing follow in the traditional manner.

Advantages of the mail procedure are easy to understand. Answers are more accurate, since the householder has time to think over the questions and to consult household records. Costs are reduced because fewer enumerators are needed. Also, the procedure offers greater privacy to the respondent.

These advantages were realized in the 1970 test but not as widely as they will probably be in the future. Improved computerized methods of compiling address files as well as improved and simplified form design should allow extension of mail procedures to more than 90 percent of the Nation's population during the census of 1980. This expansion should further improve the accuracy of data reported and result in more useful data than ever before. Fully developed, the mail census may prove as revolutionary as any of the major changes that have occurred over the years since the first census in 1790.

The Bureau staff does not view the mail census as the final answer. As you have read, the history of the census in America is the story of a job grown steadily more complex with the size and diversity of the Nation's population and economy. Trying to keep abreast of it, we have known both success and failure, but we have never been reluctant to approach new problems with new solutions. The Nation changes and the census changes—that is the story of the past, and must be the story of the future.

U.S. DEPARTMENT OF COMMERCE
Social and Economic Statistics Administration
Bureau of the Census

☆ U.S. GOVERNMENT PRINTING OFFICE : 1974—O-551-097

3. 1980年 센서스 調査票

Please fill out this official Census Form and mail it back on Census Day, Tuesday, April 1, 1980

If the address shown below has the wrong apartment identification, please write the correct apartment number or location here:

D0	A1	A2	A4	A5	A6
				L	

Your answers are confidential

By law (title 13, U.S. Code), census employees are subject to fine and/or imprisonment for any disclosure of your answers. Only after 72 years does your information become available to other government agencies or the public. The same law requires that you answer the questions to the best of your knowledge.

Para personas de habla hispana

(For Spanish-speaking persons):
SI USTED DESEA UN CUESTIONARIO DEL CENSO EN ESPAÑOL llame a la oficina del censo. El número de teléfono se encuentra en el encasillado de la dirección.

O, si prefiere, marque esta casilla ☐ y devuelva el cuestionario por correo en el sobre que se le incluye.

U.S. Department of Commerce
Bureau of the Census
Form D-2

1980 Census of the United States

A message from the Director, Bureau of the Census . . .

We must, from time to time, take stock of ourselves as a people if our Nation is to meet successfully the many national and local challenges we face. This is the purpose of the 1980 census.

The essential need for a population census was recognized almost 200 years ago when our Constitution was written. As provided by article I, the first census was conducted in 1790 and one has been taken every 10 years since then.

The law under which the census is taken protects the confidentiality of your answers. For the next 72 years — or until April 1, 2052 — only sworn census workers have access to the individual records, and no one else may see them.

Your answers, when combined with the answers from other people, will provide the statistical figures needed by public and private groups, schools, business and industry, and Federal, State, and local governments across the country. These figures will help all sectors of American society understand how our population and housing are changing. In this way, we can deal more effectively with today's problems and work toward a better future for all of us.

The census is a vitally important national activity. Please do your part by filling out this census form accurately and completely. If you mail it back promptly in the enclosed postage-paid envelope, it will save the expense and inconvenience of a census taker having to visit you.

Thank you for your cooperation.

Form Approved
O.M.B. No. 41-S78006

Please continue →

How to fill out your Census Form

See the filled-out example in the yellow instruction guide. This guide will help with any problems you may have.

If you need more help, call the Census Office. The telephone number of the local office is shown at the bottom of the address box on the front cover.

Use a black pencil to answer the questions. Black pencil is better to use than ballpoint or other pens.

Fill circles "O" completely, like this: ●

When you write in an answer, print or write clearly.

Make sure that answers are provided for everyone here.

See page 4 of the guide if a roomer or someone else in the household does not want to give you all the information for the form.

Answer the questions on pages 1 through 5, and then starting with pages 6 and 7, fill a pair of pages for each person in the household.

Check your answers. Then write your name, the date, and telephone number on page 20.

Mail back this form on Tuesday, April 1, or as soon afterward as you can. Use the enclosed envelope; no stamp is needed.

Please start by answering Question 1 below.

Question 1

List in Question 1

- Family members living here, including babies still in the hospital.
- Relatives living here.
- Lodgers or boarders living here.
- Other persons living here.
- College students who stay here while attending college, even if their parents live elsewhere.
- Persons who usually live here but are temporarily away (including children in boarding school below the college level).
- Persons with a home elsewhere but who stay here most of the week while working.

Do Not List in Question 1

- Any person away from here in the Armed Forces.
- Any college student who stays somewhere else while attending college.
- Any person who usually stays somewhere else most of the week while working there.
- Any person away from here in an institution such as a home for the aged or mental hospital.
- Any person staying or visiting here who has a usual home elsewhere.

1. What is the name of each person who was living here on Tuesday, April 1, 1980, or who was staying or visiting here and had no other home?

Note

If everyone here is staying only temporarily and has a usual home elsewhere, please mark this box ☐.

Then please:
- answer the questions on pages 2 through 5 only, and
- enter the address of your usual home on page 20.

Please continue →

ALSO ANSWER THE HOUSING QUESTIONS ON PAGE 3

ALSO ANSWER THE HOUSING QUESTIONS ON PAGE 3

Here are the QUESTIONS ↓

These are the columns for ANSWERS →

Please fill one column for each person listed in Question 1.

	PERSON in column 1	PERSON in column 2	PERSON in column 3	PERSON in column 4	PERSON in column 5	PERSON in column 6
	Last name First name — Middle initial	Last name First name — Middle initial	Last name First name — Middle initial	Last name First name — Middle initial	Last name First name — Middle initial	Last name First name — Middle initial
2. How is this person related to the person in column 1? *Fill one circle.* *If "Other relative" of person in column 1, give exact relationship, such as mother-in-law, niece, grandson, etc.*	*START in this column with the household member (or one of the members) in whose name the home is owned or rented. If there is no such person, start in this column with any adult household member.*	If relative of person in column 1: ○ Husband/wife ○ Son/daughter ○ Brother/sister ○ Father/mother ○ Other relative If not related to person in column 1: ○ Roomer, boarder ○ Partner, roommate ○ Paid employee ○ Other nonrelative	If relative of person in column 1: ○ Husband/wife ○ Son/daughter ○ Brother/sister ○ Father/mother ○ Other relative If not related to person in column 1: ○ Roomer, boarder ○ Partner, roommate ○ Paid employee ○ Other nonrelative	If relative of person in column 1: ○ Husband/wife ○ Son/daughter ○ Brother/sister ○ Father/mother ○ Other relative If not related to person in column 1: ○ Roomer, boarder ○ Partner, roommate ○ Paid employee ○ Other nonrelative	If relative of person in column 1: ○ Husband/wife ○ Son/daughter ○ Brother/sister ○ Father/mother ○ Other relative If not related to person in column 1: ○ Roomer, boarder ○ Partner, roommate ○ Paid employee ○ Other nonrelative	If relative of person in column 1: ○ Husband/wife ○ Son/daughter ○ Brother/sister ○ Father/mother ○ Other relative If not related to person in column 1: ○ Roomer, boarder ○ Partner, roommate ○ Paid employee ○ Other nonrelative
3. Sex *Fill one circle.*	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female
4. Is this person — *Fill one circle.*	○ White ○ Black or Negro ○ Japanese ○ Chinese ○ Filipino ○ Korean ○ Vietnamese ○ Indian (Amer.) *Print tribe* ○ Asian Indian ○ Hawaiian ○ Guamanian ○ Samoan ○ Eskimo ○ Aleut ○ Other — *Specify*	○ White ○ Black or Negro ○ Japanese ○ Chinese ○ Filipino ○ Korean ○ Vietnamese ○ Indian (Amer.) *Print tribe* ○ Asian Indian ○ Hawaiian ○ Guamanian ○ Samoan ○ Eskimo ○ Aleut ○ Other — *Specify*	○ White ○ Black or Negro ○ Japanese ○ Chinese ○ Filipino ○ Korean ○ Vietnamese ○ Indian (Amer.) *Print tribe* ○ Asian Indian ○ Hawaiian ○ Guamanian ○ Samoan ○ Eskimo ○ Aleut ○ Other — *Specify*	○ White ○ Black or Negro ○ Japanese ○ Chinese ○ Filipino ○ Korean ○ Vietnamese ○ Indian (Amer.) *Print tribe* ○ Asian Indian ○ Hawaiian ○ Guamanian ○ Samoan ○ Eskimo ○ Aleut ○ Other — *Specify*	○ White ○ Black or Negro ○ Japanese ○ Chinese ○ Filipino ○ Korean ○ Vietnamese ○ Indian (Amer.) *Print tribe* ○ Asian Indian ○ Hawaiian ○ Guamanian ○ Samoan ○ Eskimo ○ Aleut ○ Other — *Specify*	○ White ○ Black or Negro ○ Japanese ○ Chinese ○ Filipino ○ Korean ○ Vietnamese ○ Indian (Amer.) *Print tribe* ○ Asian Indian ○ Hawaiian ○ Guamanian ○ Samoan ○ Eskimo ○ Aleut ○ Other — *Specify*
5. Age, and month and year of birth *a. Print age at last birthday.* *b. Print month and fill one circle below each number.* *c. Print year in the spaces, and fill one circle below each number.*	a. Age at last birthday b. Month of birth ○ Jan.—Mar. ○ Apr.—June ○ July—Sept. ○ Oct.—Dec. c. Year of birth: 1 ● 8 ○ 9 ○	a. Age at last birthday b. Month of birth ○ Jan.—Mar. ○ Apr.—June ○ July—Sept. ○ Oct.—Dec. c. Year of birth: 1 ● 8 ○ 9 ○	a. Age at last birthday b. Month of birth ○ Jan.—Mar. ○ Apr.—June ○ July—Sept. ○ Oct.—Dec. c. Year of birth: 1 ● 8 ○ 9 ○	a. Age at last birthday b. Month of birth ○ Jan.—Mar. ○ Apr.—June ○ July—Sept. ○ Oct.—Dec. c. Year of birth: 1 ● 8 ○ 9 ○	a. Age at last birthday b. Month of birth ○ Jan.—Mar. ○ Apr.—June ○ July—Sept. ○ Oct.—Dec. c. Year of birth: 1 ● 8 ○ 9 ○	a. Age at last birthday b. Month of birth ○ Jan.—Mar. ○ Apr.—June ○ July—Sept. ○ Oct.—Dec. c. Year of birth: 1 ● 8 ○ 9 ○
6. Marital status *Fill one circle.*	○ Now married ○ Widowed ○ Divorced ○ Separated ○ Never married	○ Now married ○ Widowed ○ Divorced ○ Separated ○ Never married	○ Now married ○ Widowed ○ Divorced ○ Separated ○ Never married	○ Now married ○ Widowed ○ Divorced ○ Separated ○ Never married	○ Now married ○ Widowed ○ Divorced ○ Separated ○ Never married	○ Now married ○ Widowed ○ Divorced ○ Separated ○ Never married
7. Is this person of Spanish/Hispanic origin or descent? *Fill one circle.*	○ No (not Spanish/Hispanic) ○ Yes, Mexican, Mexican-Amer., Chicano ○ Yes, Puerto Rican ○ Yes, Cuban ○ Yes, other Spanish/Hispanic	○ No (not Spanish/Hispanic) ○ Yes, Mexican, Mexican-Amer., Chicano ○ Yes, Puerto Rican ○ Yes, Cuban ○ Yes, other Spanish/Hispanic	○ No (not Spanish/Hispanic) ○ Yes, Mexican, Mexican-Amer., Chicano ○ Yes, Puerto Rican ○ Yes, Cuban ○ Yes, other Spanish/Hispanic	○ No (not Spanish/Hispanic) ○ Yes, Mexican, Mexican-Amer., Chicano ○ Yes, Puerto Rican ○ Yes, Cuban ○ Yes, other Spanish/Hispanic	○ No (not Spanish/Hispanic) ○ Yes, Mexican, Mexican-Amer., Chicano ○ Yes, Puerto Rican ○ Yes, Cuban ○ Yes, other Spanish/Hispanic	○ No (not Spanish/Hispanic) ○ Yes, Mexican, Mexican-Amer., Chicano ○ Yes, Puerto Rican ○ Yes, Cuban ○ Yes, other Spanish/Hispanic
8. Since February 1, 1980, has this person attended regular school or college at any time? *Fill one circle. Count nursery school, kindergarten, elementary school, and schooling which leads to a high school diploma or college degree.*	○ No, has not attended since February 1 ○ Yes, public school, public college ○ Yes, private, church-related ○ Yes, private, not church-related	○ No, has not attended since February 1 ○ Yes, public school, public college ○ Yes, private, church-related ○ Yes, private, not church-related	○ No, has not attended since February 1 ○ Yes, public school, public college ○ Yes, private, church-related ○ Yes, private, not church-related	○ No, has not attended since February 1 ○ Yes, public school, public college ○ Yes, private, church-related ○ Yes, private, not church-related	○ No, has not attended since February 1 ○ Yes, public school, public college ○ Yes, private, church-related ○ Yes, private, not church-related	○ No, has not attended since February 1 ○ Yes, public school, public college ○ Yes, private, church-related ○ Yes, private, not church-related
9. What is the highest grade (or year) of regular school this person has ever attended? *Fill one circle.* *If now attending school, mark grade person is in. If high school was finished by equivalency test (GED), mark "12."*	**Highest grade attended:** ○ Nursery school ○ Kindergarten Elementary through high school *(grade or year)* 1 2 3 4 5 6 7 8 9 10 11 12 College *(academic year)* 1 2 3 4 5 6 7 8 or more ○ Never attended school — *Skip question 10*	**Highest grade attended:** ○ Nursery school ○ Kindergarten Elementary through high school *(grade or year)* 1 2 3 4 5 6 7 8 9 10 11 12 College *(academic year)* 1 2 3 4 5 6 7 8 or more ○ Never attended school — *Skip question 10*	**Highest grade attended:** ○ Nursery school ○ Kindergarten Elementary through high school *(grade or year)* 1 2 3 4 5 6 7 8 9 10 11 12 College *(academic year)* 1 2 3 4 5 6 7 8 or more ○ Never attended school — *Skip question 10*	**Highest grade attended:** ○ Nursery school ○ Kindergarten Elementary through high school *(grade or year)* 1 2 3 4 5 6 7 8 9 10 11 12 College *(academic year)* 1 2 3 4 5 6 7 8 or more ○ Never attended school — *Skip question 10*	**Highest grade attended:** ○ Nursery school ○ Kindergarten Elementary through high school *(grade or year)* 1 2 3 4 5 6 7 8 9 10 11 12 College *(academic year)* 1 2 3 4 5 6 7 8 or more ○ Never attended school — *Skip question 10*	**Highest grade attended:** ○ Nursery school ○ Kindergarten Elementary through high school *(grade or year)* 1 2 3 4 5 6 7 8 9 10 11 12 College *(academic year)* 1 2 3 4 5 6 7 8 or more ○ Never attended school — *Skip question 10*
10. Did this person finish the highest grade (or year) attended? *Fill one circle.*	○ Now attending this grade *(or year)* ○ Finished this grade *(or year)* ○ Did not finish this grade *(or year)*	○ Now attending this grade *(or year)* ○ Finished this grade *(or year)* ○ Did not finish this grade *(or year)*	○ Now attending this grade *(or year)* ○ Finished this grade *(or year)* ○ Did not finish this grade *(or year)*	○ Now attending this grade *(or year)* ○ Finished this grade *(or year)* ○ Did not finish this grade *(or year)*	○ Now attending this grade *(or year)* ○ Finished this grade *(or year)* ○ Did not finish this grade *(or year)*	○ Now attending this grade *(or year)* ○ Finished this grade *(or year)* ○ Did not finish this grade *(or year)*
	CENSUS USE ONLY A. ○ I ○ N ○ ○	CENSUS USE ONLY A. ○ I ○ N ○ ○	CENSUS USE ONLY A. ○ I ○ N ○ ○	CENSUS USE ONLY A. ○ I ○ N ○ ○	CENSUS USE ONLY A. ○ I ○ N ○ ○	CENSUS USE ONLY A. ○ I ○ N ○ ○

PERSON in column 7

Last name

First name — Middle initial

If relative of person in column 1:

- ○ Husband/wife
- ○ Son/daughter
- ○ Brother/sister
- ○ Father/mother
- ○ Other relative — *Specify*

If not related to person in column 1:

- ○ Roomer, boarder
- ○ Partner, roommate
- ○ Paid employee
- ○ Other nonrelative — *Specify*

- ○ Male
- ○ Female

- ○ White
- ○ Black or Negro
- ○ Japanese
- ○ Chinese
- ○ Filipino
- ○ Korean
- ○ Vietnamese
- ○ Indian (Amer.) *Print tribe* →
- ○ Asian Indian
- ○ Hawaiian
- ○ Guamanian
- ○ Samoan
- ○ Eskimo
- ○ Aleut
- ○ Other — *Specify*

a. Age at last birthday

c. Year of birth — 1 ● 8 ○ 9 ○ | Ø ○ | Ø ○

b. Month of birth

- ○ Jan.—Mar.
- ○ Apr.—June
- ○ July—Sept.
- ○ Oct.—Dec.

1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○

- ○ Now married
- ○ Widowed
- ○ Divorced
- ○ Separated
- ○ Never married

- ○ No (not Spanish/Hispanic)
- ○ Yes, Mexican, Mexican-Amer., Chicano
- ○ Yes, Puerto Rican
- ○ Yes, Cuban
- ○ Yes, other Spanish/Hispanic

- ○ No, has not attended since February 1
- ○ Yes, public school, public college
- ○ Yes, private, church-related
- ○ Yes, private, not church-related

Highest grade attended:

- ○ Nursery school
- ○ Kindergarten

Elementary through high school *(grade or year)*

1 2 3 4 5 6 7 8 9 10 11 12

○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

College *(academic year)*

1 2 3 4 5 6 7 8 or more

○ ○ ○ ○ ○ ○ ○ ○

- ○ Never attended school — *Skip question 10*

- ○ Now attending this grade *(or year)*
- ○ Finished this grade *(or year)*
- ○ Did not finish this grade *(or year)*

CENSUS USE ONLY — A. ○ I ○ N ○ ○

If you listed more than 7 persons in Question 1, please see note on page 20.

NOW PLEASE ANSWER QUESTIONS H1—H12 FOR YOUR HOUSEHOLD

H1. Did you leave anyone out of Question 1 because you were not sure if the person should be listed — *for example, a new baby still in the hospital, a lodger who also has another home, or a person who stays here once in a while and has no other home?*

- ○ Yes — *On page 20 give name(s) and reason left out.*
- ○ No

H2. Did you list anyone in Question 1 who is away from home now — *for example, on a vacation or in a hospital?*

- ○ Yes — *On page 20 give name(s) and reason person is away.*
- ○ No

H3. Is anyone visiting here who is not already listed?

- ○ Yes — *On page 20 give name of each visitor for whom there is no one at the home address to report the person to a census taker.*
- ○ No

H4. How many living quarters, occupied and vacant, are at this address?

- ○ One
- ○ 2 apartments or living quarters
- ○ 3 apartments or living quarters
- ○ 4 apartments or living quarters
- ○ 5 apartments or living quarters
- ○ 6 apartments or living quarters
- ○ 7 apartments or living quarters
- ○ 8 apartments or living quarters
- ○ 9 apartments or living quarters
- ○ 10 or more apartments or living quarters
- ○ This is a mobile home or trailer

H5. Do you enter your living quarters —

- ○ Directly from the outside or through a common or public hall?
- ○ Through someone else's living quarters?

H6. Do you have complete plumbing facilities in your living quarters, that is, hot and cold piped water, a flush toilet, and a bathtub or shower?

- ○ Yes, for this household only
- ○ Yes, but also used by another household
- ○ No, have some but not all plumbing facilities
- ○ No plumbing facilities in living quarters

H7. How many rooms do you have in your living quarters? *Do not count bathrooms, porches, balconies, foyers, halls, or half-rooms.*

- ○ 1 room
- ○ 2 rooms
- ○ 3 rooms
- ○ 4 rooms
- ○ 5 rooms
- ○ 6 rooms
- ○ 7 rooms
- ○ 8 rooms
- ○ 9 or more rooms

H8. Are your living quarters —

- ○ Owned or being bought by you or by someone else in this household?
- ○ Rented for cash rent?
- ○ Occupied without payment of cash rent?

H9. Is this apartment (house) part of a condominium?

- ○ No
- ○ Yes, a condominium

H10. *If this is a one-family house* —

a. Is the house on a property of 10 or more acres?

- ○ Yes
- ○ No

b. Is any part of the property used as a commercial establishment or medical office?

- ○ Yes
- ○ No

H11. *If you live in a one-family house or a condominium unit which you own or are buying* —

What is the value of this property, that is, how much do you think this property (house and lot or condominium unit) would sell for if it were for sale?

Do not answer this question if this is —

- A mobile home or trailer
- A house on 10 or more acres
- A house with a commercial establishment or medical office on the property

- ○ Less than $10,000
- ○ $10,000 to $14,999
- ○ $15,000 to $17,499
- ○ $17,500 to $19,999
- ○ $20,000 to $22,499
- ○ $22,500 to $24,999
- ○ $25,000 to $27,499
- ○ $27,500 to $29,999
- ○ $30,000 to $34,999
- ○ $35,000 to $39,999
- ○ $40,000 to $44,999
- ○ $45,000 to $49,999
- ○ $50,000 to $54,999
- ○ $55,000 to $59,999
- ○ $60,000 to $64,999
- ○ $65,000 to $69,999
- ○ $70,000 to $74,999
- ○ $75,000 to $79,999
- ○ $80,000 to $89,999
- ○ $90,000 to $99,999
- ○ $100,000 to $124,999
- ○ $125,000 to $149,999
- ○ $150,000 to $199,999
- ○ $200,000 or more

H12. *If you pay rent for your living quarters* —

What is the monthly rent?

If rent is not paid by the month, see the instruction guide on how to figure a monthly rent.

- ○ Less than $50
- ○ $50 to $59
- ○ $60 to $69
- ○ $70 to $79
- ○ $80 to $89
- ○ $90 to $99
- ○ $100 to $109
- ○ $110 to $119
- ○ $120 to $129
- ○ $130 to $139
- ○ $140 to $149
- ○ $150 to $159
- ○ $160 to $169
- ○ $170 to $179
- ○ $180 to $189
- ○ $190 to $199
- ○ $200 to $224
- ○ $225 to $249
- ○ $250 to $274
- ○ $275 to $299
- ○ $300 to $349
- ○ $350 to $399
- ○ $400 to $499
- ○ $500 or more

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A4. Block number — Ø Ø Ø / 1 1 1 / 2 2 2 / 3 3 3 / 4 4 4 / 5 5 5 / 6 6 6 / 7 7 7 / 8 8 8 / 9 9 9

A6. Serial number — Ø Ø Ø Ø / 1 1 1 1 / 2 2 2 2 / 3 3 3 3 / 4 4 4 4 / 5 5 5 5 / 6 6 6 6 / 7 7 7 7 / 8 8 8 8 / 9 9 9 9

B. Type of unit or quarters

Occupied
- ○ First form
- ○ Continuation

Vacant
- ○ Regular
- ○ Usual home elsewhere

Group quarters
- ○ First form
- ○ Continuation

For vacant units

C1. Is this unit for —
- ○ Year round use
- ○ Seasonal/Mig. — *Skip C2, C3, and D.*

C2. Vacancy status
- ○ For rent
- ○ For sale only
- ○ Rented or sold, not occupied
- ○ Held for occasional use
- ○ Other vacant

C3. Is this unit boarded up?
- ○ Yes
- ○ No

D. Months vacant
- ○ Less than 1 month
- ○ 1 up to 2 months
- ○ 2 up to 6 months
- ○ 6 up to 12 months
- ○ 1 year up to 2 years
- ○ 2 or more years

E. Indicators

1. ○ ○ Mail return
2. ○ ○ Pop./F

○ ○

F. Total persons — Ø Ø Ø / 1 1 1 / 2 2 2 / 3 3 3 / 4 4 4 / 5 5 5 / 6 6 6 / 7 7 7 / 8 8 8 / 9 9 9

ALSO ANSWER THESE QUESTIONS

H13. Which best describes this building?
Include all apartments, flats, etc., even if vacant.

- ○ A mobile home or trailer
- ○ A one-family house detached from any other house
- ○ A one-family house attached to one or more houses
- ○ A building for 2 families
- ○ A building for 3 or 4 families
- ○ A building for 5 to 9 families
- ○ A building for 10 to 19 families
- ○ A building for 20 to 49 families
- ○ A building for 50 or more families
- ○ A boat, tent, van, etc.

H14a. How many stories (floors) are in this building?
Count an attic or basement as a story if it has any finished rooms for living purposes.

- ○ 1 to 3 — *Skip to H15*
- ○ 4 to 6
- ○ 7 to 12
- ○ 13 or more stories

b. Is there a passenger elevator in this building?

- ○ Yes
- ○ No

H15a. Is this building —

- ○ On a city or suburban lot, or on a place of less than 1 acre? — *Skip to H16*
- ○ On a place of 1 to 9 acres?
- ○ On a place of 10 or more acres?

b. Last year, 1979, did sales of crops, livestock, and other farm products from this place amount to —

- ○ Less than $50 (or None)
- ○ $50 to $249
- ○ $250 to $599
- ○ $600 to $999
- ○ $1,000 to $2,499
- ○ $2,500 or more

H16. Do you get water from —

- ○ A public system *(city water department, etc.)* or private company?
- ○ An individual drilled well?
- ○ An individual dug well?
- ○ Some other source *(a spring, creek, river, cistern, etc.)*?

H17. Is this building connected to a public sewer?

- ○ Yes, connected to public sewer
- ○ No, connected to septic tank or cesspool
- ○ No, use other means

H18. About when was this building originally built? *Mark when the building was first constructed, not when it was remodeled, added to, or converted.*

- ○ 1979 or 1980
- ○ 1975 to 1978
- ○ 1970 to 1974
- ○ 1960 to 1969
- ○ 1950 to 1959
- ○ 1940 to 1949
- ○ 1939 or earlier

H19. When did the person listed in column 1 move into this house (or apartment)?

- ○ 1979 or 1980
- ○ 1975 to 1978
- ○ 1970 to 1974
- ○ 1960 to 1969
- ○ 1950 to 1959
- ○ 1949 or earlier
- ○ Always lived here

H20. How are your living quarters heated?
Fill one circle for the kind of heat used most.

- ○ Steam or hot water system
- ○ Central warm-air furnace with ducts to the individual rooms *(Do not count electric heat pumps here)*
- ○ Electric heat pump
- ○ Other built-in electric units *(permanently installed in wall, ceiling, or baseboard)*
- ○ Floor, wall, or pipeless furnace
- ○ Room heaters with flue or vent, burning gas, oil, or kerosene
- ○ Room heaters without flue or vent, burning gas, oil, or kerosene *(not portable)*
- ○ Fireplaces, stoves, or portable room heaters of any kind
- ○ No heating equipment

H21a. Which fuel is used most for house heating?

- ○ Gas: from underground pipes serving the neighborhood
- ○ Gas: bottled, tank, or LP
- ○ Electricity
- ○ Fuel oil, kerosene, etc.
- ○ Coal or coke
- ○ Wood
- ○ Other fuel
- ○ No fuel used

b. Which fuel is used most for water heating?

- ○ Gas: from underground pipes serving the neighborhood
- ○ Gas: bottled, tank, or LP
- ○ Electricity
- ○ Fuel oil, kerosene, etc.
- ○ Coal or coke
- ○ Wood
- ○ Other fuel
- ○ No fuel used

c. Which fuel is used most for cooking?

- ○ Gas: from underground pipes serving the neighborhood
- ○ Gas: bottled, tank, or LP
- ○ Electricity
- ○ Fuel oil, kerosene, etc.
- ○ Coal or coke
- ○ Wood
- ○ Other fuel
- ○ No fuel used

H22. What are the costs of utilities and fuels for your living quarters?

a. Electricity
$ _____ .00 OR
Average monthly cost
- ○ Included in rent or no charge
- ○ Electricity not used

b. Gas
$ _____ .00 OR
Average monthly cost
- ○ Included in rent or no charge
- ○ Gas not used

c. Water
$ _____ .00 OR
Yearly cost
- ○ Included in rent or no charge

d. Oil, coal, kerosene, wood, etc.
$ _____ .00 OR
Yearly cost
- ○ Included in rent or no charge
- ○ These fuels not used

H23. Do you have complete kitchen facilities? *Complete kitchen facilities are a sink with piped water, a range or cookstove, and a refrigerator.*

- ○ Yes
- ○ No

H24. How many bedrooms do you have?
Count rooms used mainly for sleeping even if used also for other purposes.

- ○ No bedroom
- ○ 1 bedroom
- ○ 2 bedrooms
- ○ 3 bedrooms
- ○ 4 bedrooms
- ○ 5 or more bedrooms

H25. How many bathrooms do you have?
A complete bathroom is a room with flush toilet, bathtub or shower, and wash basin with piped water.

A half bathroom has at least a flush toilet or bathtub or shower, but does not have all the facilities for a complete bathroom.

- ○ No bathroom, or only a half bathroom
- ○ 1 complete bathroom
- ○ 1 complete bathroom, plus half bath(s)
- ○ 2 or more complete bathrooms

H26. Do you have a telephone in your living quarters?

- ○ Yes
- ○ No

H27. Do you have air conditioning?

- ○ Yes, a central air-conditioning system
- ○ Yes, 1 individual room unit
- ○ Yes, 2 or more individual room units
- ○ No

H28. How many automobiles are kept at home for use by members of your household?

- ○ None
- ○ 1 automobile
- ○ 2 automobiles
- ○ 3 or more automobiles

H29. How many vans or trucks of one-ton capacity or less are kept at home for use by members of your household?

- ○ None
- ○ 1 van or truck
- ○ 2 vans or trucks
- ○ 3 or more vans or trucks

CENSUS USE

H22a.
H22b.
H22c.
H22d.

Please answer H30–H32 if you live in a one-family house which you own or are buying, unless this is –

- **A mobile home or trailer** . . . . . .
- **A house on 10 or more acres** . . . . . .
- **A condominium unit** . . . . . .
- **A house with a commercial establishment or medical office on the property** . . . . .

If any of these, or if you rent your unit or this is a multi-family structure, skip H30 to H32 and turn to page 6.

H30. What were the real estate taxes on this property last year?

$ _____ .00 OR ○ None

H31. What is the annual premium for fire and hazard insurance on this property?

$ _____ .00 OR ○ None

H32a. Do you have a mortgage, deed of trust, contract to purchase, or similar debt on this property?

- ○ Yes, mortgage, deed of trust, or similar debt
- ○ Yes, contract to purchase
- ○ No — *Skip to page 6*

b. Do you have a second or junior mortgage on this property?

○ Yes ○ No

c. How much is your total regular monthly payment to the lender?
Also include payments on a contract to purchase and to lenders holding second or junior mortgages on this property.

$ _____ .00 OR ○ No regular payment required — *Skip to page 6*

d. Does your regular monthly payment (amount entered in H32c) include payments for real estate taxes on this property?

- ○ Yes, taxes included in payment
- ○ No, taxes paid separately or taxes not required

e. Does your regular monthly payment (amount entered in H32c) include payments for fire and hazard insurance on this property?

- ○ Yes, insurance included in payment
- ○ No, insurance paid separately or no insurance

Please turn to page 6

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	2.	4.
① S.S. Yes ○ No ○	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9
② S.S. Yes ○ No ○	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9
③ S.S. Yes ○ No ○	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9
④ S.S. Yes ○ No ○	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9
⑤ S.S. Yes ○ No ○	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9
⑥ S.S. Yes ○ No ○	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9
⑦ S.S. Yes ○ No ○	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9

GQ.	H30.	H31.	H32c.
0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9	0 1 2 3 4 5 6 7 8 9

ANSWER THESE QUESTIONS FOR

Name of Person 1 on page 2:
Last name | First name | Middle initial

11. In what State or foreign country was this person born?
Print the State where this person's mother was living when this person was born. Do not give the location of the hospital unless the mother's home and the hospital were in the same State.

Name of State or foreign country; or Puerto Rico, Guam, etc.

12. *If this person was born in a foreign country –*
a. Is this person a naturalized citizen of the United States?
- ○ Yes, a naturalized citizen
- ○ No, not a citizen
- ○ Born abroad of American parents

b. When did this person come to the United States to stay?
- ○ 1975 to 1980
- ○ 1965 to 1969
- ○ 1950 to 1959
- ○ 1970 to 1974
- ○ 1960 to 1964
- ○ Before 1950

13a. Does this person speak a language other than English at home?
- ○ Yes
- ○ No, only speaks English – *Skip to 14*

b. What is this language?
(For example – Chinese, Italian, Spanish, etc.)

c. How well does this person speak English?
- ○ Very well
- ○ Well
- ○ Not well
- ○ Not at all

14. What is this person's ancestry? *If uncertain about how to report ancestry, see instruction guide.*
(For example: Afro-Amer., English, French, German, Honduran, Hungarian, Irish, Italian, Jamaican, Korean, Lebanese, Mexican, Nigerian, Polish, Ukrainian, Venezuelan, etc.)

15a. Did this person live in this house five years ago (April 1, 1975)?
If in college or Armed Forces in April 1975, report place of residence there.
- ○ Born April 1975 or later – *Turn to next page for next person*
- ○ Yes, this house – *Skip to 16*
- ○ No, different house

b. Where did this person live five years ago (April 1, 1975)?
(1) State, foreign country, Puerto Rico, Guam, etc.:
(2) County:
(3) City, town, village, etc.:
(4) Inside the incorporated (legal) limits of that city, town, village, etc.?
- ○ Yes
- ○ No, in unincorporated area

16. When was this person born?
- ○ Born before April 1965 – *Please go on with questions 17-33*
- ○ Born April 1965 or later – *Turn to next page for next person*

17. In April 1975 *(five years ago)* **was this person –**
a. On active duty in the Armed Forces?
- ○ Yes
- ○ No

b. Attending college?
- ○ Yes
- ○ No

c. Working at a job or business?
- ○ Yes, full time
- ○ No
- ○ Yes, part time

18a. Is this person a veteran of active-duty military service in the Armed Forces of the United States?
If service was in National Guard or Reserves only, see instruction guide.
- ○ Yes
- ○ No – *Skip to 19*

b. Was active-duty military service during –
Fill a circle for each period in which this person served.
- ○ May 1975 or later
- ○ Vietnam era *(August 1964–April 1975)*
- ○ February 1955–July 1964
- ○ Korean conflict *(June 1950–January 1955)*
- ○ World War II *(September 1940–July 1947)*
- ○ World War I *(April 1917–November 1918)*
- ○ Any other time

19. Does this person have a physical, mental, or other health condition which has lasted for 6 or more months and which . . .

	Yes	No
a. Limits the kind or amount of work this person can do at a job?	○	○
b. Prevents this person from working at a job?	○	○
c. Limits or prevents this person from using public transportation?	○	○

20. *If this person is a female –*
How many babies has she ever had, not counting stillbirths?
Do not count her stepchildren or children she has adopted.

None ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 ○ 11 ○ 12 or more ○

21. *If this person has ever been married –*
a. Has this person been married more than once?
- ○ Once
- ○ More than once

b. Month and year of marriage? *(Month) (Year)*
Month and year of first marriage? *(Month) (Year)*

c. *If married more than once –* **Did the first marriage end because of the death of the husband (or wife)?**
- ○ Yes
- ○ No

22a. Did this person work at any time last week?
- ○ Yes – *Fill this circle if this person worked full time or part time. (Count part-time work such as delivering papers, or helping without pay in a family business or farm. Also count active duty in the Armed Forces.)*
- ○ No – *Fill this circle if this person did not work, or did only own housework, school work, or volunteer work.*

Skip to 25

b. How many hours did this person work last week (at all jobs)?
Subtract any time off; add overtime or extra hours worked.
Hours

23. At what location did this person work last week?
If this person worked at more than one location, print where he or she worked most last week.
If one location cannot be specified, see instruction guide.

a. Address *(Number and street)*
If street address is not known, enter the building name, shopping center, or other physical location description.

b. Name of city, town, village, borough, etc.

c. Is the place of work inside the incorporated (legal) limits of that city, town, village, borough, etc.?
- ○ Yes
- ○ No, in unincorporated area

d. County

e. State **f. ZIP Code**

24a. Last week, how long did it usually take this person to get from home to work (one way)?
Minutes

b. How did this person usually get to work last week?
If this person used more than one method, give the one usually used for most of the distance.
- ○ Car
- ○ Truck
- ○ Van
- ○ Bus or streetcar
- ○ Railroad
- ○ Subway or elevated
- ○ Taxicab
- ○ Motorcycle
- ○ Bicycle
- ○ Walked only
- ○ Worked at home
- ○ Other – *Specify*

If car, truck, or van in 24b, go to 24c. Otherwise, skip to 28.

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Per. No.	11.	13b.	14.	15b.	23. ○ VL	24a.
1	∅∅∅	∅∅∅	∅∅∅ ∅∅∅	∅∅∅ ∅∅∅	∅∅∅ ∅∅∅ ∅∅∅	∅∅
2	1 1 1	1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1 1 1 1	1 1
3	2 2 2	2 2 2	2 2 2 2 2 2	2 2 2 2 2 2	2 2 2 2 2 2 2 2 2	2 2
4	3 3 3	3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3 3 3 3	3 3
5	4 4 4	4 4 4	4 4 4 4 4 4	4 4 4 4 4 4	4 4 4 4 4 4 4 4 4	4 4
6	5 5 5	5 5 5	5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5 5	5 5
7	6 6 6	6 6 6	6 6 6 6 6 6	6 6 6 6 6 6	6 6 6 6 6 6 6 6 6	6 6
8	7 7 7	7 7 7	7 7 7 7 7 7	7 7 7 7 7 7	7 7 7 7 7 7 7 7 7	7 7
9	8 8 8	8 8 8	8 8 8 8 8 8	8 8 8 8 8 8	8 8 8 8 8 8 8 8 8	8 8
∅	9 9 9	9 9 9	9 9 9 9 9 9	9 9 9 9 9 9	9 9 9 9 9 9 9 9 9	9 9

c. When going to work last week, did this person usually —

○ Drive alone — *Skip to 28*
○ Share driving
○ Drive others only
○ Ride as passenger only

d. How many people, including this person, usually rode to work in the car, truck, or van last week?

○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 or more

After answering 24d, skip to 28.

25. Was this person temporarily absent or on layoff from a job or business last week?

○ Yes, on layoff
○ Yes, on vacation, temporary illness, labor dispute, etc.
○ No

26a. Has this person been looking for work during the last 4 weeks?

○ Yes ○ No — *Skip to 27*

b. Could this person have taken a job last week?

○ No, already has a job
○ No, temporarily ill
○ No, other reasons *(in school, etc.)*
○ Yes, could have taken a job

27. When did this person last work, even for a few days?

○ 1980 ○ 1978 ○ 1970 to 1974
○ 1979 ○ 1975 to 1977 ○ 1969 or earlier
○ Never worked

Skip to 31d

28–30. Current or most recent job activity

Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give information for last job or business since 1975.

28. Industry

a. For whom did this person work? *If now on active duty in the Armed Forces, print "AF" and skip to question 31.*

(Name of company, business, organization, or other employer)

b. What kind of business or industry was this? *Describe the activity at location where employed.*

(For example: Hospital, newspaper publishing, mail order house, auto engine manufacturing, breakfast cereal manufacturing)

c. Is this mainly — *(Fill one circle)*

○ Manufacturing ○ Retail trade
○ Wholesale trade ○ Other — *(agriculture, construction, service, government, etc.)*

29. Occupation

a. What kind of work was this person doing?

(For example: Registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, grinder operator)

b. What were this person's most important activities or duties?

(For example: Patient care, directing hiring policies, supervising order clerks, assembling engines, operating grinding mill)

30. Was this person — *(Fill one circle)*

Employee of private company, business, or individual, for wages, salary, or commissions ○
Federal government employee ○
State government employee ○
Local government employee *(city, county, etc.)* ○
Self-employed in own business, professional practice, or farm —
Own business not incorporated ○
Own business incorporated ○
Working without pay in family business or farm ○

CENSUS USE

21b. I II III IV

22b.

28. A B C D E F G H J K L M AF NW

29. N P Q R S T U V W X Y Z

31a. Last year (1979), did this person work, even for a few days, at a paid job or in a business or farm?

○ Yes ○ No — *Skip to 31d*

b. How many weeks did this person work in 1979? *Count paid vacation, paid sick leave, and military service.*

Weeks

c. During the weeks worked in 1979, how many hours did this person usually work each week?

Hours

d. Of the weeks not worked in 1979 (if any), how many weeks was this person looking for work or on layoff from a job?

Weeks

32. Income in 1979 —

Fill circles and print dollar amounts. If net income was a loss, write "Loss" above the dollar amount. If exact amount is not known, give best estimate. For income received jointly by household members, see instruction guide.

During 1979 did this person receive any income from the following sources?

If "Yes" to any of the sources below — **How much did this person receive for the entire year?**

a. Wages, salary, commissions, bonuses, or tips from all jobs . . . *Report amount before deductions for taxes, bonds, dues, or other items.*

○ Yes → $ .00
○ No *(Annual amount – Dollars)*

b. Own nonfarm business, partnership, or professional practice . . . *Report net income after business expenses.*

○ Yes → $ .00
○ No *(Annual amount – Dollars)*

c. Own farm. . . *Report net income after operating expenses. Include earnings as a tenant farmer or sharecropper.*

○ Yes → $ .00
○ No *(Annual amount – Dollars)*

d. Interest, dividends, royalties, or net rental income . . . *Report even small amounts credited to an account.*

○ Yes → $ .00
○ No *(Annual amount – Dollars)*

e. Social Security or Railroad Retirement . . .

○ Yes → $ .00
○ No *(Annual amount – Dollars)*

f. Supplemental Security (SSI), Aid to Families with Dependent Children (AFDC), or other public assistance or public welfare payments . . .

○ Yes → $ .00
○ No *(Annual amount – Dollars)*

g. Unemployment compensation, veterans' payments, pensions, alimony or child support, or any other sources of income received regularly . . . *Exclude lump-sum payments such as money from an inheritance or the sale of a home.*

○ Yes → $ .00
○ No *(Annual amount – Dollars)*

33. What was this person's total income in 1979?

Add entries in questions 32a through g; subtract any losses. $ .00 *(Annual amount – Dollars)*

If total amount was a loss, write "Loss" above amount. OR ○ None

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31b. 31c. 31d.

32a. 32b. 32c. 32d. 32e. 32f. 32g. 33.

→ *Please turn to the next page and answer the questions for Person 2 on page 2*

ANSWER THESE QUESTIONS FOR

Name of Person 2 on page 2:
Last name | First name | Middle initial

11. In what State or foreign country was this person born?
Print the State where this person's mother was living when this person was born. Do not give the location of the hospital unless the mother's home and the hospital were in the same State.
Name of State or foreign country; or Puerto Rico, Guam, etc.

12. *If this person was born in a foreign country –*
a. Is this person a naturalized citizen of the United States?
- ○ Yes, a naturalized citizen
- ○ No, not a citizen
- ○ Born abroad of American parents

b. When did this person come to the United States to stay?
- ○ 1975 to 1980
- ○ 1965 to 1969
- ○ 1950 to 1959
- ○ 1970 to 1974
- ○ 1960 to 1964
- ○ Before 1950

13a. Does this person speak a language other than English at home?
- ○ Yes
- ○ No, only speaks English – *Skip to 14*

b. What is this language?
(For example – Chinese, Italian, Spanish, etc.)

c. How well does this person speak English?
- ○ Very well
- ○ Well
- ○ Not well
- ○ Not at all

14. What is this person's ancestry? *If uncertain about how to report ancestry, see instruction guide.*
(For example: Afro-Amer., English, French, German, Honduran, Hungarian, Irish, Italian, Jamaican, Korean, Lebanese, Mexican, Nigerian, Polish, Ukrainian, Venezuelan, etc.)

15a. Did this person live in this house five years ago (April 1, 1975)?
If in college or Armed Forces in April 1975, report place of residence there.
- ○ Born April 1975 or later – *Turn to next page for next person*
- ○ Yes, this house – *Skip to 16*
- ○ No, different house

b. Where did this person live five years ago (April 1, 1975)?
(1) State, foreign country, Puerto Rico, Guam, etc.:
(2) County:
(3) City, town, village, etc.:
(4) Inside the incorporated (legal) limits of that city, town, village, etc.?
- ○ Yes
- ○ No, in unincorporated area

16. When was this person born?
- ○ Born before April 1965 – *Please go on with questions 17-33*
- ○ Born April 1965 or later – *Turn to next page for next person*

17. In April 1975 *(five years ago)* **was this person –**
a. On active duty in the Armed Forces?
- ○ Yes
- ○ No

b. Attending college?
- ○ Yes
- ○ No

c. Working at a job or business?
- ○ Yes, full time
- ○ Yes, part time
- ○ No

18a. Is this person a veteran of active-duty military service in the Armed Forces of the United States?
If service was in National Guard or Reserves only, see instruction guide.
- ○ Yes
- ○ No – *Skip to 19*

b. Was active-duty military service during –
Fill a circle for each period in which this person served.
- ○ May 1975 or later
- ○ Vietnam era *(August 1964–April 1975)*
- ○ February 1955–July 1964
- ○ Korean conflict *(June 1950–January 1955)*
- ○ World War II *(September 1940–July 1947)*
- ○ World War I *(April 1917–November 1918)*
- ○ Any other time

19. Does this person have a physical, mental, or other health condition which has lasted for 6 or more months and which . . .

	Yes	No
a. Limits the kind or amount of work this person can do at a job?	○	○
b. Prevents this person from working at a job?	○	○
c. Limits or prevents this person from using public transportation?	○	○

20. *If this person is a female –*
How many babies has she ever had, not counting stillbirths?
Do not count her stepchildren or children she has adopted.

None	1	2	3	4	5	6
○	○	○	○	○	○	○

7	8	9	10	11	12 or more
○	○	○	○	○	○

21. *If this person has ever been married –*
a. Has this person been married more than once?
- ○ Once
- ○ More than once

b. Month and year of marriage? *(Month) (Year)*
Month and year of first marriage? *(Month) (Year)*

c. *If married more than once* **– Did the first marriage end because of the death of the husband (or wife)?**
- ○ Yes
- ○ No

22a. Did this person work at any time last week?
- ○ Yes – *Fill this circle if this person worked full time or part time. (Count part-time work such as delivering papers, or helping without pay in a family business or farm. Also count active duty in the Armed Forces.)*
- ○ No – *Fill this circle if this person did not work, or did only own housework, school work, or volunteer work.*

Skip to 25

b. How many hours did this person work last week (at all jobs)?
Subtract any time off; add overtime or extra hours worked.
Hours

23. At what location did this person work last week?
If this person worked at more than one location, print where he or she worked most last week.
If one location cannot be specified, see instruction guide.

a. Address *(Number and street)*
If street address is not known, enter the building name, shopping center, or other physical location description.

b. Name of city, town, village, borough, etc.

c. Is the place of work inside the incorporated (legal) limits of that city, town, village, borough, etc.?
- ○ Yes
- ○ No, in unincorporated area

d. County

e. State **f. ZIP Code**

24a. Last week, how long did it usually take this person to get from home to work (one way)?
Minutes

b. How did this person usually get to work last week?
If this person used more than one method, give the one usually used for most of the distance.
- ○ Car
- ○ Truck
- ○ Van
- ○ Bus or streetcar
- ○ Railroad
- ○ Subway or elevated
- ○ Taxicab
- ○ Motorcycle
- ○ Bicycle
- ○ Walked only
- ○ Worked at home
- ○ Other – *Specify*

If car, truck, or van in 24b, go to 24c. Otherwise, skip to 28.

FOR CENSUS USE ONLY

Per. No.	11.	13b.		14.	15b.	23. ○ VL	24a.
1	∅∅∅ 1 1 1	∅∅∅ 1 1 1		∅∅∅ ∅∅∅ 1 1 1 1 1 1	∅∅∅ ∅∅∅ 1 1 1 1 1 1	∅∅∅ ∅∅∅ ∅ 1 1 1 1 1 1 1	∅∅ 1 1
2	2 2 2	2 2 2		2 2 2 2 2 2	2 2 2 2 2 2	2 2 2 2 2 2 2 2	2 2
3	3 3 3	3 3 3		3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3 3 3	3 3
4	4 4 4	4 4 4		4 4 4 4 4 4	4 4 4 4 4 4	4 4 4 4 4 4 4 4	4 4
5	5 5 5	5 5 5		5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5	5 5
6	6 6 6	6 6 6		6 6 6 6 6 6	6 6 6 6 6 6	6 6 6 6 6 6 6 6	6 6
7	7 7 7	7 7 7		7 7 7 7 7 7	7 7 7 7 7 7	7 7 7 7 7 7 7 7	7 7
∅	8 8 8	8 8 8		8 8 8 8 8 8	8 8 8 8 8 8	8 8 8 8 8 8 8 8	8 8
	9 9 9	9 9 9		9 9 9 9 9 9	9 9 9 9 9 9	9 9 9 9 9 9 9 9	9 9

PERSON 2 ON PAGE 2

c. When going to work last week, did this person usually —

- ○ Drive alone — *Skip to 28*
- ○ Drive others only
- ○ Share driving
- ○ Ride as passenger only

d. How many people, including this person, usually rode to work in the car, truck, or van last week?

- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7 or more

After answering 24d, skip to 28.

25. Was this person temporarily absent or on layoff from a job or business last week?

- ○ Yes, on layoff
- ○ Yes, on vacation, temporary illness, labor dispute, etc.
- ○ No

26a. Has this person been looking for work during the last 4 weeks?

- ○ Yes
- ○ No — *Skip to 27*

b. Could this person have taken a job last week?

- ○ No, already has a job
- ○ No, temporarily ill
- ○ No, other reasons *(in school, etc.)*
- ○ Yes, could have taken a job

27. When did this person last work, even for a few days?

- ○ 1980
- ○ 1979
- ○ 1978
- ○ 1975 to 1977
- ○ 1970 to 1974
- ○ 1969 or earlier
- ○ Never worked

Skip to 31d

28–30. Current or most recent job activity

Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give information for last job or business since 1975.

28. Industry

a. For whom did this person work? *If now on active duty in the Armed Forces, print "AF" and skip to question 31.*

(Name of company, business, organization, or other employer)

b. What kind of business or industry was this? *Describe the activity at location where employed.*

(For example: Hospital, newspaper publishing, mail order house, auto engine manufacturing, breakfast cereal manufacturing)

c. Is this mainly — *(Fill one circle)*

- ○ Manufacturing
- ○ Retail trade
- ○ Wholesale trade
- ○ Other — *(agriculture, construction, service, government, etc.)*

29. Occupation

a. What kind of work was this person doing?

(For example: Registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, grinder operator)

b. What were this person's most important activities or duties?

(For example: Patient care, directing hiring policies, supervising order clerks, assembling engines, operating grinding mill)

30. Was this person — *(Fill one circle)*

- ○ Employee of private company, business, or individual, for wages, salary, or commissions
- ○ Federal government employee
- ○ State government employee
- ○ Local government employee *(city, county, etc.)*
- ○ Self-employed in own business, professional practice, or farm —
  - ○ Own business not incorporated
  - ○ Own business incorporated
- ○ Working without pay in family business or farm

CENSUS USE

21b. I II III IV

22b.

28. A B C D E F G H J K L M AF NW

29. N P Q R S T U V W X Y Z

31a. Last year (1979), did this person work, even for a few days, at a paid job or in a business or farm?

- ○ Yes
- ○ No — *Skip to 31d*

b. How many weeks did this person work in 1979? *Count paid vacation, paid sick leave, and military service.*

Weeks

c. During the weeks worked in 1979, how many hours did this person usually work each week?

Hours

d. Of the weeks not worked in 1979 (if any), how many weeks was this person looking for work or on layoff from a job?

Weeks

32. Income in 1979 —

Fill circles and print dollar amounts. If net income was a loss, write "Loss" above the dollar amount. If exact amount is not known, give best estimate. For income received jointly by household members, see instruction guide.

During 1979 did this person receive any income from the following sources?

If "Yes" to any of the sources below — **How much did this person receive for the entire year?**

a. Wages, salary, commissions, bonuses, or tips from all jobs . . . *Report amount before deductions for taxes, bonds, dues, or other items.*

- ○ Yes → $ .00 *(Annual amount — Dollars)*
- ○ No

b. Own nonfarm business, partnership, or professional practice . . . *Report net income after business expenses.*

- ○ Yes → $ .00 *(Annual amount — Dollars)*
- ○ No

c. Own farm. . . *Report net income after operating expenses. Include earnings as a tenant farmer or sharecropper.*

- ○ Yes → $ .00 *(Annual amount — Dollars)*
- ○ No

d. Interest, dividends, royalties, or net rental income . . . *Report even small amounts credited to an account.*

- ○ Yes → $ .00 *(Annual amount — Dollars)*
- ○ No

e. Social Security or Railroad Retirement . . .

- ○ Yes → $ .00 *(Annual amount — Dollars)*
- ○ No

f. Supplemental Security (SSI), Aid to Families with Dependent Children (AFDC), or other public assistance or public welfare payments . . .

- ○ Yes → $ .00 *(Annual amount — Dollars)*
- ○ No

g. Unemployment compensation, veterans' payments, pensions, alimony or child support, or any other sources of income received regularly . . . *Exclude lump-sum payments such as money from an inheritance or the sale of a home.*

- ○ Yes → $ .00 *(Annual amount — Dollars)*
- ○ No

33. What was this person's total income in 1979?

Add entries in questions 32a through g; subtract any losses. $ .00 *(Annual amount — Dollars)*

If total amount was a loss, write "Loss" above amount. OR ○ None

CENSUS USE ONLY

31b. 31c. 31d.

32a. 32b. 32c. 32d. 32e. 32f. 32g. 33.

Please turn to the next page and answer the questions for Person 3 on page 2

ANSWER THESE QUESTIONS FOR

Name of Person 3 on page 2:
Last name | First name | Middle initial

11. In what State or foreign country was this person born?
Print the State where this person's mother was living when this person was born. Do not give the location of the hospital unless the mother's home and the hospital were in the same State.

Name of State or foreign country; or Puerto Rico, Guam, etc.

12. *If this person was born in a foreign country –*
a. Is this person a naturalized citizen of the United States?
- ○ Yes, a naturalized citizen
- ○ No, not a citizen
- ○ Born abroad of American parents

b. When did this person come to the United States to stay?
- ○ 1975 to 1980
- ○ 1965 to 1969
- ○ 1950 to 1959
- ○ 1970 to 1974
- ○ 1960 to 1964
- ○ Before 1950

13a. Does this person speak a language other than English at home?
- ○ Yes
- ○ No, only speaks English – *Skip to 14*

b. What is this language?

(For example – Chinese, Italian, Spanish, etc.)

c. How well does this person speak English?
- ○ Very well
- ○ Well
- ○ Not well
- ○ Not at all

14. What is this person's ancestry? *If uncertain about how to report ancestry, see instruction guide.*

(For example: Afro-Amer., English, French, German, Honduran, Hungarian, Irish, Italian, Jamaican, Korean, Lebanese, Mexican, Nigerian, Polish, Ukrainian, Venezuelan, etc.)

15a. Did this person live in this house five years ago (April 1, 1975)?
If in college or Armed Forces in April 1975, report place of residence there.
- ○ Born April 1975 or later – *Turn to next page for next person*
- ○ Yes, this house – *Skip to 16*
- ○ No, different house

b. Where did this person live five years ago (April 1, 1975)?
(1) State, foreign country, Puerto Rico, Guam, etc.:
(2) County:
(3) City, town, village, etc.:
(4) Inside the incorporated (legal) limits of that city, town, village, etc.?
- ○ Yes
- ○ No, in unincorporated area

16. When was this person born?
- ○ Born before April 1965 – *Please go on with questions 17-33*
- ○ Born April 1965 or later – *Turn to next page for next person*

17. In April 1975 *(five years ago)* **was this person –**
a. On active duty in the Armed Forces?
- ○ Yes
- ○ No

b. Attending college?
- ○ Yes
- ○ No

c. Working at a job or business?
- ○ Yes, full time
- ○ Yes, part time
- ○ No

18a. Is this person a veteran of active-duty military service in the Armed Forces of the United States?
If service was in National Guard or Reserves only, see instruction guide.
- ○ Yes
- ○ No – *Skip to 19*

b. Was active-duty military service during –
Fill a circle for each period in which this person served.
- ○ May 1975 or later
- ○ Vietnam era *(August 1964–April 1975)*
- ○ February 1955–July 1964
- ○ Korean conflict *(June 1950–January 1955)*
- ○ World War II *(September 1940–July 1947)*
- ○ World War I *(April 1917–November 1918)*
- ○ Any other time

19. Does this person have a physical, mental, or other health condition which has lasted for 6 or more months and which . . .

	Yes	No
a. Limits the kind or amount of work this person can do at a job?	○	○
b. Prevents this person from working at a job?	○	○
c. Limits or prevents this person from using public transportation?	○	○

20. *If this person is a female –*
How many babies has she ever had, not counting stillbirths? *Do not count her stepchildren or children she has adopted.*
None ○ | 1 ○ | 2 ○ | 3 ○ | 4 ○ | 5 ○ | 6 ○ | 7 ○ | 8 ○ | 9 ○ | 10 ○ | 11 ○ | 12 or more ○

21. *If this person has ever been married –*
a. Has this person been married more than once?
- ○ Once
- ○ More than once

b. Month and year of marriage? *(Month) (Year)*
Month and year of first marriage? *(Month) (Year)*

c. *If married more than once –* **Did the first marriage end because of the death of the husband (or wife)?**
- ○ Yes
- ○ No

22a. Did this person work at any time last week?
- ○ Yes – *Fill this circle if this person worked full time or part time. (Count part-time work such as delivering papers, or helping without pay in a family business or farm. Also count active duty in the Armed Forces.)*
- ○ No – *Fill this circle if this person did not work, or did only own housework, school work, or volunteer work.*

Skip to 25

b. How many hours did this person work last week (at all jobs)?
Subtract any time off; add overtime or extra hours worked.
Hours

23. At what location did this person work last week?
If this person worked at more than one location, print where he or she worked most last week.
If one location cannot be specified, see instruction guide.

a. Address *(Number and street)*

If street address is not known, enter the building name, shopping center, or other physical location description.

b. Name of city, town, village, borough, etc.

c. Is the place of work inside the incorporated (legal) limits of that city, town, village, borough, etc.?
- ○ Yes
- ○ No, in unincorporated area

d. County

e. State **f. ZIP Code**

24a. Last week, how long did it usually take this person to get from home to work (one way)?
Minutes

b. How did this person usually get to work last week?
If this person used more than one method, give the one usually used for most of the distance.
- ○ Car
- ○ Truck
- ○ Van
- ○ Bus or streetcar
- ○ Railroad
- ○ Subway or elevated
- ○ Taxicab
- ○ Motorcycle
- ○ Bicycle
- ○ Walked only
- ○ Worked at home
- ○ Other – *Specify*

If car, truck, or van in 24b, go to 24c. Otherwise, skip to 28.

FOR CENSUS USE ONLY

Per. No.	11.	13b.	14.	15b.	23.	VL	24a.
	000	000	000 000	000 000	000 000	000	00
1	111	111	111 111	111 111	111 111	111	11
2	222	222	222 222	222 222	222 222	222	22
3	333	333	333 333	333 333	333 333	333	33
4	444	444	444 444	444 444	444 444	444	44
5	555	555	555 555	555 555	555 555	555	55
6	666	666	666 666	666 666	666 666	666	66
7	777	777	777 777	777 777	777 777	777	77
8	888	888	888 888	888 888	888 888	888	88
9	999	999	999 999	999 999	999 999	999	99

c. When going to work last week, did this person usually —

○ Drive alone — *Skip to 28* ○ Drive others only
○ Share driving ○ Ride as passenger only

d. How many people, including this person, usually rode to work in the car, truck, or van last week?

○ 2 ○ 4 ○ 6
○ 3 ○ 5 ○ 7 or more

After answering 24d, skip to 28.

25. Was this person temporarily absent or on layoff from a job or business last week?

○ Yes, on layoff
○ Yes, on vacation, temporary illness, labor dispute, etc.
○ No

26a. Has this person been looking for work during the last 4 weeks?

○ Yes ○ No — *Skip to 27*

b. Could this person have taken a job last week?

○ No, already has a job
○ No, temporarily ill
○ No, other reasons *(in school, etc.)*
○ Yes, could have taken a job

27. When did this person last work, even for a few days?

○ 1980 ○ 1978 ○ 1970 to 1974
○ 1979 ○ 1975 to 1977 ○ 1969 or earlier
○ Never worked

Skip to 31d

28–30. Current or most recent job activity

Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give information for last job or business since 1975.

28. Industry

a. For whom did this person work? *If now on active duty in the Armed Forces, print "AF" and skip to question 31.*

(Name of company, business, organization, or other employer)

b. What kind of business or industry was this?
Describe the activity at location where employed.

(For example: Hospital, newspaper publishing, mail order house, auto engine manufacturing, breakfast cereal manufacturing)

c. Is this mainly — *(Fill one circle)*

○ Manufacturing ○ Retail trade
○ Wholesale trade ○ Other — *(agriculture, construction, service, government, etc.)*

29. Occupation

a. What kind of work was this person doing?

(For example: Registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, grinder operator)

b. What were this person's most important activities or duties?

(For example: Patient care, directing hiring policies, supervising order clerks, assembling engines, operating grinding mill)

30. Was this person — *(Fill one circle)*

Employee of private company, business, or individual, for wages, salary, or commissions ○
Federal government employee ○
State government employee ○
Local government employee *(city, county, etc.)* ○

Self-employed in own business, professional practice, or farm —
Own business not incorporated ○
Own business incorporated ○

Working without pay in family business or farm ○

CENSUS USE

21b. I II III IV

22b.

28. A B C D E F G H J K L M

AF ○ NW ○

29. N P Q R S T U V W X Y Z

31a. Last year (1979), did this person work, even for a few days, at a paid job or in a business or farm?

○ Yes ○ No — *Skip to 31d*

b. How many weeks did this person work in 1979?
Count paid vacation, paid sick leave, and military service.

Weeks

c. During the weeks worked in 1979, how many hours did this person usually work each week?

Hours

d. Of the weeks not worked in 1979 (if any), how many weeks was this person looking for work or on layoff from a job?

Weeks

32. Income in 1979 —

Fill circles and print dollar amounts.
If net income was a loss, write "Loss" above the dollar amount.
If exact amount is not known, give best estimate. For income received jointly by household members, see instruction guide.

During 1979 did this person receive any income from the following sources?

If "Yes" to any of the sources below — **How much did this person receive for the entire year?**

a. Wages, salary, commissions, bonuses, or tips from all jobs . . . *Report amount before deductions for taxes, bonds, dues, or other items.*

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

b. Own nonfarm business, partnership, or professional practice . . . *Report net income after business expenses.*

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

c. Own farm. . .
Report net income after operating expenses. Include earnings as a tenant farmer or sharecropper.

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

d. Interest, dividends, royalties, or net rental income . . .
Report even small amounts credited to an account.

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

e. Social Security or Railroad Retirement . . .

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

f. Supplemental Security (SSI), Aid to Families with Dependent Children (AFDC), or other public assistance or public welfare payments . . .

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

g. Unemployment compensation, veterans' payments, pensions, alimony or child support, or any other sources of income received regularly . . .
Exclude lump-sum payments such as money from an inheritance or the sale of a home.

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

33. What was this person's total income in 1979?
Add entries in questions 32a through g; subtract any losses.

$ .00
(Annual amount — Dollars)

If total amount was a loss, write "Loss" above amount.

OR ○ None

CENSUS USE ONLY

31b. 31c. 31d.

32a. 32b. 32c. 32d. 32e. 32f. 32g.

33.

Please turn to the next page and answer the questions for Person 4 on page 2

ANSWER THESE QUESTIONS FO

Name of Person 4 on page 2:
Last name | First name | Middle initial

11. In what State or foreign country was this person born?
Print the State where this person's mother was living when this person was born. Do not give the location of the hospital unless the mother's home and the hospital were in the same State.

Name of State or foreign country; or Puerto Rico, Guam, etc.

12. *If this person was born in a foreign country –*
a. Is this person a naturalized citizen of the United States?
- ○ Yes, a naturalized citizen
- ○ No, not a citizen
- ○ Born abroad of American parents

b. When did this person come to the United States to stay?
- ○ 1975 to 1980
- ○ 1965 to 1969
- ○ 1950 to 1959
- ○ 1970 to 1974
- ○ 1960 to 1964
- ○ Before 1950

13a. Does this person speak a language other than English at home?
- ○ Yes
- ○ No, only speaks English – *Skip to 14*

b. What is this language?
(For example – Chinese, Italian, Spanish, etc.)

c. How well does this person speak English?
- ○ Very well
- ○ Well
- ○ Not well
- ○ Not at all

14. What is this person's ancestry? *If uncertain about how to report ancestry, see instruction guide.*
(For example: Afro-Amer., English, French, German, Honduran, Hungarian, Irish, Italian, Jamaican, Korean, Lebanese, Mexican, Nigerian, Polish, Ukrainian, Venezuelan, etc.)

15a. Did this person live in this house five years ago (April 1, 1975)?
If in college or Armed Forces in April 1975, report place of residence there.
- ○ Born April 1975 or later – *Turn to next page for next person*
- ○ Yes, this house – *Skip to 16*
- ○ No, different house

b. Where did this person live five years ago (April 1, 1975)?
(1) State, foreign country, Puerto Rico, Guam, etc.:
(2) County:
(3) City, town, village, etc.:
(4) Inside the incorporated (legal) limits of that city, town, village, etc.?
- ○ Yes
- ○ No, in unincorporated area

16. When was this person born?
- ○ Born before April 1965 – *Please go on with questions 17-33*
- ○ Born April 1965 or later – *Turn to next page for next person*

17. In April 1975 *(five years ago)* **was this person –**
a. On active duty in the Armed Forces?
- ○ Yes
- ○ No

b. Attending college?
- ○ Yes
- ○ No

c. Working at a job or business?
- ○ Yes, full time
- ○ Yes, part time
- ○ No

18a. Is this person a veteran of active-duty military service in the Armed Forces of the United States?
If service was in National Guard or Reserves only, see instruction guide.
- ○ Yes
- ○ No – *Skip to 19*

b. Was active-duty military service during –
Fill a circle for each period in which this person served.
- ○ May 1975 or later
- ○ Vietnam era *(August 1964–April 1975)*
- ○ February 1955–July 1964
- ○ Korean conflict *(June 1950–January 1955)*
- ○ World War II *(September 1940–July 1947)*
- ○ World War I *(April 1917–November 1918)*
- ○ Any other time

19. Does this person have a physical, mental, or other health condition which has lasted for 6 or more months and which . . .

	Yes	No
a. Limits the kind or amount of work this person can do at a job?	○	○
b. Prevents this person from working at a job?	○	○
c. Limits or prevents this person from using public transportation?	○	○

20. *If this person is a female –*
How many babies has she ever had, not counting stillbirths?
Do not count her stepchildren or children she has adopted.
None ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○
7 ○ 8 ○ 9 ○ 10 ○ 11 ○ 12 or more ○

21. *If this person has ever been married –*
a. Has this person been married more than once?
- ○ Once
- ○ More than once

b. Month and year of marriage? *(Month) (Year)*
Month and year of first marriage? *(Month) (Year)*

c. *If married more than once* **– Did the first marriage end because of the death of the husband (or wife)?**
- ○ Yes
- ○ No

22a. Did this person work at any time last week?
- ○ Yes – *Fill this circle if this person worked full time or part time. (Count part-time work such as delivering papers, or helping without pay in a family business or farm. Also count active duty in the Armed Forces.)*
- ○ No – *Fill this circle if this person did not work, or did only own housework, school work, or volunteer work.*

Skip to 25

b. How many hours did this person work last week (at all jobs)?
Subtract any time off; add overtime or extra hours worked.
Hours

23. At what location did this person work last week?
If this person worked at more than one location, print where he or she worked most last week.
If one location cannot be specified, see instruction guide.

a. Address *(Number and street)*
If street address is not known, enter the building name, shopping center, or other physical location description.

b. Name of city, town, village, borough, etc.

c. Is the place of work inside the incorporated (legal) limits of that city, town, village, borough, etc.?
- ○ Yes
- ○ No, in unincorporated area

d. County

e. State **f. ZIP Code**

24a. Last week, how long did it usually take this person to get from home to work (one way)?
Minutes

b. How did this person usually get to work last week?
If this person used more than one method, give the one usually used for most of the distance.
- ○ Car
- ○ Truck
- ○ Van
- ○ Bus or streetcar
- ○ Railroad
- ○ Subway or elevated
- ○ Taxicab
- ○ Motorcycle
- ○ Bicycle
- ○ Walked only
- ○ Worked at home
- ○ Other – *Specify*

If car, truck, or van in 24b, go to 24c. Otherwise, skip to 28.

FOR CENSUS USE ONLY

Per. No.	11.	13b.	14.	15b.	23. ○ VL	24a.
1	000 111	000 111	000 000 111 111	000 000 111 111	000 000 000 111 111 111	00 11
2	222	222	222 222	222 222	222 222 222	22
3	333	333	333 333	333 333	333 333 333	33
4	444	444	444 444	444 444	444 444 444	44
5	555	555	555 555	555 555	555 555 555	55
6	666	666	666 666	666 666	666 666 666	66
7	777	777	777 777	777 777	777 777 777	77
8	888	888	888 888	888 888	888 888 888	88
9	999	999	999 999	999 999	999 999 999	99
0	000	000	000 000	000 000	000 000 000	00

PERSON 4 ON PAGE 2

c. When going to work last week, did this person usually —

○ Drive alone — *Skip to 28* ○ Drive others only
○ Share driving ○ Ride as passenger only

d. How many people, including this person, usually rode to work in the car, truck, or van last week?

○ 2 ○ 4 ○ 6
○ 3 ○ 5 ○ 7 or more

After answering 24d, skip to 28.

25. Was this person temporarily absent or on layoff from a job or business last week?

○ Yes, on layoff
○ Yes, on vacation, temporary illness, labor dispute, etc.
○ No

26a. Has this person been looking for work during the last 4 weeks?

○ Yes ○ No — *Skip to 27*

b. Could this person have taken a job last week?

○ No, already has a job
○ No, temporarily ill
○ No, other reasons *(in school, etc.)*
○ Yes, could have taken a job

27. When did this person last work, even for a few days?

○ 1980 ○ 1978 ○ 1970 to 1974
○ 1979 ○ 1975 to 1977 ○ 1969 or earlier
○ Never worked

Skip to 31d

28–30. Current or most recent job activity

Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give information for last job or business since 1975.

28. Industry

a. For whom did this person work? *If now on active duty in the Armed Forces, print "AF" and skip to question 31.*

(Name of company, business, organization, or other employer)

b. What kind of business or industry was this? *Describe the activity at location where employed.*

(For example: Hospital, newspaper publishing, mail order house, auto engine manufacturing, breakfast cereal manufacturing)

c. Is this mainly — *(Fill one circle)*

○ Manufacturing ○ Retail trade
○ Wholesale trade ○ Other — *(agriculture, construction, service, government, etc.)*

29. Occupation

a. What kind of work was this person doing?

(For example: Registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, grinder operator)

b. What were this person's most important activities or duties?

(For example: Patient care, directing hiring policies, supervising order clerks, assembling engines, operating grinding mill)

30. Was this person — *(Fill one circle)*

Employee of private company, business, or individual, for wages, salary, or commissions ○
Federal government employee ○
State government employee ○
Local government employee *(city, county, etc.)* ○
Self-employed in own business, professional practice, or farm —
Own business not incorporated ○
Own business incorporated ○
Working without pay in family business or farm ○

CENSUS USE

21b. I II III IV

22b.

28. A B C D E F G H J K L M AF NW

29. N P Q R S T U V W X Y Z

31a. Last year (1979), did this person work, even for a few days, at a paid job or in a business or farm?

○ Yes ○ No — *Skip to 31d*

b. How many weeks did this person work in 1979? *Count paid vacation, paid sick leave, and military service.*

_____ Weeks

c. During the weeks worked in 1979, how many hours did this person usually work each week?

_____ Hours

d. Of the weeks not worked in 1979 (if any), how many weeks was this person looking for work or on layoff from a job?

_____ Weeks

32. Income in 1979 —

Fill circles and print dollar amounts. If net income was a loss, write "Loss" above the dollar amount. If exact amount is not known, give best estimate. For income received jointly by household members, see instruction guide.

During 1979 did this person receive any income from the following sources?

If "Yes" to any of the sources below — **How much did this person receive for the entire year?**

a. Wages, salary, commissions, bonuses, or tips from all jobs . . . *Report amount before deductions for taxes, bonds, dues, or other items.*

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

b. Own nonfarm business, partnership, or professional practice . . . *Report net income after business expenses.*

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

c. Own farm. . . *Report net income after operating expenses. Include earnings as a tenant farmer or sharecropper.*

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

d. Interest, dividends, royalties, or net rental income . . . *Report even small amounts credited to an account.*

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

e. Social Security or Railroad Retirement . . .

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

f. Supplemental Security (SSI), Aid to Families with Dependent Children (AFDC), or other public assistance or public welfare payments . . .

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

g. Unemployment compensation, veterans' payments, pensions, alimony or child support, or any other sources of income received regularly . . . *Exclude lump-sum payments such as money from an inheritance or the sale of a home.*

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

33. What was this person's total income in 1979?

Add entries in questions 32a through g; subtract any losses. $ .00 *(Annual amount — Dollars)*

If total amount was a loss, write "Loss" above amount. OR ○ None

CENSUS USE ONLY

31b. 31c. 31d.

32a. 32b. 32c. 32d. 32e. 32f. 32g. 33.

Please turn to the next page and answer the questions for Person 5 on page 2

Name of Person 5 on page 2:
Last name | First name | Middle initial

11. In what State or foreign country was this person born?
Print the State where this person's mother was living when this person was born. Do not give the location of the hospital unless the mother's home and the hospital were in the same State.

Name of State or foreign country; or Puerto Rico, Guam, etc.

12. *If this person was born in a foreign country –*
a. Is this person a naturalized citizen of the United States?
- ○ Yes, a naturalized citizen
- ○ No, not a citizen
- ○ Born abroad of American parents

b. When did this person come to the United States to stay?
- ○ 1975 to 1980
- ○ 1965 to 1969
- ○ 1950 to 1959
- ○ 1970 to 1974
- ○ 1960 to 1964
- ○ Before 1950

13a. Does this person speak a language other than English at home?
- ○ Yes
- ○ No, only speaks English – *Skip to 14*

b. What is this language?
(For example – Chinese, Italian, Spanish, etc.)

c. How well does this person speak English?
- ○ Very well
- ○ Well
- ○ Not well
- ○ Not at all

14. What is this person's ancestry? *If uncertain about how to report ancestry, see instruction guide.*
(For example: Afro-Amer., English, French, German, Honduran, Hungarian, Irish, Italian, Jamaican, Korean, Lebanese, Mexican, Nigerian, Polish, Ukrainian, Venezuelan, etc.)

15a. Did this person live in this house five years ago (April 1, 1975)?
If in college or Armed Forces in April 1975, report place of residence there.
- ○ Born April 1975 or later – *Turn to next page for next person*
- ○ Yes, this house – *Skip to 16*
- ○ No, different house

b. Where did this person live five years ago (April 1, 1975)?
(1) State, foreign country, Puerto Rico, Guam, etc.:
(2) County:
(3) City, town, village, etc.:
(4) Inside the incorporated (legal) limits of that city, town, village, etc.?
- ○ Yes
- ○ No, in unincorporated area

16. When was this person born?
- ○ Born before April 1965 – *Please go on with questions 17-33*
- ○ Born April 1965 or later – *Turn to next page for next person*

17. In April 1975 *(five years ago)* **was this person –**
a. On active duty in the Armed Forces?
- ○ Yes
- ○ No

b. Attending college?
- ○ Yes
- ○ No

c. Working at a job or business?
- ○ Yes, full time
- ○ Yes, part time
- ○ No

18a. Is this person a veteran of active-duty military service in the Armed Forces of the United States?
If service was in National Guard or Reserves only, see instruction guide.
- ○ Yes
- ○ No – *Skip to 19*

b. Was active-duty military service during –
Fill a circle for each period in which this person served.
- ○ May 1975 or later
- ○ Vietnam era *(August 1964–April 1975)*
- ○ February 1955–July 1964
- ○ Korean conflict *(June 1950–January 1955)*
- ○ World War II *(September 1940–July 1947)*
- ○ World War I *(April 1917–November 1918)*
- ○ Any other time

19. Does this person have a physical, mental, or other health condition which has lasted for 6 or more months and which . . .

	Yes	No
a. Limits the kind or amount of work this person can do at a job?	○	○
b. Prevents this person from working at a job?	○	○
c. Limits or prevents this person from using public transportation?	○	○

20. *If this person is a female –*
How many babies has she ever had, not counting stillbirths?
Do not count her stepchildren or children she has adopted.

None	1	2	3	4	5	6	7	8	9	10	11	12 or more
○	○	○	○	○	○	○	○	○	○	○	○	○

21. *If this person has ever been married –*
a. Has this person been married more than once?
- ○ Once
- ○ More than once

b. Month and year of marriage? *(Month) (Year)*
Month and year of first marriage? *(Month) (Year)*

c. *If married more than once* **– Did the first marriage end because of the death of the husband (or wife)?**
- ○ Yes
- ○ No

22a. Did this person work at any time last week?
- ○ Yes – *Fill this circle if this person worked full time or part time. (Count part-time work such as delivering papers, or helping without pay in a family business or farm. Also count active duty in the Armed Forces.)*
- ○ No – *Fill this circle if this person did not work, or did only own housework, school work, or volunteer work.*

Skip to 25

b. How many hours did this person work last week (at all jobs)?
Subtract any time off; add overtime or extra hours worked.
Hours

23. At what location did this person work last week?
If this person worked at more than one location, print where he or she worked most last week.
If one location cannot be specified, see instruction guide.

a. Address *(Number and street)*
If street address is not known, enter the building name, shopping center, or other physical location description.

b. Name of city, town, village, borough, etc.

c. Is the place of work inside the incorporated (legal) limits of that city, town, village, borough, etc.?
- ○ Yes
- ○ No, in unincorporated area

d. County

e. State **f. ZIP Code**

24a. Last week, how long did it usually take this person to get from home to work (one way)?
Minutes

b. How did this person usually get to work last week?
If this person used more than one method, give the one usually used for most of the distance.
- ○ Car
- ○ Truck
- ○ Van
- ○ Bus or streetcar
- ○ Railroad
- ○ Subway or elevated
- ○ Taxicab
- ○ Motorcycle
- ○ Bicycle
- ○ Walked only
- ○ Worked at home
- ○ Other – *Specify*

If car, truck, or van in 24b, go to 24c. Otherwise, skip to 28.

FOR CENSUS USE ONLY

Per. No.	11.	13b.	14.	15b.	23.	○ VL	24a.
1	⊘ ⊘ ⊘	⊘ ⊘ ⊘	⊘ ⊘ ⊘	⊘ ⊘ ⊘	⊘ ⊘ ⊘	⊘ ⊘ ⊘	⊘ ⊘
2	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1
3	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2
4	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3
5	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4
6	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5
7	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6
⊘	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7
	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8
	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9

c. When going to work last week, did this person usually —

○ Drive alone — *Skip to 28*
○ Share driving
○ Drive others only
○ Ride as passenger only

d. How many people, including this person, usually rode to work in the car, truck, or van last week?

○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 or more

After answering 24d, skip to 28.

25. Was this person temporarily absent or on layoff from a job or business last week?

○ Yes, on layoff
○ Yes, on vacation, temporary illness, labor dispute, etc.
○ No

26a. Has this person been looking for work during the last 4 weeks?

○ Yes ○ No — *Skip to 27*

b. Could this person have taken a job last week?

○ No, already has a job
○ No, temporarily ill
○ No, other reasons *(in school, etc.)*
○ Yes, could have taken a job

27. When did this person last work, even for a few days?

○ 1980 ○ 1979 ○ 1978 ○ 1975 to 1977 ○ 1970 to 1974 ○ 1969 or earlier ○ Never worked — *Skip to 31d*

28–30. Current or most recent job activity

Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours.
If this person had no job or business last week, give information for last job or business since 1975.

28. Industry

a. For whom did this person work? *If now on active duty in the Armed Forces, print "AF" and skip to question 31.*

(Name of company, business, organization, or other employer)

b. What kind of business or industry was this?
Describe the activity at location where employed.

(For example: Hospital, newspaper publishing, mail order house, auto engine manufacturing, breakfast cereal manufacturing)

c. Is this mainly — *(Fill one circle)*

○ Manufacturing ○ Retail trade
○ Wholesale trade ○ Other — *(agriculture, construction, service, government, etc.)*

29. Occupation

a. What kind of work was this person doing?

(For example: Registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, grinder operator)

b. What were this person's most important activities or duties?

(For example: Patient care, directing hiring policies, supervising order clerks, assembling engines, operating grinding mill)

30. Was this person — *(Fill one circle)*

Employee of private company, business, or individual, for wages, salary, or commissions ○
Federal government employee ○
State government employee ○
Local government employee *(city, county, etc.)* ○
Self-employed in own business, professional practice, or farm —
Own business not incorporated ○
Own business incorporated ○
Working without pay in family business or farm ○

CENSUS USE

21b. I II III IV

22b.

28. A B C D E F G H J K L M AF NW

29. N P Q R S T U V W X Y Z

31a. Last year (1979), did this person work, even for a few days, at a paid job or in a business or farm?

○ Yes ○ No — *Skip to 31d*

b. How many weeks did this person work in 1979?
Count paid vacation, paid sick leave, and military service.

Weeks

c. During the weeks worked in 1979, how many hours did this person usually work each week?

Hours

d. Of the weeks not worked in 1979 (if any), how many weeks was this person looking for work or on layoff from a job?

Weeks

32. Income in 1979 —

Fill circles and print dollar amounts.
If net income was a loss, write "Loss" above the dollar amount.
If exact amount is not known, give best estimate. For income received jointly by household members, see instruction guide.

During 1979 did this person receive any income from the following sources?

If "Yes" to any of the sources below — **How much did this person receive for the entire year?**

a. Wages, salary, commissions, bonuses, or tips from all jobs . . . *Report amount before deductions for taxes, bonds, dues, or other items.*

○ Yes → $ .00
○ No
(Annual amount – Dollars)

b. Own nonfarm business, partnership, or professional practice . . . *Report net income after business expenses.*

○ Yes → $ .00
○ No
(Annual amount – Dollars)

c. Own farm. . .
Report net income after operating expenses. Include earnings as a tenant farmer or sharecropper.

○ Yes → $ .00
○ No
(Annual amount – Dollars)

d. Interest, dividends, royalties, or net rental income . . .
Report even small amounts credited to an account.

○ Yes → $ .00
○ No
(Annual amount – Dollars)

e. Social Security or Railroad Retirement . . .

○ Yes → $ .00
○ No
(Annual amount – Dollars)

f. Supplemental Security (SSI), Aid to Families with Dependent Children (AFDC), or other public assistance or public welfare payments . . .

○ Yes → $ .00
○ No
(Annual amount – Dollars)

g. Unemployment compensation, veterans' payments, pensions, alimony or child support, or any other sources of income received regularly . . .
Exclude lump-sum payments such as money from an inheritance or the sale of a home.

○ Yes → $ .00
○ No
(Annual amount – Dollars)

33. What was this person's total income in 1979?

Add entries in questions 32a through g; subtract any losses. $ .00
(Annual amount – Dollars)

If total amount was a loss, write "Loss" above amount. OR ○ None

CENSUS USE ONLY

31b. 31c. 31d.

32a. 32b. 32c. 32d. 32e. 32f. 32g. 33.

Please turn to the next page and answer the questions for Person 6 on page 2

ANSWER THESE QUESTIONS FOR

Name of Person 6 on page 2:
Last name | First name | Middle initial

11. In what State or foreign country was this person born?
Print the State where this person's mother was living when this person was born. Do not give the location of the hospital unless the mother's home and the hospital were in the same State.

Name of State or foreign country; or Puerto Rico, Guam, etc.

12. *If this person was born in a foreign country –*
a. Is this person a naturalized citizen of the United States?
- ○ Yes, a naturalized citizen
- ○ No, not a citizen
- ○ Born abroad of American parents

b. When did this person come to the United States to stay?
- ○ 1975 to 1980
- ○ 1965 to 1969
- ○ 1950 to 1959
- ○ 1970 to 1974
- ○ 1960 to 1964
- ○ Before 1950

13a. Does this person speak a language other than English at home?
- ○ Yes
- ○ No, only speaks English – *Skip to 14*

b. What is this language?
(For example – Chinese, Italian, Spanish, etc.)

c. How well does this person speak English?
- ○ Very well
- ○ Well
- ○ Not well
- ○ Not at all

14. What is this person's ancestry? *If uncertain about how to report ancestry, see instruction guide.*
(For example: Afro-Amer., English, French, German, Honduran, Hungarian, Irish, Italian, Jamaican, Korean, Lebanese, Mexican, Nigerian, Polish, Ukrainian, Venezuelan, etc.)

15a. Did this person live in this house five years ago (April 1, 1975)?
If in college or Armed Forces in April 1975, report place of residence there.
- ○ Born April 1975 or later – *Turn to next page for next person*
- ○ Yes, this house – *Skip to 16*
- ○ No, different house

b. Where did this person live five years ago (April 1, 1975)?
(1) State, foreign country, Puerto Rico, Guam, etc.:
(2) County:
(3) City, town, village, etc.:
(4) Inside the incorporated (legal) limits of that city, town, village, etc.?
- ○ Yes
- ○ No, in unincorporated area

16. When was this person born?
- ○ Born before April 1965 – *Please go on with questions 17-33*
- ○ Born April 1965 or later – *Turn to next page for next person*

17. In April 1975 *(five years ago)* **was this person –**
a. On active duty in the Armed Forces?
- ○ Yes
- ○ No

b. Attending college?
- ○ Yes
- ○ No

c. Working at a job or business?
- ○ Yes, full time
- ○ No
- ○ Yes, part time

18a. Is this person a veteran of active-duty military service in the Armed Forces of the United States?
If service was in National Guard or Reserves only, see instruction guide.
- ○ Yes
- ○ No – *Skip to 19*

b. Was active-duty military service during –
Fill a circle for each period in which this person served.
- ○ May 1975 or later
- ○ Vietnam era *(August 1964–April 1975)*
- ○ February 1955–July 1964
- ○ Korean conflict *(June 1950–January 1955)*
- ○ World War II *(September 1940–July 1947)*
- ○ World War I *(April 1917–November 1918)*
- ○ Any other time

19. Does this person have a physical, mental, or other health condition which has lasted for 6 or more months and which . . .

	Yes	No
a. Limits the kind or amount of work this person can do at a job?	○	○
b. Prevents this person from working at a job?	○	○
c. Limits or prevents this person from using public transportation?	○	○

20. *If this person is a female –*
How many babies has she ever had, not counting stillbirths?
Do not count her stepchildren or children she has adopted.
None ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 ○ 11 ○ 12 or more ○

21. *If this person has ever been married –*
a. Has this person been married more than once?
- ○ Once
- ○ More than once

b. Month and year of marriage? *(Month) (Year)*
Month and year of first marriage? *(Month) (Year)*

c. *If married more than once –* **Did the first marriage end because of the death of the husband (or wife)?**
- ○ Yes
- ○ No

22a. Did this person work at any time last week?
- ○ Yes – *Fill this circle if this person worked full time or part time. (Count part-time work such as delivering papers, or helping without pay in a family business or farm. Also count active duty in the Armed Forces.)*
- ○ No – *Fill this circle if this person did not work, or did only own housework, school work, or volunteer work.*

Skip to 25

b. How many hours did this person work last week (at all jobs)?
Subtract any time off; add overtime or extra hours worked.
Hours

23. At what location did this person work last week?
If this person worked at more than one location, print where he or she worked most last week.
If one location cannot be specified, see instruction guide.

a. Address *(Number and street)*
If street address is not known, enter the building name, shopping center, or other physical location description.

b. Name of city, town, village, borough, etc.

c. Is the place of work inside the incorporated (legal) limits of that city, town, village, borough, etc.?
- ○ Yes
- ○ No, in unincorporated area

d. County

e. State **f. ZIP Code**

24a. Last week, how long did it usually take this person to get from home to work (one way)?
Minutes

b. How did this person usually get to work last week?
If this person used more than one method, give the one usually used for most of the distance.
- ○ Car
- ○ Truck
- ○ Van
- ○ Bus or streetcar
- ○ Railroad
- ○ Subway or elevated
- ○ Taxicab
- ○ Motorcycle
- ○ Bicycle
- ○ Walked only
- ○ Worked at home
- ○ Other – *Specify*

If car, truck, or van in 24b, go to 24c. Otherwise, skip to 28.

FOR CENSUS USE ONLY

Per. No.	11.	13b.	14.	15b.	23.	○ VL	24a.
1	⊘ ⊘ ⊘	⊘ ⊘ ⊘	⊘ ⊘ ⊘ ⊘ ⊘ ⊘	⊘ ⊘ ⊘ ⊘ ⊘ ⊘	⊘ ⊘ ⊘ ⊘ ⊘ ⊘ ⊘ ⊘	⊘ ⊘ ⊘	⊘ ⊘
2	1 1 1	1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1	1 1
3	2 2 2	2 2 2	2 2 2 2 2 2	2 2 2 2 2 2	2 2 2 2 2 2 2 2	2 2 2	2 2
4	3 3 3	3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3 3 3	3 3 3	3 3
5	4 4 4	4 4 4	4 4 4 4 4 4	4 4 4 4 4 4	4 4 4 4 4 4 4 4	4 4 4	4 4
6	5 5 5	5 5 5	5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5	5 5 5	5 5
7	6 6 6	6 6 6	6 6 6 6 6 6	6 6 6 6 6 6	6 6 6 6 6 6 6 6	6 6 6	6 6
8	7 7 7	7 7 7	7 7 7 7 7 7	7 7 7 7 7 7	7 7 7 7 7 7 7 7	7 7 7	7 7
9	8 8 8	8 8 8	8 8 8 8 8 8	8 8 8 8 8 8	8 8 8 8 8 8 8 8	8 8 8	8 8
0	9 9 9	9 9 9	9 9 9 9 9 9	9 9 9 9 9 9	9 9 9 9 9 9 9 9	9 9 9	9 9

c. When going to work last week, did this person usually —

○ Drive alone — *Skip to 28* ○ Drive others only
○ Share driving ○ Ride as passenger only

d. How many people, including this person, usually rode to work in the car, truck, or van last week?

○ 2 ○ 4 ○ 6
○ 3 ○ 5 ○ 7 or more

After answering 24d, skip to 28.

25. Was this person temporarily absent or on layoff from a job or business last week?

○ Yes, on layoff
○ Yes, on vacation, temporary illness, labor dispute, etc.
○ No

26a. Has this person been looking for work during the last 4 weeks?

○ Yes ○ No — *Skip to 27*

b. Could this person have taken a job last week?

○ No, already has a job
○ No, temporarily ill
○ No, other reasons *(in school, etc.)*
○ Yes, could have taken a job

27. When did this person last work, even for a few days?

○ 1980 ○ 1978 ○ 1970 to 1974
○ 1979 ○ 1975 to 1977 ○ 1969 or earlier
○ Never worked

Skip to 31d

28–30. Current or most recent job activity

Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give information for last job or business since 1975.

28. Industry

a. For whom did this person work? *If now on active duty in the Armed Forces, print "AF" and skip to question 31.*

(Name of company, business, organization, or other employer)

b. What kind of business or industry was this?

Describe the activity at location where employed.

(For example: Hospital, newspaper publishing, mail order house, auto engine manufacturing, breakfast cereal manufacturing)

c. Is this mainly — *(Fill one circle)*

○ Manufacturing ○ Retail trade
○ Wholesale trade ○ Other — *(agriculture, construction, service, government, etc.)*

29. Occupation

a. What kind of work was this person doing?

(For example: Registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, grinder operator)

b. What were this person's most important activities or duties?

(For example: Patient care, directing hiring policies, supervising order clerks, assembling engines, operating grinding mill)

30. Was this person — *(Fill one circle)*

Employee of private company, business, or individual, for wages, salary, or commissions ○
Federal government employee ○
State government employee ○
Local government employee *(city, county, etc.)* ○

Self-employed in own business, professional practice, or farm —
Own business not incorporated ○
Own business incorporated ○

Working without pay in family business or farm ○

CENSUS USE

21b. I II III IV

22b.

28. A B C D E F G H J K L M AF NW

29. N P Q R S T U V W X Y Z

31a. Last year (1979), did this person work, even for a few days, at a paid job or in a business or farm?

○ Yes ○ No — *Skip to 31d*

b. How many weeks did this person work in 1979?

Count paid vacation, paid sick leave, and military service.

_____ Weeks

c. During the weeks worked in 1979, how many hours did this person usually work each week?

_____ Hours

d. Of the weeks not worked in 1979 (if any), how many weeks was this person looking for work or on layoff from a job?

_____ Weeks

32. Income in 1979 —

Fill circles and print dollar amounts.
If net income was a loss, write "Loss" above the dollar amount.
If exact amount is not known, give best estimate. For income received jointly by household members, see instruction guide.

During 1979 did this person receive any income from the following sources?

If "Yes" to any of the sources below — **How much did this person receive for the entire year?**

a. Wages, salary, commissions, bonuses, or tips from all jobs . . . *Report amount before deductions for taxes, bonds, dues, or other items.*

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

b. Own nonfarm business, partnership, or professional practice . . . *Report net income after business expenses.*

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

c. Own farm. . .

Report net income after operating expenses. Include earnings as a tenant farmer or sharecropper.

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

d. Interest, dividends, royalties, or net rental income . . .

Report even small amounts credited to an account.

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

e. Social Security or Railroad Retirement . . .

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

f. Supplemental Security (SSI), Aid to Families with Dependent Children (AFDC), or other public assistance or public welfare payments . . .

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

g. Unemployment compensation, veterans' payments, pensions, alimony or child support, or any other sources of income received regularly . . .

Exclude lump-sum payments such as money from an inheritance or the sale of a home.

○ Yes → $ .00
○ No *(Annual amount — Dollars)*

33. What was this person's total income in 1979?

Add entries in questions 32a through g; subtract any losses. $ .00 *(Annual amount — Dollars)*

If total amount was a loss, write "Loss" above amount. OR ○ None

CENSUS USE ONLY

31b. 31c. 31d.

32a. 32b. 32c. 32d. 32e. 32f. 32g. 33.

Please turn to the next page and answer the questions for Person 7 on page 3

ANSWER THESE QUESTIONS FOR

Name of Person 7 on page 3:

Last name | First name | Middle initial

11. In what State or foreign country was this person born?
Print the State where this person's mother was living when this person was born. Do not give the location of the hospital unless the mother's home and the hospital were in the same State.

Name of State or foreign country; or Puerto Rico, Guam, etc.

12. *If this person was born in a foreign country –*

a. Is this person a naturalized citizen of the United States?

- ○ Yes, a naturalized citizen
- ○ No, not a citizen
- ○ Born abroad of American parents

b. When did this person come to the United States to stay?

- ○ 1975 to 1980
- ○ 1965 to 1969
- ○ 1950 to 1959
- ○ 1970 to 1974
- ○ 1960 to 1964
- ○ Before 1950

13a. Does this person speak a language other than English at home?

- ○ Yes
- ○ No, only speaks English – *Skip to 14*

b. What is this language?

(For example – Chinese, Italian, Spanish, etc.)

c. How well does this person speak English?

- ○ Very well
- ○ Well
- ○ Not well
- ○ Not at all

14. What is this person's ancestry? *If uncertain about how to report ancestry, see instruction guide.*

(For example: Afro-Amer., English, French, German, Honduran, Hungarian, Irish, Italian, Jamaican, Korean, Lebanese, Mexican, Nigerian, Polish, Ukrainian, Venezuelan, etc.)

15a. Did this person live in this house five years ago (April 1, 1975)?
If in college or Armed Forces in April 1975, report place of residence there.

- ○ Born April 1975 or later – *Turn to next page for next person*
- ○ Yes, this house – *Skip to 16*
- ○ No, different house

b. Where did this person live five years ago (April 1, 1975)?

(1) State, foreign country, Puerto Rico, Guam, etc.:

(2) County:

(3) City, town, village, etc.:

(4) Inside the incorporated (legal) limits of that city, town, village, etc.?

- ○ Yes
- ○ No, in unincorporated area

16. When was this person born?

- ○ Born before April 1965 – *Please go on with questions 17-33*
- ○ Born April 1965 or later – *Turn to next page for next person*

17. In April 1975 *(five years ago)* **was this person –**

a. On active duty in the Armed Forces?

- ○ Yes
- ○ No

b. Attending college?

- ○ Yes
- ○ No

c. Working at a job or business?

- ○ Yes, full time
- ○ Yes, part time
- ○ No

18a. Is this person a veteran of active-duty military service in the Armed Forces of the United States?
If service was in National Guard or Reserves only, see instruction guide.

- ○ Yes
- ○ No – *Skip to 19*

b. Was active-duty military service during –
Fill a circle for each period in which this person served.

- ○ May 1975 or later
- ○ Vietnam era *(August 1964–April 1975)*
- ○ February 1955–July 1964
- ○ Korean conflict *(June 1950–January 1955)*
- ○ World War II *(September 1940–July 1947)*
- ○ World War I *(April 1917–November 1918)*
- ○ Any other time

19. Does this person have a physical, mental, or other health condition which has lasted for 6 or more months and which . . .

	Yes	No
a. Limits the kind or amount of work this person can do at a job?	○	○
b. Prevents this person from working at a job?	○	○
c. Limits or prevents this person from using public transportation?	○	○

20. *If this person is a female –*

How many babies has she ever had, not counting stillbirths? *Do not count her stepchildren or children she has adopted.*

None ○ | 1 ○ | 2 ○ | 3 ○ | 4 ○ | 5 ○ | 6 ○ | 7 ○ | 8 ○ | 9 ○ | 10 ○ | 11 ○ | 12 or more ○

21. *If this person has ever been married –*

a. Has this person been married more than once?

- ○ Once
- ○ More than once

b. Month and year of marriage? *(Month) (Year)*

Month and year of first marriage? *(Month) (Year)*

c. *If married more than once* **– Did the first marriage end because of the death of the husband (or wife)?**

- ○ Yes
- ○ No

22a. Did this person work at any time last week?

- ○ Yes – *Fill this circle if this person worked full time or part time. (Count part-time work such as delivering papers, or helping without pay in a family business or farm. Also count active duty in the Armed Forces.)*
- ○ No – *Fill this circle if this person did not work, or did only own housework, school work, or volunteer work.*

Skip to 25

b. How many hours did this person work last week (at all jobs)?
Subtract any time off; add overtime or extra hours worked.

Hours

23. At what location did this person work last week?
If this person worked at more than one location, print where he or she worked most last week.

If one location cannot be specified, see instruction guide.

a. Address *(Number and street)*

If street address is not known, enter the building name, shopping center, or other physical location description.

b. Name of city, town, village, borough, etc.

c. Is the place of work inside the incorporated (legal) limits of that city, town, village, borough, etc.?

- ○ Yes
- ○ No, in unincorporated area

d. County

e. State **f. ZIP Code**

24a. Last week, how long did it usually take this person to get from home to work (one way)?

Minutes

b. How did this person usually get to work last week?
If this person used more than one method, give the one usually used for most of the distance.

- ○ Car
- ○ Truck
- ○ Van
- ○ Bus or streetcar
- ○ Railroad
- ○ Subway or elevated
- ○ Taxicab
- ○ Motorcycle
- ○ Bicycle
- ○ Walked only
- ○ Worked at home
- ○ Other – *Specify*

If car, truck, or van in 24b, go to 24c. Otherwise, skip to 28.

FOR CENSUS USE ONLY

Per. No.	11.	13b.	14.	15b.	23. ○ VL	24a.
1	∅∅∅	∅∅∅	∅∅∅ ∅∅∅	∅∅∅ ∅∅∅	∅∅∅ ∅∅∅ ∅∅∅	∅∅
2	1 1 1	1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1 1 1 1	1 1
3	2 2 2	2 2 2	2 2 2 2 2 2	2 2 2 2 2 2	2 2 2 2 2 2 2 2 2	2 2
4	3 3 3	3 3 3	3 3 3 3 3 3	3 3 3 3 3 3	3 3 3 3 3 3 3 3 3	3 3
5	4 4 4	4 4 4	4 4 4 4 4 4	4 4 4 4 4 4	4 4 4 4 4 4 4 4 4	4 4
6	5 5 5	5 5 5	5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5 5	5 5
7	6 6 6	6 6 6	6 6 6 6 6 6	6 6 6 6 6 6	6 6 6 6 6 6 6 6 6	6 6
8	7 7 7	7 7 7	7 7 7 7 7 7	7 7 7 7 7 7	7 7 7 7 7 7 7 7 7	7 7
∅	8 8 8	8 8 8	8 8 8 8 8 8	8 8 8 8 8 8	8 8 8 8 8 8 8 8 8	8 8
	9 9 9	9 9 9	9 9 9 9 9 9	9 9 9 9 9 9	9 9 9 9 9 9 9 9 9	9 9

c. When going to work last week, did this person usually —
- ○ Drive alone — *Skip to 28*
- ○ Share driving
- ○ Drive others only
- ○ Ride as passenger only

d. How many people, including this person, usually rode to work in the car, truck, or van last week?
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7 or more

After answering 24d, skip to 28.

25. Was this person temporarily absent or on layoff from a job or business last week?
- ○ Yes, on layoff
- ○ Yes, on vacation, temporary illness, labor dispute, etc.
- ○ No

26a. Has this person been looking for work during the last 4 weeks?
- ○ Yes
- ○ No — *Skip to 27*

b. Could this person have taken a job last week?
- ○ No, already has a job
- ○ No, temporarily ill
- ○ No, other reasons *(in school, etc.)*
- ○ Yes, could have taken a job

27. When did this person last work, even for a few days?
- ○ 1980
- ○ 1979
- ○ 1978
- ○ 1975 to 1977
- ○ 1970 to 1974
- ○ 1969 or earlier
- ○ Never worked

Skip to 31d

28–30. Current or most recent job activity

Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give information for last job or business since 1975.

28. Industry

a. For whom did this person work? *If now on active duty in the Armed Forces, print "AF" and skip to question 31.*

(Name of company, business, organization, or other employer)

b. What kind of business or industry was this?
Describe the activity at location where employed.

(For example: Hospital, newspaper publishing, mail order house, auto engine manufacturing, breakfast cereal manufacturing)

c. Is this mainly — *(Fill one circle)*
- ○ Manufacturing
- ○ Retail trade
- ○ Wholesale trade
- ○ Other — *(agriculture, construction, service, government, etc.)*

29. Occupation

a. What kind of work was this person doing?

(For example: Registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, grinder operator)

b. What were this person's most important activities or duties?

(For example: Patient care, directing hiring policies, supervising order clerks, assembling engines, operating grinding mill)

30. Was this person — *(Fill one circle)*
- Employee of private company, business, or individual, for wages, salary, or commissions ○
- Federal government employee ○
- State government employee ○
- Local government employee *(city, county, etc.)* ○
- Self-employed in own business, professional practice, or farm —
  - Own business not incorporated ○
  - Own business incorporated ○
- Working without pay in family business or farm ○

CENSUS USE

21b. I II III IV ○

22b. ○

28. A B C D E F G H J K L M ○ AF ○ NW ○

29. N P Q R S T U V W X Y Z ○

31a. Last year (1979), did this person work, even for a few days, at a paid job or in a business or farm?
- ○ Yes
- ○ No — *Skip to 31d*

b. How many weeks did this person work in 1979?
Count paid vacation, paid sick leave, and military service.
_____ Weeks

c. During the weeks worked in 1979, how many hours did this person usually work each week?
_____ Hours

d. Of the weeks not worked in 1979 (if any), how many weeks was this person looking for work or on layoff from a job?
_____ Weeks

32. Income in 1979 —
Fill circles and print dollar amounts.
If net income was a loss, write "Loss" above the dollar amount.
If exact amount is not known, give best estimate. For income received jointly by household members, see instruction guide.

During 1979 did this person receive any income from the following sources?
If "Yes" to any of the sources below — How much did this person receive for the entire year?

a. Wages, salary, commissions, bonuses, or tips from all jobs . . . *Report amount before deductions for taxes, bonds, dues, or other items.*
- ○ Yes → $ .00 *(Annual amount – Dollars)*
- ○ No

b. Own nonfarm business, partnership, or professional practice . . . *Report net income after business expenses.*
- ○ Yes → $ .00 *(Annual amount – Dollars)*
- ○ No

c. Own farm. . . *Report net income after operating expenses. Include earnings as a tenant farmer or sharecropper.*
- ○ Yes → $ .00 *(Annual amount – Dollars)*
- ○ No

d. Interest, dividends, royalties, or net rental income . . . *Report even small amounts credited to an account.*
- ○ Yes → $ .00 *(Annual amount – Dollars)*
- ○ No

e. Social Security or Railroad Retirement . . .
- ○ Yes → $ .00 *(Annual amount – Dollars)*
- ○ No

f. Supplemental Security (SSI), Aid to Families with Dependent Children (AFDC), or other public assistance or public welfare payments . . .
- ○ Yes → $ .00 *(Annual amount – Dollars)*
- ○ No

g. Unemployment compensation, veterans' payments, pensions, alimony or child support, or any other sources of income received regularly . . .
Exclude lump-sum payments such as money from an inheritance or the sale of a home.
- ○ Yes → $ .00 *(Annual amount – Dollars)*
- ○ No

33. What was this person's total income in 1979?
Add entries in questions 32a through g; subtract any losses.
If total amount was a loss, write "Loss" above amount.
$ .00 *(Annual amount – Dollars)*
OR ○ None

CENSUS USE ONLY

31b. 31c. 31d.

32a. 32b. 32c. 32d. 32e. 32f. 32g. 33.

Please Make Sure You Have Filled This Form Completely

For persons who answered in Question 1 that they are staying here only temporarily and have a usual home elsewhere, enter the address of usual home here:

House number | Street or road | Apartment number or location

City | County

State | ZIP Code

For Answers to Questions H1, H2, and H3:

H1. Name of person(s) left out and reason:

H2. Name of person(s) away from home and reason away:

H3. Name of visitor(s) for whom there is no one at the home address to report the person to a Census Taker:

NOTE

If you have listed more than 7 persons in Question 1, please make sure that you have filled the form for the first 7 people. Then mail back this form. A Census Taker will call to obtain the information for the other people.

1 **Check to be certain you have:**

- Answered Question 1 on page 1.
- Answered Questions 2 through 10 for each person you listed at the top of pages 2 and 3.
- Answered Questions H1 through H32 on pages 3, 4, and 5.
- Filled a pair of pages for each person listed on pages 2 and 3. That is, pages 6 and 7 should be filled for the Person in column 1; pages 8 and 9 for the Person in column 2, etc.

Please notice we need answers to questions 17 through 33 for every person born before April 1965 even though they may not seem to apply to the particular person.

For example, you may have forgotten to fill all the necessary circles on work or on income for a teenager going to school, or a retired person. To avoid our having to check with you to make sure of the answer, please be certain you have given all the necessary answers.

2 **Write here the name** of the person who filled the form, the date the form was completed, and the telephone number on which the people in this household can be called.

Name

Date

Telephone Number

3 **Then fold the form** the way it was sent to you. Mail it back in the enclosed envelope. The address of the U.S. Census Office appears on the front cover of this questionnaire. Please be sure that before you seal the envelope the address shows through the window. No stamp is required.

Thank you very much.

4. 1990年 센서스를 위한 試驗 調査票

If the address shown below has the wrong apartment identification, please write the correct number or location below.

CO | ID | CBNA | BLK | — | F | S

Please fill out this official Census form and mail it back on
Census Day, March 16, 1986

Your answers are confidential

By law (Title 13, U.S. Code), census employees are subject to fine and/or imprisonment for any disclosure of your answers. The same law requires that you answer the questions to the best of your knowledge.

Para personas de habla hispana

(For Spanish – speaking persons):
SI USTED DESEA UN CUESTIONARIO DEL CENSO EN ESPAÑOL llame a la oficina del censo. El numero de teléfono se encuentra en el encasillado de la dirección.
O, si prefiere, marque esta casilla ☐ y devuelva el cuestionario por correo en el sobre que se le incluye.

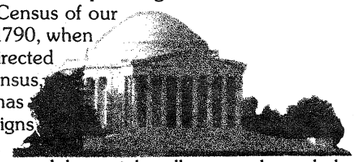
U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

FORM **DC-1-U(F)** (11-18-85)
★ U.S.G.P.O.-1986-496-696

OMB No. 0607-0491:
Approval Expires December 31, 1986

1986 Census of Central Los Angeles County

A message from the Director Bureau of the Census



We at the Census Bureau are planning the 21st Decennial Census of our Nation. Starting in 1790, when Thomas Jefferson directed the first decennial census, the Census Bureau has monitored the vital signs of our great country. To preserve this legacy and do our job well, we need your help as we conduct a test census in your community this year.

The census is more than just a count of the population. It is a chance for us to take stock of ourselves as a people and successfully meet future local and national challenges. The 1990 census will be your personal and national bridge to the 21st Century, and I thank you in advance for helping in its design. The census in central Los Angeles County is part of a program for planning the next national census, and I hope we can count on you to participate now as well.

Perhaps you may be worried that by participating, your name and information will be shared with others. That is not the case. In fact, the law under which the census is taken protects the confidentiality of your responses. No one sees your answers except Census Bureau workers, who are sworn to hold them in confidence and can be fined and/or imprisoned for disclosing information. By law, no other government agency, person, or business can see your completed census form. Your answers combined with those from other people provide anonymous statistical totals. These summary figures are used by members of public and private groups – including community organizations – and by businesses and industries, as well as local, state, and Federal governments.

The census is vitally important, so do your part by filling out this form accurately and completely. Kindly return the form on Census Day, March 16, 1986, or as close to that date as possible. Please do mail it back. If you do so promptly in the enclosed envelope, it will save the expense and inconvenience of a personal visit from a census taker.

Your Census Bureau is grateful for your help and the cooperation of the central Los Angeles County community.

How to fill out your Census form

See the filled-out example in the instruction guide. This guide will help you with any problems you may have.

If you need more help, call the local Census Office. The telephone number of the local office is shown within the address label on the front cover.

Most questions ask you to fill a circle, like this ●

When you write in an answer, print or write clearly.

Make sure that answers are provided for everyone here. If more than 7 persons, see note on page 4 of this form.

See page 2 of the instruction guide if a roomer or someone else in the household does not want to give you all the information for the form.

Answer the questions on pages 1 through 4.

Mail back this form on March 16 or as soon afterward as you can. Use the enclosed envelope; no stamp is needed.

Please start by answering Question 1 below.

Question 1

List in Question 1

- Each person living here on March 16 including persons temporarily away such as in a general hospital, on vacation, or on a business trip.
  - Family members and relatives—including babies still in the hospital and children in boarding schools below the college level.
  - College students who stay here while attending college.
  - Partners or roommates.
  - Roomers or boarders.
  - Domestic workers who "live-in."
  - Persons who have another home, but who stay here most of the week while working.
- Each person who was visiting or staying here on March 16, and had no other home.

Do not list in Question 1

- College students who live somewhere else while attending college.
- Persons away in the Armed Forces.
- Persons away in an institution such as a prison, mental hospital, or home for the aged.
- Any person who usually stays somewhere else, including persons who live somewhere else while working.
- Any person visiting here who has a usual home elsewhere.

1. Please list below the name of each person who was living here on March 16, or who was visiting or staying here and had no other home.

If you have any questions about whom to list, please see the instruction guide.

Please enter first name, middle initial, and last name, beginning with the adult who owns or rents this home.

Now please go to Question 2 on page 2 and answer questions for the first 7 people listed above.

PLEASE ANSWER HOUSING QUESTIONS ON PAGE 3 →

PLEASE ANSWER HOUSING QUESTIONS ON PAGE 3 →

PLEASE ANSWER HOUSING QUESTIONS ON PAGE 3 →

Please fill one column ➡ for each person listed in Question 1 on page 1.

	PERSON 1	PERSON 2	PERSON 3	PERSON 4	PERSON 5	PERSON 6
	Last name First name — Middle initial	Last name First name — Middle initial	Last name First name — Middle initial	Last name First name — Middle initial	Last name First name — Middle initial	Last name First name — Middle initial
2. How is this person related to PERSON 1? *Fill ONE circle for each person.*	*START in this column with the household member (or one of the members) in whose name the home is owned or rented.* *If there is no such person, start in this column with any adult household member.*	If a RELATIVE of Person 1: ○ Husband/wife ○ Brother/sister ○ Natural or adopted son/daughter ○ Father/mother ○ Stepson/stepdaughter ○ Grandchild ○ Other relative If NOT RELATED to Person 1: ○ Roomer, boarder ○ Partner, friend ○ Housemate, roommate ○ Paid employee ○ Other nonrelative	If a RELATIVE of Person 1: ○ Husband/wife ○ Brother/sister ○ Natural or adopted son/daughter ○ Father/mother ○ Stepson/stepdaughter ○ Grandchild ○ Other relative If NOT RELATED to Person 1: ○ Roomer, boarder ○ Partner, friend ○ Housemate, roommate ○ Paid employee ○ Other nonrelative	If a RELATIVE of Person 1: ○ Husband/wife ○ Brother/sister ○ Natural or adopted son/daughter ○ Father/mother ○ Stepson/stepdaughter ○ Grandchild ○ Other relative If NOT RELATED to Person 1: ○ Roomer, boarder ○ Partner, friend ○ Housemate, roommate ○ Paid employee ○ Other nonrelative	If a RELATIVE of Person 1: ○ Husband/wife ○ Brother/sister ○ Natural or adopted son/daughter ○ Father/mother ○ Stepson/stepdaughter ○ Grandchild ○ Other relative If NOT RELATED to Person 1: ○ Roomer, boarder ○ Partner, friend ○ Housemate, roommate ○ Paid employee ○ Other nonrelative	If a RELATIVE of Person 1: ○ Husband/wife ○ Brother/sister ○ Natural or adopted son/daughter ○ Father/mother ○ Stepson/stepdaughter ○ Grandchild ○ Other relative If NOT RELATED to Person 1: ○ Roomer, boarder ○ Partner, friend ○ Housemate, roommate ○ Paid employee ○ Other nonrelative
3. Sex *Fill ONE circle for each person.*	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female
4. Race *Fill ONE circle for each person.* *AND* *If "Asian or Pacific Islander," print one group.* *If "Indian (Amer.)," print enrolled or principal tribe* *If "Other race," print race.* *Report the race the person considers him/herself to be.*	○ White ○ Black or Negro ○ Asian or Pacific Islander *(Print one group, for example: Chinese, Asian Indian, Hawaiian, Laotian, Vietnamese, etc.)* ○ Indian *(Amer.)* *Print enrolled or principal tribe* ○ Eskimo ○ Aleut ○ Other race–*Print race*	○ White ○ Black or Negro ○ Asian or Pacific Islander *(Print one group, for example: Chinese, Asian Indian, Hawaiian, Laotian, Vietnamese, etc.)* ○ Indian *(Amer.)* *Print enrolled or principal tribe* ○ Eskimo ○ Aleut ○ Other race–*Print race*	○ White ○ Black or Negro ○ Asian or Pacific Islander *(Print one group, for example: Chinese, Asian Indian, Hawaiian, Laotian, Vietnamese, etc.)* ○ Indian *(Amer.)* *Print enrolled or principal tribe* ○ Eskimo ○ Aleut ○ Other race–*Print race*	○ White ○ Black or Negro ○ Asian or Pacific Islander *(Print one group, for example: Chinese, Asian Indian, Hawaiian, Laotian, Vietnamese, etc.)* ○ Indian *(Amer.)* *Print enrolled or principal tribe* ○ Eskimo ○ Aleut ○ Other race–*Print race*	○ White ○ Black or Negro ○ Asian or Pacific Islander *(Print one group, for example: Chinese, Asian Indian, Hawaiian, Laotian, Vietnamese, etc.)* ○ Indian *(Amer.)* *Print enrolled or principal tribe* ○ Eskimo ○ Aleut ○ Other race–*Print race*
5. Age and year of birth *a. Print age at last birthday and fill in the corresponding circle below each number.* *b. Print year of birth and fill the corresponding circle below each number.*	a. Age: 0 0, 1 1, 2, 3, 4, 5, 6, 7, 8, 9 b. Year of birth: 1 9 8 0 0 0 0; 1 9 0 1 1 1 1; 2 2 2 2 2 2 2; 3 3 3 3 3 3 3; 4 4 4 4 4 4 4; 5 5 5 5 5 5 5; 6 6 6 6 6 6 6; 7 7 7 7 7 7 7; 8 8 8 8 8 8 8; 9 9 9 9 9 9 9	a. Age: 0 0, 1 1, 2, 3, 4, 5, 6, 7, 8, 9 b. Year of birth: 1 9 8 0 0 0 0; 1 9 0 1 1 1 1; 2 2 2 2 2 2 2; 3 3 3 3 3 3 3; 4 4 4 4 4 4 4; 5 5 5 5 5 5 5; 6 6 6 6 6 6 6; 7 7 7 7 7 7 7; 8 8 8 8 8 8 8; 9 9 9 9 9 9 9	a. Age: 0 0, 1 1, 2, 3, 4, 5, 6, 7, 8, 9 b. Year of birth: 1 9 8 0 0 0 0; 1 9 0 1 1 1 1; 2 2 2 2 2 2 2; 3 3 3 3 3 3 3; 4 4 4 4 4 4 4; 5 5 5 5 5 5 5; 6 6 6 6 6 6 6; 7 7 7 7 7 7 7; 8 8 8 8 8 8 8; 9 9 9 9 9 9 9	a. Age: 0 0, 1 1, 2, 3, 4, 5, 6, 7, 8, 9 b. Year of birth: 1 9 8 0 0 0 0; 1 9 0 1 1 1 1; 2 2 2 2 2 2 2; 3 3 3 3 3 3 3; 4 4 4 4 4 4 4; 5 5 5 5 5 5 5; 6 6 6 6 6 6 6; 7 7 7 7 7 7 7; 8 8 8 8 8 8 8; 9 9 9 9 9 9 9	a. Age: 0 0, 1 1, 2, 3, 4, 5, 6, 7, 8, 9 b. Year of birth: 1 9 8 0 0 0 0; 1 9 0 1 1 1 1; 2 2 2 2 2 2 2; 3 3 3 3 3 3 3; 4 4 4 4 4 4 4; 5 5 5 5 5 5 5; 6 6 6 6 6 6 6; 7 7 7 7 7 7 7; 8 8 8 8 8 8 8; 9 9 9 9 9 9 9	a. Age: 0 0, 1 1, 2, 3, 4, 5, 6, 7, 8, 9 b. Year of birth: 1 9 8 0 0 0 0; 1 9 0 1 1 1 1; 2 2 2 2 2 2 2; 3 3 3 3 3 3 3; 4 4 4 4 4 4 4; 5 5 5 5 5 5 5; 6 6 6 6 6 6 6; 7 7 7 7 7 7 7; 8 8 8 8 8 8 8; 9 9 9 9 9 9 9
6. Marital status *Fill ONE circle for each person.*	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced
7. Is this person of Spanish/Hispanic origin? *Fill ONE circle for each person.* *AND* *If "Yes, Spanish/Hispanic," print one group.*	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group, for example: Mexican, Mex.-Am., Puerto Rican, Cuban, Argentinean, Dominican, Spaniard, etc.)*	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group, for example: Mexican, Mex.-Am., Puerto Rican, Cuban, Argentinean, Dominican, Spaniard, etc.)*	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group, for example: Mexican, Mex.-Am., Puerto Rican, Cuban, Argentinean, Dominican, Spaniard, etc.)*	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group, for example: Mexican, Mex.-Am., Puerto Rican, Cuban, Argentinean, Dominican, Spaniard, etc.)*	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group, for example: Mexican, Mex.-Am., Puerto Rican, Cuban, Argentinean, Dominican, Spaniard, etc.)*	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group, for example: Mexican, Mex.-Am., Puerto Rican, Cuban, Argentinean, Dominican, Spaniard, etc.)*
FOR CENSUS USE ➡	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○

PERSON 7

Last name

First name | Middle initial

If a RELATIVE of Person 1:

- ○ Husband/wife
- ○ Brother/sister
- ○ Natural or adopted son/daughter
- ○ Father/mother
- ○ Grandchild
- ○ Stepson/ stepdaughter
- ○ Other relative

If NOT RELATED to Person 1:

- ○ Roomer, boarder
- ○ Partner, friend
- ○ Housemate, roommate
- ○ Paid employee
- ○ Other nonrelative

- ○ Male
- ○ Female

- ○ White
- ○ Black or Negro
- ○ Asian or Pacific Islander *(Print one group, for example: Chinese, Asian Indian, Hawaiian, Laotian, Vietnamese, etc.)*
- ○ Indian *(Amer.)* *Print enrolled or principal tribe*
- ○ Eskimo
- ○ Aleut
- ○ Other race–*Print race*

a. Age | b. Year of birth

1

- ○ Now married
- ○ Separated
- ○ Widowed
- ○ Never married
- ○ Divorced

- ○ No *(not Spanish/Hispanic)*
- ○ Yes, Spanish/Hispanic *(Print one group, for example: Mexican, Mex.-Am., Puerto Rican, Cuban, Argentinean, Dominican, Spaniard, etc.)*

NOW PLEASE ANSWER QUESTIONS H1—H10 FOR YOUR HOUSEHOLD

H1. Did you have any trouble deciding whether or not to list a particular name(s) in Question 1?

○ Yes, *please print the name(s).* ○ No

H2. Does anyone listed in Question 1 regularly live at another residence for 30 or more days during the year? *(The time may be consecutive, for example, all winter; or occasionally, for example, weekends).*

○ No ○ Yes *Complete Questions A and B on the back page; then return to H3.*

H3. Do you have to go through someone else's living quarters to enter your house or apartment?

○ No, enter through a common hall or the out of doors
○ Yes, must go through someone else's house or apartment

H4. What best describes the building in which you live? *Fill ONE circle. Include all apartments, flats, etc., even if vacant.*

○ Mobile home or trailer
○ One-family detached house
○ One-family house attached to one or more buildings
○ A commercial building with 1 apartment

A building with:

- ○ 2 apartments
- ○ 3 apartments
- ○ 4 apartments
- ○ 5 to 9 apartments
- ○ 10 to 19 apartments
- ○ 20 to 49 apartments
- ○ 50 or more apartments OR
- ○ Boat, tent, van, etc.

H5. How many rooms do you have in your house or apartment? *Do NOT count bathrooms, porches, balconies, foyers, halls, or half-rooms.*

- ○ 1 room
- ○ 2 rooms
- ○ 3 rooms
- ○ 4 rooms
- ○ 5 rooms
- ○ 6 rooms
- ○ 7 rooms
- ○ 8 rooms
- ○ 9 or more rooms

H6. Is your house or apartment —

○ Owned or being bought by you or by someone else in this household?
○ Rented for cash rent?
○ Occupied without payment of cash rent?

H7. Is this apartment or house part of a condominium or a cooperative? A COOPERATIVE is a building or development owned by its occupants. Shares are purchased in a cooperative corporation which entitle each shareholder to occupy an individual apartment or house.

○ No ○ Yes, a condominium ○ Yes, a cooperative

H8. If this is a ONE-FAMILY HOUSE —

a. Is the house on 10 or more acres?

○ No ○ Yes

b. Is any part of the property used as a commercial establishment or medical office?

○ No ○ Yes

H9. If you live in a ONE-FAMILY HOUSE OR a CONDOMINIUM UNIT which you OWN OR ARE BUYING —

What is the value of this property, that is, how much do you think this property (house and lot or condominium unit) would sell for if it were for sale?

Do not answer this question if this is —

- a mobile home or trailer
- a house on 10 or more acres
- a one-family house with a commercial establishment or medical office on the property
- a cooperative

- ○ Less than $15,000
- ○ $15,000 to $19,999
- ○ $20,000 to $24,999
- ○ $25,000 to $29,999
- ○ $30,000 to $34,999
- ○ $35,000 to $39,999
- ○ $40,000 to $44,999
- ○ $45,000 to $49,999
- ○ $50,000 to $54,999
- ○ $55,000 to $59,999
- ○ $60,000 to $64,999
- ○ $65,000 to $69,999
- ○ $70,000 to $74,999
- ○ $75,000 to $79,999
- ○ $80,000 to $89,999
- ○ $90,000 to $99,999
- ○ $100,000 to $124,999
- ○ $125,000 to $149,999
- ○ $150,000 to $199,999
- ○ $200,000 to $249,999
- ○ $250,000 to $299,999
- ○ $300,000 or more

H10. If you PAY RENT for your house or apartment — What is the monthly rent? *If rent is NOT PAID BY THE MONTH, see the instruction guide on how to figure a monthly rent.*

- ○ Less than $60
- ○ $60 to $79
- ○ $80 to $89
- ○ $90 to $99
- ○ $100 to $124
- ○ $125 to $149
- ○ $150 to $174
- ○ $175 to $199
- ○ $200 to $224
- ○ $225 to $249
- ○ $250 to $274
- ○ $275 to $299
- ○ $300 to $349
- ○ $350 to $399
- ○ $400 to $449
- ○ $450 to $499
- ○ $500 to $549
- ○ $550 to $599
- ○ $600 to $649
- ○ $650 to $699
- ○ $700 to $749
- ○ $750 or more

FOR CENSUS USE ONLY (DO NOT MARK)

C. Type of unit

Occupied: ○ First form ○ Cont'n
Vacant: ○ Regular ○ Usual home elsewhere

D1. Vacancy status

- ○ For rent
- ○ For sale only
- ○ Rented or sold not occupied
- ○ For seas/rec/occ
- ○ For mig workers
- ○ Other vacant

D2. Is this unit boarded up?

○ No ○ Yes

E. Months vacant

- ○ Less than 1
- ○ 1 up to 2
- ○ 2 up to 6
- ○ 6 up to 12
- ○ 12 up to 24
- ○ 24 or more

1.	2.	3.	4.	5.	6.	7.
○	○	○	○	○	○	○
○	○	○	○	○	○	○

F. Total per's

G. ○ PV ○ T ○ Pop/F ○ G.P.

H. R/C

○ N ○ MR ○ PD ○ MI ○ OR

I. Enum.

IF QUESTION H2 ON PAGE 3 IS MARKED "YES," PLEASE COMPLETE ITEMS A AND B BELOW.

A. Address of other residence

If you answered "Yes" in Question H2 —

1. Does everyone listed in Question 1 regularly live at this other residence for 30 or more days during the year?

- ○ No — *Return to Question H3 on page 3*
- ○ Yes

2. Print the address of the other residence below

a. House number and street or road (rural route/box or P.O. box)	Apartment No. or location
b. Place (city, town, village, etc.)	
c. County	
d. State	**e.** ZIP Code
f. Foreign country or Puerto Rico, Guam, etc.	

3. Is this address on an American Indian Reservation?

- ○ No
- ○ Yes — *Print name of the reservation*

Name of reservation

B. Address of usual home

Which residence do you consider to be the usual home?

- ○ The address on the label of this questionnaire
- ○ The address listed above in item A2

Return to Question H3 on page 3.

Please make sure you have . . .

1. FILLED this form completely.

2. CHECKED to be certain you have --

- Answered Question 1 on page 1.
- Answered Questions 2 through 7 for each person you listed in Question 1.
- Answered Questions H1 through H10 on page 3.

3. PRINT here the name of the household member who filled the form, the date the form was completed, and the telephone number on which the people in this household can be called.

Name		
Date		
Telephone number →	Area code	Number

Then . . .

4. FOLD the form the way it was sent to you.

5. MAIL it back on March 16, or as soon afterward as you can in the enclosed envelope; no stamp is needed. The address of the U.S. Census Office appears on the front of the envelope. Make sure before you seal the envelope that the bar code shows through the window.

NOTE – If you have listed more than 7 persons in Question 1, please make sure that you have filled the form for the first 7 people. Then mail back this form. A census taker will call to obtain the information for the other people.

Thank you very much.

• This is your official census questionnaire

• Please fill it out and **MAIL IT BACK on Census Day, March 20, 1988**

• **Need help –** See the enclosed instruction guide or call **1-(800)-451-9980**

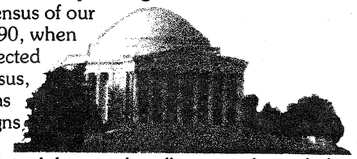
GEO: 2602 4090 405 XXXX
2829 HOWARD ST # 311
ST LOUIS MO 63106

301C0020989

If wrong apartment identification, please write the correct number or location above.

1988 Census of Population and Housing

A message from the Director Bureau of the Census



We at the Census Bureau are planning the 21st Decennial Census of our Nation. Starting in 1790, when Thomas Jefferson directed the first decennial census, the Census Bureau has monitored the vital signs of our great country. To preserve this legacy and do our job well, we need your help.

Our 1988 census is a full-scale tryout of our program for conducting the next national census, and I hope we can count on you to participate.

Perhaps you may be concerned that by participating, your name and information will be shared with others. That is not the case. In fact, the law under which the census is taken protects the confidentiality of your responses. No one sees your completed form except Census Bureau workers, who are sworn to hold it in confidence and can be fined and/or imprisoned for disclosing information.

The census is vitally important, so do your part by filling out this form accurately and completely. Kindly return the form on Census Day, March 20, 1988, or as close to that date as possible. **PLEASE DO MAIL IT BACK.** If you do so promptly in the enclosed envelope, it will save the expense and inconvenience of a personal visit from a census taker.

Your Census Bureau is grateful for your help and the cooperation of all the people in your community.

Your answers are confidential

By law (Title 13, U.S. Code), census employees are subject to fine and/or imprisonment for any disclosure of your answers. The same law requires that you answer the questions to the best of your knowledge.

Para personas de habla hispana

(For Spanish-speaking persons): SI USTED DESEA UN CUESTIONARIO DEL CENSO EN ESPAÑOL llame a la oficina del censo. El número de teléfono se encuentra en el encasillado de la dirección.

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

FORM **DX-1** (10-16-87)

OMB No. 0607-0596
Approval Expires 12/31/89

The 1988 census must count every person at his or her "usual residence." This means the place where the person lives and sleeps most of the time.

1a. What is the name of each person living here on Sunday, March 20, including all persons staying here who have no other home? If NO ONE staying here on March 20 usually lives here, list the name of each person staying here temporarily.

Include

- Everyone who usually lives here such as family members, housemates and roommates, foster children, roomers, boarders, and live-in employees
- Persons who are temporarily away on a business trip, on vacation, or in a general hospital
- College students who stay here while attending college
- Persons in the Armed Forces who live here
- Newborn babies still in the hospital
- Children in boarding schools below the college level
- Persons who stay here most of the week while working even if they have a home somewhere else
- Persons with no other home who were staying here on March 20

Do NOT include

- Persons who usually live somewhere else (except if EVERYONE is staying here temporarily)
- Persons who are away in an institution such as a prison, mental hospital, or a home for the aged
- College students who live somewhere else while attending college
- Persons in the Armed Forces who live somewhere else
- Persons who stay somewhere else most of the week while working

Begin with the household member (or one of the household members) in whose name the home is owned, being bought, or rented. Enter last name, first name, and middle initial for each person.

1	**7**
2	**8**
3	**9**
4	**10**
5	**11**
6	**12**

1b. If EVERYONE listed above is staying here only temporarily and usually lives somewhere else, please fill this circle → ○ and enter the address of the usual home below.

House number | Street or road/Rural route and box number | Apartment number

City | State | ZIP Code

County | Names of nearest intersecting streets or roads

NOW PLEASE OPEN THE FLAP TO PAGE 2 AND ANSWER ALL QUESTIONS FOR THE FIRST 7 PEOPLE LISTED. If more than 7 people are listed, a census taker will contact you.

PLEASE ANSWER HOUSING QUESTIONS ON PAGE 3 →

PLEASE ANSWER HOUSING QUESTIONS ON PAGE 3 →

PLEASE ANSWER HOUSING QUESTIONS ON PAGE 3 →

Please fill one column → for each person listed in Question 1 on page 1.

	PERSON 1	PERSON 2	PERSON 3	PERSON 4	PERSON 5	PERSON 6
	Last name First name Middle initial	Last name First name Middle initial	Last name First name Middle initial	Last name First name Middle initial	Last name First name Middle initial	Last name First name Middle initial
2. How is this person related to PERSON 1? *Fill ONE circle for each person.*	*START in this column with the household member (or one of the members) in whose name the home is owned or rented.* *If there is no such person, start in this column with any adult household member.*	If a RELATIVE of Person 1: ○ Husband/wife ○ Brother/sister ○ Natural-born or adopted son/daughter ○ Father/mother ○ Grandchild ○ Other relative → [ ] ○ Stepson/stepdaughter If NOT RELATED to Person 1: ○ Roomer, boarder, or foster child ○ Paid employee ○ Other nonrelative ○ Housemate, roommate ○ Unmarried partner	If a RELATIVE of Person 1: ○ Husband/wife ○ Brother/sister ○ Natural-born or adopted son/daughter ○ Father/mother ○ Grandchild ○ Other relative → [ ] ○ Stepson/stepdaughter If NOT RELATED to Person 1: ○ Roomer, boarder, or foster child ○ Paid employee ○ Other nonrelative ○ Housemate, roommate ○ Unmarried partner	If a RELATIVE of Person 1: ○ Husband/wife ○ Brother/sister ○ Natural-born or adopted son/daughter ○ Father/mother ○ Grandchild ○ Other relative → [ ] ○ Stepson/stepdaughter If NOT RELATED to Person 1: ○ Roomer, boarder, or foster child ○ Paid employee ○ Other nonrelative ○ Housemate, roommate ○ Unmarried partner	If a RELATIVE of Person 1: ○ Husband/wife ○ Brother/sister ○ Natural-born or adopted son/daughter ○ Father/mother ○ Grandchild ○ Other relative → [ ] ○ Stepson/stepdaughter If NOT RELATED to Person 1: ○ Roomer, boarder, or foster child ○ Paid employee ○ Other nonrelative ○ Housemate, roommate ○ Unmarried partner	If a RELATIVE of Person 1: ○ Husband/wife ○ Brother/sister ○ Natural-born or adopted son/daughter ○ Father/mother ○ Grandchild ○ Other relative → [ ] ○ Stepson/stepdaughter If NOT RELATED to Person 1: ○ Roomer, boarder, or foster child ○ Paid employee ○ Other nonrelative ○ Housemate, roommate ○ Unmarried partner
3. Sex *Fill ONE circle for each person.*	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female
4. Race *Fill ONE circle for each person.* *Report the race the person considers himself /herself to be.* *If* **Asian or Pacific Islander**, *fill circle and print one group, for example: Chinese, Filipino, Hawaiian, Laotian, Asian Indian, Japanese, Korean, Samoan, Vietnamese, etc.* *If* **Indian** *(Amer.) fill circle and print the name of the enrolled or principal tribe.* *If* **Other race**, *fill circle and print race.*	○ White ○ Black or Negro ○ Asian or Pacific Islander *(Print one group)* → ○ Indian (Amer.) *(Print the name of the enrolled or principal tribe)* → ○ Eskimo ○ Aleut ○ Other race *(Print race)* →	○ White ○ Black or Negro ○ Asian or Pacific Islander *(Print one group)* → ○ Indian (Amer.) *(Print the name of the enrolled or principal tribe)* → ○ Eskimo ○ Aleut ○ Other race *(Print race)* →	○ White ○ Black or Negro ○ Asian or Pacific Islander *(Print one group)* → ○ Indian (Amer.) *(Print the name of the enrolled or principal tribe)* → ○ Eskimo ○ Aleut ○ Other race *(Print race)* →	○ White ○ Black or Negro ○ Asian or Pacific Islander *(Print one group)* → ○ Indian (Amer.) *(Print the name of the enrolled or principal tribe)* → ○ Eskimo ○ Aleut ○ Other race *(Print race)* →	○ White ○ Black or Negro ○ Asian or Pacific Islander *(Print one group)* → ○ Indian (Amer.) *(Print the name of the enrolled or principal tribe)* → ○ Eskimo ○ Aleut ○ Other race *(Print race)* →	○ White ○ Black or Negro ○ Asian or Pacific Islander *(Print one group)* → ○ Indian (Amer.) *(Print the name of the enrolled or principal tribe)* → ○ Eskimo ○ Aleut ○ Other race *(Print race)* →
5. Age and year of birth a. *Print each person's age at last birthday. Fill in the matching circle below each box. Put a zero in the first box for each person under age 100.* b. *Print each person's year of birth and fill the matching circle below each box.*	a. Age / b. Year of birth 0 ○ 0 ○ 0 ○ 1 ○ 1 ○ 1 ○ 2 ○ 2 ○ 3 ○ 3 ○ 4 ○ 4 ○ 5 ○ 5 ○ 6 ○ 6 ○ 7 ○ 7 ○ 8 ○ 8 ○ 9 ○ 9 ○ 1 ● 8 ○ 0 ○ 0 ○ 0 ○ 9 ○ 1 ○ 1 ○ 2 ○ 2 ○ 3 ○ 3 ○ 4 ○ 4 ○ 5 ○ 5 ○ 6 ○ 6 ○ 7 ○ 7 ○ 8 ○ 8 ○ 9 ○ 9 ○	a. Age / b. Year of birth 0 ○ 0 ○ 0 ○ 1 ○ 1 ○ 1 ○ 2 ○ 2 ○ 3 ○ 3 ○ 4 ○ 4 ○ 5 ○ 5 ○ 6 ○ 6 ○ 7 ○ 7 ○ 8 ○ 8 ○ 9 ○ 9 ○ 1 ● 8 ○ 0 ○ 0 ○ 0 ○ 9 ○ 1 ○ 1 ○ 2 ○ 2 ○ 3 ○ 3 ○ 4 ○ 4 ○ 5 ○ 5 ○ 6 ○ 6 ○ 7 ○ 7 ○ 8 ○ 8 ○ 9 ○ 9 ○	a. Age / b. Year of birth 0 ○ 0 ○ 0 ○ 1 ○ 1 ○ 1 ○ 2 ○ 2 ○ 3 ○ 3 ○ 4 ○ 4 ○ 5 ○ 5 ○ 6 ○ 6 ○ 7 ○ 7 ○ 8 ○ 8 ○ 9 ○ 9 ○ 1 ● 8 ○ 0 ○ 0 ○ 0 ○ 9 ○ 1 ○ 1 ○ 2 ○ 2 ○ 3 ○ 3 ○ 4 ○ 4 ○ 5 ○ 5 ○ 6 ○ 6 ○ 7 ○ 7 ○ 8 ○ 8 ○ 9 ○ 9 ○	a. Age / b. Year of birth 0 ○ 0 ○ 0 ○ 1 ○ 1 ○ 1 ○ 2 ○ 2 ○ 3 ○ 3 ○ 4 ○ 4 ○ 5 ○ 5 ○ 6 ○ 6 ○ 7 ○ 7 ○ 8 ○ 8 ○ 9 ○ 9 ○ 1 ● 8 ○ 0 ○ 0 ○ 0 ○ 9 ○ 1 ○ 1 ○ 2 ○ 2 ○ 3 ○ 3 ○ 4 ○ 4 ○ 5 ○ 5 ○ 6 ○ 6 ○ 7 ○ 7 ○ 8 ○ 8 ○ 9 ○ 9 ○	a. Age / b. Year of birth 0 ○ 0 ○ 0 ○ 1 ○ 1 ○ 1 ○ 2 ○ 2 ○ 3 ○ 3 ○ 4 ○ 4 ○ 5 ○ 5 ○ 6 ○ 6 ○ 7 ○ 7 ○ 8 ○ 8 ○ 9 ○ 9 ○ 1 ● 8 ○ 0 ○ 0 ○ 0 ○ 9 ○ 1 ○ 1 ○ 2 ○ 2 ○ 3 ○ 3 ○ 4 ○ 4 ○ 5 ○ 5 ○ 6 ○ 6 ○ 7 ○ 7 ○ 8 ○ 8 ○ 9 ○ 9 ○
6. Marital status *Fill ONE circle for each person.*	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced	○ Now married ○ Separated ○ Widowed ○ Never married ○ Divorced
7. Is this person of Spanish/Hispanic origin? *Fill the NO circle if NOT Spanish/Hispanic.* → *OR* *Fill the YES circle if this person is of Spanish/Hispanic origin, and print one group, for example: Mexican, Mexican-Am., Chicano, Puerto Rican, Cuban, Dominican, Ecuadoran, Salvadoran, Spaniard, and so on.* →	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group)* →	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group)* →	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group)* →	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group)* →	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group)* →	○ No *(not Spanish/Hispanic)* ○ Yes, Spanish/Hispanic *(Print one group)* →
FOR CENSUS USE →		2602 267 4290				

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PERSON 7

Last name

First name | Middle initial

If a RELATIVE of Person 1:

- ○ Husband/wife
- ○ Natural-born or adopted son/daughter
- ○ Stepson/ stepdaughter
- ○ Brother/sister
- ○ Father/mother
- ○ Grandchild
- ○ Other relative

If NOT RELATED to Person 1:

- ○ Roomer, boarder, or foster child
- ○ Housemate, roommate
- ○ Unmarried partner
- ○ Paid employee
- ○ Other nonrelative

- ○ Male
- ○ Female

- ○ White
- ○ Black or Negro
- ○ Asian or Pacific Islander *(Print one group)*
- ○ Indian (Amer.) *(Print the name of the enrolled or principal tribe)*
- ○ Eskimo
- ○ Aleut
- ○ Other race *(Print race)*

a. Age | b. Year of birth

1 8 0 0 0 0 0 0 1 0 2 0 3 0 4 0 5 0 6 0 7 0 8 0 9 0

- ○ Now married
- ○ Widowed
- ○ Divorced
- ○ Separated
- ○ Never married

- ○ No *(not Spanish/Hispanic)*
- ○ Yes, Spanish/Hispanic *(Print one group)*

NOW PLEASE ANSWER QUESTIONS H1—H3 FOR YOUR HOUSEHOLD

H1. Did you have any trouble deciding whether or not to list a particular name(s) in Question 1 on page 1?

- ○ Yes, *please print the name(s).*
- ○ No

H2. Which best describes this building? *Include all apartments, flats, etc., even if vacant.*

- ○ A mobile home or trailer
- ○ A one-family house detached from any other house
- ○ A one-family house attached to one or more houses
- ○ A building with 2 apartments
- ○ A building with 3 or 4 apartments
- ○ A building with 5 to 9 apartments
- ○ A building with 10 to 19 apartments
- ○ A building with 20 to 49 apartments
- ○ A building with 50 or more apartments
- ○ Other

H3. Is this house or apartment —

- ○ Owned with a mortgage or loan?
- ○ Owned free and clear *(without a mortgage)?*
- ○ Rented for cash rent?
- ○ Occupied without payment of cash rent?

Please continue onto the next page. →

FOR CENSUS USE

A. DO | ID

B. Total persons

C. Type of unit

Occupied	Vacant
○ First form	1 ○ Regular
○ Cont'n	2 ○ Usual home elsewhere

D1. Vacancy status

- ○ For rent
- ○ For sale only
- ○ Rented or sold not occupied
- ○ For seas/rec/occ
- ○ For mig workers
- ○ Other vacant

D2. Is this unit boarded up?

- ○ Yes
- ○ No

E. Months vacant

- ○ Less than 1
- ○ 1 up to 2
- ○ 2 up to 6
- ○ 6 up to 12
- ○ 12 up to 24
- ○ 24 or more

F. Complete after

○ ENUM	○ IN/T
1 ○ LR	○ C/O
○ POP/F	○ RE
○ EDIT	○ QA
○ TC	○ GP
○ JIC 1	○ JIC 2

G. Coverage

- ○ 1a
- ○ 1b
- ○ H1

Please make sure you have . . .

1. FILLED this form completely.

2. CHECKED to be certain you have –

- Answered Question 1 on page 1.
- Answered Questions 2 through 7 for each person you listed in Question 1.
- Answered Questions H1 through H3 on page 3.

3. PRINT here the name of the household member who filled the form, the date the form was completed, and the telephone number on which the person in this household can be called.

Name			Date
Telephone number →	Area code	Number	

Then . . .

4. FOLD the form the way it was sent to you.

5. MAIL it back on or before March 20, or as soon afterward as you can in the enclosed envelope; no stamp is needed. The address of the U.S. Census Office appears on the front of the envelope.

NOTE – If you have listed more than 7 persons in Question 1, please make sure that you have filled the form for the first 7 people. Then mail back this form. A census taker will call to obtain the information for the other people.

Thank you very much.

5. 1990年 센서스 概要

1990 CENSUS GOALS

* Meet constitutional & legal mandates
* Produce more timely data products
* Keep total cost to 1980 unit cost adjusted for inflation
* Maintain a high rate of overall coverage
* Strike a proper balance between need for information and time needed to complete the questionnaire
* Maintain strict confidentiality (both actual and perceived)

AUTOMATION SOLUTIONS

* CHECK-IN

* ADDRESS CONTROL

* DATA CONVERSION

* DECENTRALIZED PROCESSING

* CONCURRENT COLLECTION AND CONVERSION

PROGRAM OVERVIEW

* **Enumeration of:**
  235+ million persons
  104+ million housing units

* **Tabulation/publication for:**
  10+ million blocks
  35,000+ jurisdictions

* **During peak operations:**
  12 regional offices
  450 district offices
  10-14 processing offices
  300,000 peak employment

HARDWARE PROFILE

* 350-450 District Offices each with a D or E Class Machine, Terminals, Printers, and Tape Drives

* 10-14 Processing Offices each with 2-4 B Class Machines, Terminals, Printers, and Tape Drives

* 3,000 to 4,000 Terminals

* Communications Equipment

6．1990年 Census Information

1990 census INFORMATION

THE BIG COUNT: GEARING UP FOR THE 1990 BICENTENNIAL CENSUS

Sunday, April 1, 1990.

That's the 21st national "Census Day" in American History. It marks the final phase of the Nation's most important once-every-10-year statistical project: the Decennial Census of Population and Housing.

It's the day when the U.S. Bureau of the Census will start painting America's portrait by collecting numbers from an estimated 106 million housing units and some 250 million people living in them, located in some 39,000 governmental units.

The basic reason for taking the 21st census is the same as cited 200 years ago in Article I, Section 2 of the U.S. Constitution: to provide the facts needed to divide the seats in the House of Representatives fairly among the states based on population, reflecting changes during the previous decade. Census numbers also are used to redraw state and local legislative districts.

Beyond political representation, however, there is a great deal of federal and state money at stake in the final census numbers. Despite recent cutbacks, billions of federal dollars for a wide range of programs are redistributed to local governments based on population, age, income, and other census statistics.

State governments also use census figures to dispense shares of revenues to local governments that have been collected through statewide fuel, liquor, sales, and cigarette taxes.

Not only do the census counts translate into government dollars for every community, they also are used for planning and improving public facilities and programs. State and local government planners use census facts to establish long-range community plans, to develop capital improvement programs, to help locate new schools, to improve nutrition programs, to set up day-care centers and health clinics where they are most needed, to develop facilities for older people, and to provide better transportation.

(more)

U.S. Department of Commerce
BUREAU OF THE CENSUS
Washington, D.C. 20233

Census Promotion Office (301) 763-1921

But the impact of 1990 census statistics will reach far beyond government information needs. Business and industry will use the data for planning the production and sales of goods and services--where they should open new facilities, relocate or expand, what sales volume they might expect, what prices the market will bear, and how they should advertise.

Results from the next census will provide detailed, timely demographic and socioeconomic information for the nation and its regions, states, counties, cities, townships, villages, boroughs and other geographic areas down to the census block level. The information will be provided in a wide variety of formats to meet the needs of data users, including: printed reports; summary computer tapes and diskettes; microfiche; maps and charts; and perhaps even compact data discs.

To help plan for the 1990 census, Census Bureau officials have held hundreds of meetings since 1983 with hundreds of interested groups and thousands of individuals in scores of cities across the country. Census representatives have consulted with data users in many walks of life--with all types of business people; trade associations; librarians; civic leaders; and local, state, and federal government officials--to find out what the nation needs in the way of statistics from the census and how users want the data published.

The 1990 count will be a "do-it-yourself" census taken largely by mail. Every household will receive a census questionnaire through the mail shortly before Sunday, April 1--Census Day. One adult member in each household will be asked to serve as census-taker. The job: to fill out the form and mail it back in a pre-addressed, postage-paid envelope. Census workers will call door-to-door to pick up or complete the forms and check them in more rural areas. In the mail census areas, Census Bureau employees also will follow up in person or by telephone with those households that do not send back their completed census questionnaires.

There will be two census forms in 1990. The short form, taking about 15 minutes to fill out, contains fewer than 20 basic population and housing questions. Five out of every six households will receive this short questionnaire. Questions asked will include age, race, sex, marital status, and household relationship for each person in the household. Several questions about the housing unit also will be on the basic form.

The remaining 17 percent of the households will get a longer form that may take about 45 minutes to complete. The long form contains the basic questions plus additional ones about the demographic and socioeconomic characteristics of each household member, as well as some additional housing questions. These long-form-only questions request information on income, ancestry, occupation, education, travel to work, and housing costs. The information from this large sample will be statistically inflated to depict the entire population.

The mail-out, mail-back system of census taking was first used in 1970. It permits people to respond more thoughtfully and therefore more accurately than they might during a personal interview. Responding by mail allows them to complete the form in the privacy of their own homes and to refer to personal records more easily.

(more)

To manage the massive census operation, the Census Bureau will obtain several million square feet of office space in about 450 temporary district offices located strategically throughout the country. These offices will be established and supervised through the Bureau's 12 permanent regional offices and their 13 temporary Regional Census Centers. In addition, 11 temporary processing centers will be opened to handle the processing and summarization of data from the census forms.

To hire the estimated 400,000 temporary employees who will take and process the census, the Census Bureau plans to test and interview some 1.6 million people between 1988 and 1990. Eventually, those hired and trained will serve as district office managers, crew leaders, and census-takers who will contact the households when necessary.

These temporary employees, from many walks of life and different educational levels, in truth become the Census Bureau, both in terms of personal contact with the public and quality control in the field offices.

Processing and tabulation of the more than 106 million questionnaires will occur in 11 processing centers between April and October 1990 in order to report the count for each state to the President by December 31, 1990. These counts are for reapportioning seats in the House of Representatives as required by the Constitution. Then by April 1, 1991, just a year after Census Day, the Census Bureau will make available to state officials the small-area counts needed to carry out redrawing state and local election district and legislative boundaries.

Response to the census is required by law--specifically, title 13, United States Code. By this same law, information furnished on census report forms is kept strictly confidential. The law requires that information obtained from an individual be used for statistical purposes only. It clearly states that individual U.S. census reports cannot be used for purposes of taxation, investigation, or regulation. It also requires that published data be in such a format that it is not possible to identify an individual, household, or housing unit or a single business establishment. The law stipulates that only Census Bureau officers and employees may have access to individual information, and each Census Bureau employee has signed an affidavit and taken an oath to uphold the law. The law provides a stiff fine and prison sentence for employees who disclose confidential information. The Census Bureau has a proud tradition of maintaining the confidentiality of the information.

To meet the challenge of the 21st Decennial Census, the Census Bureau intends to mount the most massive and professional publicity campaign in census history. In this regard, the Census Bureau is receiving the enthusiastic and dedicated support of the Advertising Council--the major public service arm of the advertising and communications industry.

Underlying all these preparations and improvements for 1990 is the Census Bureau's awareness that the need for accurate, complete, and timely statistical data has never been greater.

August 1987

7. An Integrated Micro-Computer Processing System for Censuses and Surveys

April 1, 1988

AN INTEGRATED MICROCOMPUTER PROCESSING SYSTEM (IMPS) FOR CENSUSES AND SURVEYS

The International Statistical Programs Center (ISPC) of the U.S. Bureau of the Census has developed an integrated microcomputer system to perform the major tasks in survey and census data processing. This development project was funded by the Agency for International Development (AID). The system allows persons with little or no computer experience to contribute to the data processing. It has been constructed from packages which perform the following processing tasks:

Data Entry - CENTRY, developed by ISPC.

Editing - CONCOR, developed by ISPC. Major improvements have been made to this package, primarily in the area of user interface.

Tabulation - CENTS, developed by ISPC. Major improvements have been made to this package, primarily in the area of user interface.

Statistical Analysis - PC-CARP, Iowa State University's statistical analysis package, which includes major algorithms for analyzing survey data and computing sampling error.

Demographic Analysis - The Computer Programs for Demographic Analysis written by the U.S. Bureau of the Census are available, but interfaces to other demographic analysis packages also may be developed.

The following integrating features have also been developed:

Interactive User Interface - In order to easily use the system without reference to operating system manuals, an interactive user interface has been developed for most of the components. For these components, users will not have to work directly with the operating system of the microcomputer, but rather will select from menus the functions they want to perform.

Common Data Dictionary for Data Entry, Editing and Tabulation Packages Since the data entry, editing, and tabulation functions all use data files with the same item and record organization, a common data dictionary is both desirable and practical. Users of the previous version of CONCOR were required to construct a data dictionary to define the data files to be edited. However, the previous version of CENTS (CENTS 4) could not use this dictionary when tabulating the same data files. The CENTS 4 user was forced to specify the location of data items, a process which introduces the possibility of error and requires additional work. Therefore, a separate data dictionary creation module was developed. CENTRY has been designed to interface this dictionary, and CONCOR and CENTS have been modified to access it as well.

System Documentation - Documentation for all packages within the system has been reviewed and enhanced to make it usable for subject-matter personnel.

HARDWARE AND SOFTWARE

IMPS is designed for use on the following minimum hardware and software:

IBM PC, PC/XT, PC/AT or compatible
512K bytes of memory
10M bytes of disk storage
Math coprocessor (PC-CARP only)
Printer capable of 132 characters per line
DOS 2.0 or above
Realia COBOL compiler 2.0 or above (CONCOR & CENTS only)

CURRENT STATUS

- The Data Dictionary creation program, which was developed specifically for IMPS, will accompany the CONCOR and CENTS packages.

- CENTRY, which is being developed specifically for IMPS, will be available from ISPC in late 1988. A demonstration version copy is now available.

- CONCOR version 3 and CENTS version 5, are available from ISPC. They contain significant improvements over previous versions, especially in the area of user interface. They require the Realia COBOL compiler which can be purchased for about $1000 (U.S.) from:

  Realia, Inc.
  10 South Riverside Plaza
  Chicago, IL 60606
  U.S.A. Telephone: (312) 346-0642

- Iowa State University completed the conversion of SUPER CARP to run on a microcomputer. This package, called PC-CARP, is available from ISPC.

- The microcomputer version of the Computer Programs for Demographic Analysis (MCPDA) is available. It is, with few exceptions, the same as the mainframe version of the package. MCPDA can be obtained for a cost of $50 (free for developing countries with USAID funding) from:

  IRD/Westinghouse
  P.O. Box 866
  Columbia, MD 21044
  U.S.A. Telephone: (301) 992-0066

Cost of CONCOR and CENTS are $500 (U.S.) each. Cost of PC-CARP is $50 (U.S.). These packages may be obtained by developing country statistical offices at no cost if they are requested through the U.S. Agency for International Development.

For more information contact:

International Statistical Programs Center
Computer Software Branch
U.S. Bureau of the Census
Washington, DC 20233 Telex: 9102509167
U.S.A. Telephone: (301) 763-4210

April 1, 1988

C E N T R Y

CENTRY (Census data ENTRY) is a screen-oriented, menu-driven software package for developing data entry applications, entering and verifying data, and collecting statistics on data entry operations.

CENTRY is being developed by the International Statistical Programs Center (ISPC) of the U.S. Bureau of the Census as the data entry component of the Integrated Microcomputer Processing System (IMPS) to be used in the 1990 Round of Censuses.

DESIGN OBJECTIVES

- Customize to census applications as opposed to survey.
- Interface with IMPS data dictionary.
- Speed of execution.
- Strong user screen design capabilities.
- Ease of use/minimum of training.
- Future interface to other software.

MAJOR FEATURES

- Processing of data in batches.
- Programmable data entry screens.
- Limited programmable logic:
  - Range checking
  - Automatic duplication of fields
  - Field entry sequencing (cursor control)
  - Skip pattern definition
- ASCII output (ready for input to CONCOR).
- Record retrieval and modification capability.
- Verification capability.
- Operator statistics.

MINIMUM HARDWARE AND SOFTWARE

- IBM PC/XT/AT or compatible
- 256K bytes of memory
- 2 floppy disk drives (10M bytes hard disk for application development)
- DOS 2.0 or above
- DATADICT software, developed by ISPC

SOURCE LANGUAGE: C

For further information contact:

International Statistical Programs Center
Computer Software Branch
U.S. Bureau of the Census
Washington, D.C. 20233
U.S.A.

Telephone: (301) 763-4210

Telex: 9102509167

8. Telephone Contacts Bureau of the Census

U.S. Department of Commerce • Bureau of the Census • Washington, D.C. 20233

telephone contacts bureau of the census

A Data User Services Division Publication

No. 25 March 1986

Director	John G. Keane	(301)763-5190
Deputy Director	C. Louis Kincannon	763-5192
Associate Director for Demographic Fields	William P. Butz	763-5167
Associate Director for Economic Fields	Charles A. Waite	763-5274
Associate Director for Field Operations	Roland H. Moore	763-7247
Associate Director for Management Services	Bryant Benton	763-7980
Associate Director for Statistical Standards and Methodology	Barbara A. Bailar	763-2562
Assistant Director for Administration	Clifford J. Parker	763-2350
Assistant Director for Automatic Data Processing	Gerald F. Cranford	763-2360
Assistant Director for Communications		763-2446
Assistant Director for Demographic Censuses	Peter A. Bounpane	763-5613
Assistant Director for Economic and Agriculture Censuses	John H. Berry	763-7356
Assistant Director for Economic Surveys	Roger H. Bugenhagen	763-2076
Assistant Director for International Programs	Robert O. Bartram	763-4014
Congressional Liaison	Staff	763-5360
Data User Services Division	Staff	763-4100
Public Information Office	Staff	763-4040

DEMOGRAPHIC FIELDS

Center for Demographic Studies	CDS	James R. Wetzel, Chief	763-7720
Center for International Research	CIR	Barbara Boyle Torrey, Chief	763-2870
Decennial Operations Division	DOD	Arnold A. Jackson, Chief	763-5613
Decennial Planning Division	DPLD	Susan M. Miskura, Chief	763-7670
Demographic Surveys Division	DSD	Thomas C. Walsh, Chief	763-2776
Housing Division	HOUS	Arthur F. Young, Chief	763-2863
International Statistical Programs Center	ISPC	Karl K. Kindel, Chief	763-2832
Population Division	POP	Acting Chief	763-7646
Statistical Methods Division	SMD	Charles D. Jones, Chief	763-2672

Population and Housing Subjects

Age and Sex:			
States (age only)	POP	Edwin Byerly	763-5072
United States	POP	Louisa Miller	763-5072
Aging Population	POP	Karen Crook	763-7948
Aliens	POP	Edward Fernandez	763-5219
Annexation Population Counts	POP	Joel Miller	763-7955
Apportionment	POP	Robert Speaker	763-7955
Births:			
Birth Expectations and Child Care	POP	Martin O'Connell	763-5303
Number, Race and Place of Birth	POP	Amara Bachu	763-5303
Socioeconomic Characteristics: Out-of-Wedlock	POP	Martin O'Connell	763-5303
Census Tracts:			
Boundary Information	GEO	Alice Winterfeld	763-2364
Census Data	POP	Staff	763-5002
Citizenship:			
Foreign Born Persons, Country of Birth; Foreign Stock Persons	POP	Edward Fernandez/Arthur Cresce	763-5219
Commuting:			
Means of Transportation; Place of Work	POP	Philip Fulton/Phil Salopek	763-3850
Congressional Districts:			
Census Data	POP	Staff	763-5002
Address Locations	GEO	Ernie Swapshur	763-5692
Population Estimates	POP	Donald Starsinic	763-5072
Consumer Expenditure Survey	DSD	Gail Hoff	763-2764
Crime Surveys:			
Victimization, General Information	DSD	Robert Tinari	763-1735
Current Population Survey	DSD	Kenneth Riccini	763-2773
(See detailed listing on page 2 for Population Estimates)			
Decennial Census:			
Content and Tabulations	DPLD	Patricia Berman	763-2358
Count Questions - 1980 Census	DPLD	Edgar Elam	763-2685
General	DPLD	Rachel F. Brown	763-2748
Minority Statistics Program	DPLD	Russell Valentine	763-4358

Population and Housing Subjects-Con.

Decennial Census--con.			
Special Tabulations:			
Population Data	POP	Paula Schneider	(301)763-7962
Housing Data	HOUS	Bill Downs	763-2873
Disability	POP	Jack McNeil	763-7946
Education; School Enrollment and Social Stratification	POP	Paul Siegel	763-1154
Employment; Unemployment; Labor Force	POP	Thomas Palumbo/Arvella Nelson	763-2825
Farm Population:			
Census; Current Surveys	POP	Diana DeAre	763-7955
Health Surveys	DSD	Robert Mangold	763-5508
Household Wealth	POP	Enrique Lamas	763-7946
Households and Families:			
Marriage and Divorce	POP	Arlene Saluter	763-7950
Projections	POP	Robert Grymes	763-7950
Size; Number; Social Characteristics	POP	Steve Rawlings	763-7950
Housing:			
American Housing Survey	HOUS	Edward Montfort	763-2881
Components of Inventory Change Survey	HOUS	Jane Maynard	763-5840
Contract Block Program	HOUS	Richard Knapp	763-2873
Housing Information, Decennial Census	HOUS	Bill Downs	763-2873
Housing Vacancy Data	HOUS	Paul R. Harple, Jr.	763-2880
Market Absorption	HOUS	Charles Clark	763-2866
Residential Finance	HOUS	Peter Fronczek	763-2866
(See also Economic Subjects--Construction Statistics)			
Income Statistics:			
After Tax Income	POP	Charles Nelson	763-5060
Child Support and Alimony	POP	Ruth Sanders	763-5060
Current Surveys (National Data only)	POP	Mary Henson/Edward Welniak	763-5060
Decennial Statistics (State level or below)	POP	George Patterson/Gordon Lester	763-5060
Discretionary Income	POP	John Coder	763-5060
Lifetime Earnings	POP	Dan Burkhead	763-5060
Noncash Benefits	POP	Edward Welniak	763-5060
Per Capita Income	POP	Gordon Lester	763-5060
Survey of Income & Program Participation	POP	Angela Feldman	763-5060
Income Surveys	DSD	Chester Bowie	763-2063
Incorporated/Unincorporated Places	POP	Joel Miller	763-7955
Industry and Occupation Statistics			
(See also Economic Fields)	POP	John Priebe/Paula Vines	763-5144
Institutional Population	POP	Karen Crook	763-7948
International Statistics:			
Africa, Caribbean, Latin America	CIR	Sylvia Quick	763-4086
Asia, Oceania, Europe and North America	CIR	Arjun Adlakha	763-4221
China, People's Republic of	CIR	Judith Banister	763-4012
International Data Base	CIR	Peter Johnson	763-4086
USSR- Population/Manpower	CIR	Stephen Rapawy	763-4020
USSR- Economics	CIR	Barry Kostinsky	763-4022
Women in Development	CIR	Ellen Jamison	763-4221
Journey to Work	POP	Phil Fulton/Phil Salopek	763-3850
Language, Current; Mother Tongue	POP	Paul Siegel	763-1154
Longitudinal Surveys	DSD	Ronald Dopkowski	763-2380
Marital Status; Living Arrangements	POP	Arlene Saluter	763-7950
Metropolitan Statistical Areas (MSA's)			
Census and Estimates Data; Current Definitions	POP	Staff	763-5002
New Criteria	POP	Richard Forstall	763-5184/5368
Migration	POP	Kristin Hansen/Celia Boertlein	763-3850
Neighborhood Statistics	DPLD	Patricia Berman	763-2358
Outlying Areas (Puerto Rico, Virgin Islands, Guam, No. Marianas)			
Decennial Census	POP	Staff	763-5002
Population Estimates	POP	Louisa Miller	763-5072
Place of Birth	POP	Kristin Hansen/Celia Boertlein	763-3850
Population:			
General Information; Published Data from Censuses, Surveys, Estimates, and Projections	POP	Staff	763-5020(TTY)/763-5002
Population Estimates Methodology:			
Congressional Districts; SMSA's	POP	Donald Starsinic	763-5072
Counties; Federal-State Cooperative Program for Local Population Estimates	POP	Fred Cavanaugh	763-7722
Estimates Research; Age Estimates	POP	Richard Irwin	763-7883
Local Areas	POP	Fred Cavanaugh	763-7722
Race Estimates	POP	David Word	763-7883
States	POP	Edward Byerly	763-5072
United States (National)	POP	Louisa Miller	763-5072
Population Projections Methodology:			
National	POP	Gregory Spencer	763-5964
State	POP	Signe Wetrogan	763-5964
Poverty Statistics	POP	Jack McNeil/Arno Winard	763-7946/5790
Current Surveys	POP	Steve Rudolph	763-5790
Decennial Census/Poverty Areas	POP	Arno Winard	763-5790
Prisoner Surveys:			
National Prisoner Statistics	DSD	Robert Tinari	763-1735
Race and Ethnic Statistics:			
American Indian Population	POP	Edna Paisano	763-2607
Asian and Pacific Islander Population	POP	Pat Johnson/Wilfred Masumura	763-2607
Black Population	POP	Staff	763-7572
Ethnic Populations	POP	Edward Fernandez/Nancy Sweet	763-5219
Race	POP	Staff	763-2607
Spanish Population	POP	Edward Fernandez/Carmen DeNavas	763-5219

Population and Housing Subjects-Con.

Religion	POP	Carmen DeNavas	(301)763-5219
Revenue Sharing (See also Population: General Information; Economic Fields--Governments)	POP	Douglas Sater	763-5178
Sampling Methods	SMD	Charles Jones	763-2672
Social Stratification	POP	Paul Siegel	763-1154
Special Population Censuses	DPLD	George Hurn	763-7854
Special Surveys	DSD	Ronald Dopkowski	763-2380
SMSA's (See MSA's)			
Survey of Income and Program Participation	POP	Daniel Kaspryzk	763-5784
Travel Surveys	DSD	John Cannon	763-2802
Undercount	POP	Jeff Passel/Greg Robinson	763-5590
Undocumented Aliens	POP	Jeff Passel/Karen Woodrow	763-5590
Urban/Rural Residence	POP	Diana DeAre	763-7955
Veteran Status	POP	Thomas Palumbo	763-2825
Voting and Registration	POP	Jerry Jennings	763-5179
Voting Rights	POP	Paul Siegel	763-1154
Women	POP	Karen Crook	763-7948

ECONOMIC FIELDS

Agriculture Division	AGR	Charles Pautler, Chief	763-5230
Business Division	BUS	Howard Hamilton, Chief	763-7564
Center for Economic Studies	CES	Robert Bechtold, Acting Chief	763-2337
Construction Statistics Division	CSD	Leonora M. Gross, Chief	763-7163
Economic Census Staff	ECS	John H. Berry, Chief	763-7356
Economic Surveys Division	ESD	W. Joel Richardson, Chief	763-7735
Foreign Trade Division	FTD	Barry M. Cohen, Chief	763-5342
Governments Division	GOVS	John R. Coleman, Chief	763-7366
Industry Division	IND	Gaylord E. Worden, Chief	763-5850

Economic Subjects

Agriculture:			
Crop Statistics	AGR	Donald Jahnke	763-1939
Farm Economics	AGR	John Blackledge	763-5819
General Information	AGR	Mary Burch	763-1113
Livestock Statistics	AGR	Thomas Monroe	763-1081
Puerto Rico, Virgin Islands, Guam, No. Marianas	AGR	Staff	763-5170
Business Statistics:			
Minority and Women-Owned Businesses	ESD	John Dodds	763-5470
Retail Trade:			
Advance Monthly Sales; Annual Sales; Mo. Inventories	BUS	Ronald Piencykoski	763-7561
Census	BUS	Mark Wallace	763-7038
Monthly Retail Trade Report	BUS	Irving True	763-7128
Service Industries:			
Census	BUS	Sidney Marcus	763-7039
Current Selected Services Reports	BUS	Thomas Zabelsky	763-3996
Wholesale Trade:			
Census	BUS	John Trimble	763-5281
Current Wholesale Sales and Inventories	BUS	Shirley Roberts	763-3916
Construction Statistics:			
Census/Industries Surveys	CSD	Staff	763-7163
Special Trades; Contractors	CSD	Andrew Visnansky	763-7546
Construction Authorized by Building Permits (C40 Series)	CSD	Linda Hoyle	763-7244
Current Programs	CSD	William Mittendorf	763-7165
New Residential Construction:			
Characteristics; Price Index; Sales (C25/27 Series)	CSD	Steve Berman	763-7842
Housing Starts (C20 Series)	CSD	David Fondelier	763-5731
Housing Completions (C22 Series)	CSD	Stanley Rolark	763-5731
In Selected SMSA's (C21 Series)	CSD	Dale Jacobson	763-7842
Residential Alterations and Repairs (C50 Series)	CSD	George Roff	763-5717
Value of New Construction Put in Place (C30 Series)	CSD	Allan Meyer	763-5717
County Business Patterns	ESD	Faran E. Stoetzel	763-5430
Employment/Unemployment Statistics	POP	Thomas Palumbo	763-2825
Enterprise Statistics	ESD	John Dodds	763-5470
Foreign Owned U.S. Firms	ESD	Jerry McDonald	763-5182
Foreign Trade Information	FTD	Joyce Ware	763-5140
Governments:			
Criminal Justice Statistics	GOVS	Diana Cull	763-7789
Eastern States Government Sector	GOVS	Genevieve Speight	763-7783
Employment	GOVS	Alan Stevens	763-5086
Federal Expenditure Data	GOVS	David Kellerman	763-5276
Finance	GOVS	Henry Wulf	763-7664
Governmental Organization and Special Projects	GOVS	Diana Cull	763-7789
Revenue Sharing	GOVS	James Hogan	763-5120
Taxation	GOVS	John Behrens	763-5308
Western States Government Sector	GOVS	Ulvey Harris	763-5344
Industry and Commodity Classification	ESD	C. Harvey Monk, Jr.	763-1935
Manufactures:			
Census/Annual Survey:	IND	John Govoni	763-7666
Durables	IND	Dale Gordon	763-7304
Nondurables	IND	Michael Zampogna	763-2510
Subject Reports (Concentration, Production Index, etc.)	IND	Bruce Goldhirsch	763-1503
Current Programs	IND	Thomas Mesenbourg	763-7800
Durables	IND	Malcolm Bernhardt	763-2518
Special Industry Surveys	IND	Elinor Champion	763-5616
Nondurables	IND	Carole Ambler	763-5911

Economic Subjects-Con.

Origin of Exports	IND	Wayne McCaughey	763-5566
Shipments, Inventories, and Orders	IND	Ruth Runyan	763-2502
Mineral Industries	IND	John McNamee	763-5938
Fuels/Electric Energy Consumed by Manufactures	IND	Robert Struble	763-7067
Water Use in Mineral and Manufacturing Industries	IND	Joyce Guy	763-7066
Puerto Rico, Virgin Islands, Guam:			
Censuses of Retail Trade, Wholesale Trade, and Selected Service Industries	ESD	William Wade	763-7778
Quarterly Financial Report	ESD	Paul Zarrett	763-4270
Transportation:			
Commodity Transportation Survey; Truck Inventory and Use.	ESD	Carmen Campbell/J. Schroeder	763-1744

GEOGRAPHY, USER SERVICES, STATISTICAL STANDARDS & METHODOLOGY

Administrative Services Division	ASD	Albert M. Cosner, Acting Chief	763-5400
Center for Survey Methods Research	CSMR	James L. O,Brien, Acting Chief	763-3838
Data User Services Division	DUSD	Don L. Adams, Chief	763-5820
Field Division	FLD	Stanley D. Matchett, Chief	763-5000
Geography Division	GEO	Robert W. Marx, Chief	763-5636
Statistical Research Division	SRD	Kirk M. Wolter, Chief	763-3807
Age Search - Access to Personal Census Records	DUSD	Census History Staff	763-7936
Area Measurement and Earth Resources Satellite Technology	GEO	Robert Durland	763-2034
Boundaries and Annexations	GEO	Brian Scott	763-2364
Catalog, Bureau of the Census	DUSD	John McCall	763-1584
Census Geography 1970/1980; Geographic Concepts	GEO	Staff	763-5720
Census Procedures, History of	DUSD	Frederick Bohme	763-7936
Centers of Population	GEO	Kathy Chincheck/Jim Wood	763-5597
Clearinghouse for Census Data Services	DUSD	John Kavaliunas	763-1580
Census Curriculum Support Project	DUSD	Arnold A. Goldstein	763-1510
Computer Graphics and Computer Mapping	GEO	Frederick Broome	763-7818
Computer Tape Files	DUSD	Customer Services	763-4100
Congressional District Component Areas, Atlas	GEO	Kevin Shaw	763-5437
Data User News (Monthly Newsletter)	DUSD	Neil Tillman	763-1584
Data User Training	DUSD	Dorothy Chin	763-1510
Demographic Research	SRD	Paul P. Biemer	763-5350
Economic Research	SRD	Nash J. Monsour	763-3938
Exhibits, Conferences	DUSD	Joanne Dickinson	763-2370
GBF/DIME System	GEO	Staff	763-7315
Geographic Statistical Areas	GEO	Staff	763-2364
Guides and Directories	DUSD	Gary Young	763-1584
Information Services Program (Regional Offices)	FLD	Susan Hardy	763-5830
Library	ASD	Betty Baxtresser	763-5040
Circulation	ASD	Jim Thorne	763-1175
Interlibrary Loan	ASD	Staff	763-1176
Out of Print Publications	ASD	Census Unit	763-5511
Reference Service	ASD	Grace Waibel	763-5042
Map Information	GEO	Staff	763-7818
Map Orders	DPD	Wendell McManus	(812)288-3213
Maps for 1970/1980	GEO	Lawrence Taylor	(301)763-5720
Microfilm/Microfiche	DUSD	Customer Services	763-4100
Monthly Product Announcement	DUSD	Data Access and Use Staff	763-2092
Population Information: Published Data from Censuses, Surveys, Estimates and Projections	POP	Staff	763-5002
Public-Use Microdata Samples	DUSD	Bob Clair	763-4100
Publication Orders	DUSD	Customer Services	763-4100
Reapportionment/Redistricting	DUSD	Marshall L. Turner	763-1386
Revenue Sharing Geography	GEO	Robert Bakondi	763-1996
State Data Center Program	DUSD	Larry Carbaugh	763-1580
Statistical Abstracts	DUSD	Glenn King	763-5299
County & City Data, State & Metropolitan Area Data Books.	DUSD	Wanda Cevis	763-1034
Undercount Research	SRD	Howard Hogan	763-5926
User Software (CENSPAC, ADMATCH, etc.)	DUSD	Staff	763-4100

Regional Assistance

Census Bureau Regional Offices	Regional Directors		Information Services
Atlanta, GA	James F. Holmes	404/347-2271	404/347-2274
Boston, MA	Arthur G. Dukakis	617/223-2327	617/223-0226
Charlotte, NC	John E. Bell, Acting	704/371-6142	704/371-6144
Chicago, IL	Stanley D. Moore	312/353-6251	312/353-0980
Dallas, TX	John E. Reeder, Jr.	214/767-0621	214/767-0625
Denver, CO	William F. Adams	303/236-2200	303/236-2200
Detroit, MI	Robert G. McWilliam	313/226-7742	313/226-4675
Kansas City, KS	Marvin Postma	913/236-3728	913/236-3731
Los Angeles, CA	Francis W. White	213/209-6616	213/209-6612
New York, NY	William Hill	212/264-3860	212/264-4730
Philadelphia, PA	LaVerne Vines Collins	215/597-4920	215/597-8313
Seattle, WA	Leo C. Schilling	206/442-7828	206/442-7080

Telephone Contacts for Data Users compiled by Dorothy Chin, User Training Branch, Data User Services Division. For sources of assistance outside the Bureau, including 1,200 State Data Center organizations, obtain the "Bureau of the Census Catalog and Guide to Programs: 1985." For ordering information, contact Data User Services Division, Customer Services, Bureau of the Census, Washington, DC, 20233, telephone 301/763-4100.

9. 1990 Census Research, Evaluation, and Experimental Program and Projects

APRIL 1988

1990 CENSUS RESEARCH, EVALUATION, AND EXPERIMENTAL PROGRAM AND PROJECTS

Susan M. Miskura
Chief, Decennial Planning Division
Bureau of the Census

Thursday, April 14, 1988
1:15 p.m.
or
Friday, April 15, 1988
8:45 p.m.

To be presented to the Census Advisory Committee of the American Statistical Association and on Population Statistics
April 14-15, 1988: Oxon Hill, Maryland

1990 CENSUS RESEARCH, EVALUATION, AND EXPERIMENTAL PROGRAM AND PROJECTS

ABSTRACT

In October 1987, the Census Bureau discussed the general design of the 1990 Research, Evaluation, and Experimental (REX) Program with these Committees. Based on the advice of these Committees and other sources, we have further defined the scope and content of the REX Program. This paper outlines the specific projects we propose to include. We ask if these program components adequately address the important issues in evaluating the 1990 census and planning the 2000 census. We further solicit your advice about the design of these studies.

After we addressed these Committees in October 1987, we further discussed the 1990 REX Program in other forums. In particular, we solicited advice from the Minority Advisory Committees on the 1990 Census in October 1987; and from the Panel on Decennial Census Methodology, Committee on National Statistics, in February 1988. Some general themes arose from these discussions:

1. The Census Bureau should evaluate all important new aspects of the 1990 census. In addition, the program should research methods to form a basis for planning future censuses, even though, at this time, we do not know what changes will take place in subsequent censuses.

2. It is better to concentrate on a small number of well-designed, definitive studies, than to spread resources to many projects that may not be done well.

3. We must maintain flexibility in the program design so that we can research problem areas or new concerns that may arise.

4. We should take advantage of automated record-keeping to evaluate the census process. With the increased automation of the 1990 census, we will have detailed records for each housing unit and questionnaire. The challenge lies in summarizing and analyzing all of this information.

5. It is essential for the REX Program to produce detailed data about the quality of census coverage and content. In regard to coverage, it is important to have estimates by detailed demographic groups, geography, and data collection methods. With regard to content, it is important to learn how errors in the data affect various applications.

6. The 1990 REX Program should complement ongoing research and developmental efforts within the Census Bureau. Three major efforts are particularly relevant. The first is our ongoing program of questionnaire design research, entailing a systematic study of ways to increase response and reporting accuracy by improving the design of the census questionnaire. The second is the program of Undercount Behavioral Research initiated over a year ago to learn about reasons for undercount among selected target groups; develop alternative enumeration and outreach procedures; and enhance the evaluation of the completeness of coverage. The third is compiling a complete data base of operational, descriptive, and budgetary variables that can be used in planning the 2000 census.

Given these ideas, we have determined that the following projects will form the core of the 1990 REX Program.

MAJOR COMPONENTS OF THE 1990 REX PROGRAM

The major components of the 1990 Research, Evaluation, and Experimental Program encompass three subject areas: content studies, coverage studies, and procedural and processing studies. Each set of studies includes aspects of evaluation, research, and experimentation. Each study would be designed to produce results at the national level as well as appropriate subnational breakdowns, such as demographic groups; regional and other geographic levels; type of enumeration technique; and the like.

Content

This portion of the REX Program should assure that we obtain information on the following:

1. The quality of data from the 1990 census. It should provide information about the sources and magnitude of nonsampling errors due to data collection and processing sources.

2. The effect of sampling, nonsampling, coverage, and geographic errors on data use. We should identify major uses of the data and evaluate how these errors affect applications.

3. Using the data collected in the census and the evaluations as a base, determine more efficient, more accurate ways of collecting the data.

4. The design of the program should also allow for monitoring, documentation, and, if possible, correction of errors identified in collection or processing.

A set of studies that will meet these goals is as follows:

1. An evaluation to provide data on the level of completeness of all census questionnaires at critical stages: incoming; after edit; after follow-up; after sample coding; and final (this latter would address imputation and allocation techniques). For particular operational phases, in-depth analysis would be provided. In particular, we need to evaluate two new procedures for 1990: automated edit and automated coding.

2. A master sample of questionnaires for detailed study. This detailed study would compare, on an individual questionnaire basis and/or a summary level, the census results to independent data. We would select the master sample within the following groups of questionnaires:

    a. Cases to be compared to other Census Bureau surveys, such as the Current Population Survey, Survey of Income and Program Participation, and the American Housing Survey.

b. Cases to undergo content reinterview to get measures of inconsistency and bias. The content reinterview can use traditional techniques as well as techniques to study the reasons respondents report inaccurately or incompletely.

b. Post-Enumeration Survey cases: This will allow us to use the PES to study content issues as well as coverage issues.

d. Cases that may be matched individually, or tabulated for summary comparison, to administrative records from various sources. We would learn how differences in collection methods and definitions or concepts affect data quality and use.

3. Data use study: This would be a ongoing effort. It would use quality measures provided by the preceding studies and key them to specific uses. Initially, from the 1990 census, it would focus on known uses of the data--allocation formulas, planning efforts, and the like, and show how well the data meet their objectives given the errors associated with them.

4. A study of matrix sampling; that is, having multiple questionnaires during the census. There would be a set of core questions on all sample questionnaires and combinations of various sets of other questions on various subsamples. We would research technical aspects of the estimation techniques required to use this kind of sample design, as well as determine whether it would adequately meet the needs of data users.

5. Questionnaire design research: This study would explore the effects of alternative question wording and sequencing compared to the current questionnaire; it would also address the effects of the appearance of the questionnaire and other components of the mailing package for the census.

Coverage

Coverage studies for the 1990 census should provide accurate and informative measures of population and housing coverage by population group and other correlates of undercoverage: demographic and housing characteristics, type of enumeration, geography, and the like. We will evaluate the success of coverage improvement programs. Furthermore, we will evaluate the coverage evaluation techniques themselves.

The components of this program should be as follows:

1. The PES, designed to provide detailed measures of population and housing coverage for 1990, and to study characteristics that correlate with coverage errors, as a basis for designing ways to improve coverage in the future.

2. Various small- or large-scale evaluations of the quality of PES operations, such as matching techniques.

3. Demographic analysis, to provide national level data on undercoverage, and for comparing to or supplementing the PES.

4. Evaluations of error components in demographic analysis; for example, estimates of undocumented workers, and the completeness of data source records.

5. Coverage enhancement techniques: Our automated record system will provide universal tallies on the source of housing unit adds by various characteristics. We would design this study to evaluate our new rules for adding, deleting, and verifying the status of persons and housing units.

6. As part of ongoing undercount behavioral research, we will incorporate studies to evaluate and test ways to enumerate special populations: homeless, undocumented workers, minority populations, recent immigrants, and the like.

Procedures and Processing

Evaluation and research efforts in the area of census procedures and processing should emphasize new or expanded techniques for the 1990 census. Since major innovations have been implemented in the areas of automated, decentralized data processing, this is one area we should concentrate on to determine if the new techniques are cost effective and produce the desired results. Properly designed, the Content and Coverage Studies described above will complement Procedural and Processing Studies by providing data on how methods and operations affect data quality. Designing those studies so that we get comparative measures by processing office and type of enumeration would yield important data about decentralized automated processing. Other new or expanded areas in the 1990 census include the automation of our geographic data base (TIGER), and outreach and promotion initiatives.

Therefore, the major efforts in this category will be:

1. A study of effects on data quality and operational efficiency between the several processing offices for the 1990 census, and within the processing offices.

2. TIGER and Geocoding: Our new automated geographic data base presents great potential for future survey and census taking. Our evaluation should set the stage for future improvement and use. The 1990 REX Program would be the first step in expanding the use of TIGER by integrating the geographic and address data bases; land use studies; and quality and other data base enhancements. The second step will be early 2000 testing of terrestrial navigation or similar technology for map spotting units, digitizing 1990 records, and the like. Therefore, the 1990 REX Program should provide an evaluation of the quality and performance of TIGER in the census.

   In terms of quality, the evaluation should address measures of geocoding error in terms of its two basic components:

   a. Errors in the TIGER base file. We should determine the magnitude and types of errors and omissions in the base file, and how and why they came about; and suggest means of avoiding or correcting them for future use.

   b. Errors in using computer-generated maps and reference materials. We will determine if errors were due to enumerator error, clerical error, or other sources.

3. Promotion and outreach: Studies of our promotion and outreach efforts will provide information about the effectiveness in producing awareness of the census and the degree to that this awareness translates into respondent cooperation. We will evaluate what the most effective means of reaching people who mailed in their questionnaires were; and why people who did not return questionnaires did not. In addition, we will study the effectiveness of various language assistance efforts being instituted in the 1990 census.

QUESTIONS AND ISSUES

1. Will this set of studies adequately address the evaluation of all important aspects of the 1990 census? If not, what other methods and procedures should we evaluate?

2. Will this set of studies form an adequate basis for planning the next census? If not, what other research or experimental projects should be included?

3. If resource limitations do not allow us to carry out this full program, what are the most important studies to include?

4. What specific suggestions do you have for the design of these studies?

U.S. DEPARTMENT OF COMMERCE

April 18, 1988

To : Distribution List

From: Carolee Bush Carolee

Re: CAC/ASA Recommendations, April 15, 1988

Attached, FYI, are the above-mentioned recommendations. A formal request for Census Bureau responses will follow next week.

Attachment

Distribution List

Kincannon
Butz
Jones
Herriot
Wolter
Miskura
Thompson
Schneider
Passel
Gibson
Bohme
Micarelli
Courtland
Van Tassel

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UNITED STATES DEPARTMENT OF COMMERCE
Bureau of the Census
Washington, D.C. 20233

OFFICE OF THE DIRECTOR

RECOMMENDATIONS OF THE CENSUS ADVISORY COMMITTEE OF THE AMERICAN STATISTICAL ASSOCIATION MADE AS A RESULT OF THE MEETING ON APRIL 14-15, 1988

Recommendation 1

Coverage Error Analysis

"At its last meeting, the Committee reiterated its previous recommendation that the Census Bureau proceed with plans for a large-scale post-enumeration survey (PES) and other activities necessary to prepare for a possible adjustment of the counts following the 1990 census. At this meeting, the Committee reviewed subsequent developments on this issue, including the October 30, 1987, statement of the Department of Commerce that no adjustment would be made and that current plans call for a PES of 150,000 housing units, half of the originally proposed sample size.

"The Committee endorses the views of the Committee on National Statistics' Panel on Decennial Census Methodology as expressed in its letter of March 31 to Secretary Verity and repeats the same recommendations in what follows.

"The Committee continues to believe that the Census Bureau was conducting a promising line of research on adjustment. The initial results of the 1986 test of adjustment-related operations in Los Angeles were encouraging, and there was a good possibility that, with continued progress, a sound adjustment methodology would have emerged.

"The Committee especially regrets the Department's decision to cut in half the planned size of the 1990 PES. Despite the Department's decision not to adjust the 1990 census, a large-scale PES remains vitally important for the following reasons:

"(1) A large-scale PES is a necessary foundation for an adequate coverage evaluation program. The Census Bureau has a strong tradition of evaluation, and coverage evaluation is an important part of the decennial census. As public scrutiny continues to focus on the quality of census data, the Census Bureau should strengthen its coverage evaluation activities, carrying its program to a new level of quality and accuracy.

"(2) Planning for the census of 2000 will depend critically on the results of the 1990 census coverage evaluation. Without adequate coverage evaluation in 1990, including evaluation at the smallest levels of geography, planning for and conduct of the next census will be impaired.

"(3) For a variety of possible reasons--including an unexpectedly large undercount, a legal directive from the Congress or the courts, or a decision by a new administration--it may become necessary or desirable to adjust the census of 1990 for coverage errors. To meet its responsibilities to the Nation, the Census Bureau must be in a position to respond constructively.

"(4) A large-scale PES in 1990 will put the Census Bureau in a better operational position to consider the feasibility and desirability of adjustment for the census of 2000.

"For these reasons, the Committee reiterates its earlier recommendations that a large-scale PES be an integral part of the census dress rehearsal and the census of 1990. The Committee considers the presently planned PES size of approximately 150,000 households to represent a bare minimum. We urge that any pressures to reduce it further be firmly resisted and that, if possible, the size be increased.

"The Committee further recommends that at the next meeting of the Census Advisory Committee, the Bureau present a detailed proposal for the timing and content of the evaluation reports."

Recommendation 2

Research, Evaluation, and Experimental (REX) Program

"The Research, Evaluation, and Experimental (REX) program is vitally important for the evaluation of the 1990 census results and for planning the 2000 census, so REX planning should be high priority matter. The Committee recognizes that the Bureau has made progress on the planning for REX since its last meeting, but is concerned that the plans are still vague and incomplete at this late date. The Bureau needs to give more attention to this critical matter. The Committee is willing to work with the Bureau in refining the plans for REX, but doing so will require more specific descriptions of the options being considered than have been provided to us.

"In further planning for the REX, the Committee recommends that more emphasis be placed on preparing for an adjustment in 1990 or 2000. In particular, the Bureau should conduct (1) studies of the error structure of the PES and demographic analysis; (2) tests of the feasibility of integrating census and PES activities so that the counts could be adjusted in a timely fashion; (3) evaluation of coverage enhancement techniques, especially with regard to whether they add enough precision to the estimates to justify keeping a PES out of the field for an extra few weeks; and (4) experiments designed to measure correlation bias, perhaps by using administrative records in multiple system estimation."

Recommendation 3

Interdisciplinary Research on Decennial Census Decision-Making

"Decennial census planning is complex, lengthy, and extensive. Decisions are made at numerous points both internal and external to the Bureau. The Committee suggests that the Census Bureau sponsor interdisciplinary research to support and improve this process. Examples might be (a) an analytic history of the decision-making process in recent censuses, possibly including oral histories; and (b) an analysis and classification of uses of census data at the subnational level by type, scope, and other characteristics."

Recommendation 4

Disclosure Avoidance

"The Committee recommends that the Bureau vigorously pursue research on disclosure avoidance techniques with the goal of clarifying (a) the nature of protection provided in both demographic and economic contexts; (b) the need for using both data switching and data suppression to achieve protection; and (c) the relative merits of a wide variety of disclosure avoidance techniques, including data switching."

Recommendation 5

Allocation of the Census Sample

"The Committeee recommends against allocating the 1990 census sample so as to achieve approximately equal precision in tracts (defined as small governmental units, and remaining BNA's or census tracts), independent of their size. The reasons are given in the attached memorandum which also explains the basis for our recommendation that proportionate sampling be adopted (except, perhaps, for small governmental units). Acceptable departures from proportionate sampling are also considered in the memorandum, to be adopted provided examination of the principal goals to be served by the census sample leads to a decision to give greater priority to tract statistics than to statistics for other areas, large and small."

Attachment (Hansen discussion notes, which are being cleaned up. Clean copy to follow.)

U.S. DEPARTMENT OF COMMERCE

April 18, 1988

To : Distribution List

From: Cam Gibson CG

FYI--CAC/POP recommendations (4) from the April 14-15 meeting are attached. A formal request for Census Bureau responses will follow next week from Mr. Butz's office.

Attachment

Distribution List

Butz (DIR)
Jones
Herriot
Bush
Miskura (DPLD)
Thompson (STSD)
Bohme (DUSD)
Micarelli
Courtland (PPDO)
Van Tassel
Schneider (POP)
Passel
Gibson
POP DIV FILE
CHRON

TRANSMITTAL FORM CD-52A (10-07)
PRESCRIBED BY DAO 214-2

UNITED STATES DEPARTMENT OF COMMERCE
Bureau of the Census
Washington, D.C. 20233

OFFICE OF THE DIRECTOR

RECOMMENDATIONS OF THE
CENSUS ADVISORY COMMITTEE ON POPULATION STATISTICS
MADE AS A RESULT OF THE MEETING ON APRIL 14-15, 1988

Recommendation 1

1990 Census Post-Enumeration Survey (PES)

"The Committee continues to believe that the Census Bureau should pursue research on adjustment-related issues and methodology. Indeed, the initial results of the 1986 test of adjustment-related operations in Los Angeles showed some promising results that should be pursued with further research. The Committee reiterates its earlier recommendation that a large-scale PES be an integral part of the census dress rehearsal and the census of 1990. The Committee considers the presently planned PES size of approximately 150,000 households to represent a bare minimum. We strongly urge that the size of the presently planned PES of 150,000 be returned to 300,000. The difference in cost is a necessary requirement for this important foundation of future Census Bureau evaluation. Improvement in future counts can only be obtained by extensive research, testing, and evaluation of past operations. These necessary activities cannot proceed without the proper tools."

Recommendation 2

1990 Census Research, Evaluation, and Experimental (REX) Program

"The Committee asks that it be kept abreast of developments for the 1990 REX program, with written updates at appropriate intervals and opportunity for detailed examination of specific projects, such as content evaluation, as they are formulated."

Recommendation 3

1990 Census Disclosure Avoidance

"The Committee recommends that the disclosure avoidance technique now termed 'Data Switching' be restricted to the full count census data and not carried forward into the sample-count characteristics or the Public Use Microdata Sample files."

Recommendation 4

1990 Census Variable Sampling Plan

"With regard to the design of a variable sampling plan, the Committee recommends that the Bureau of the Census:

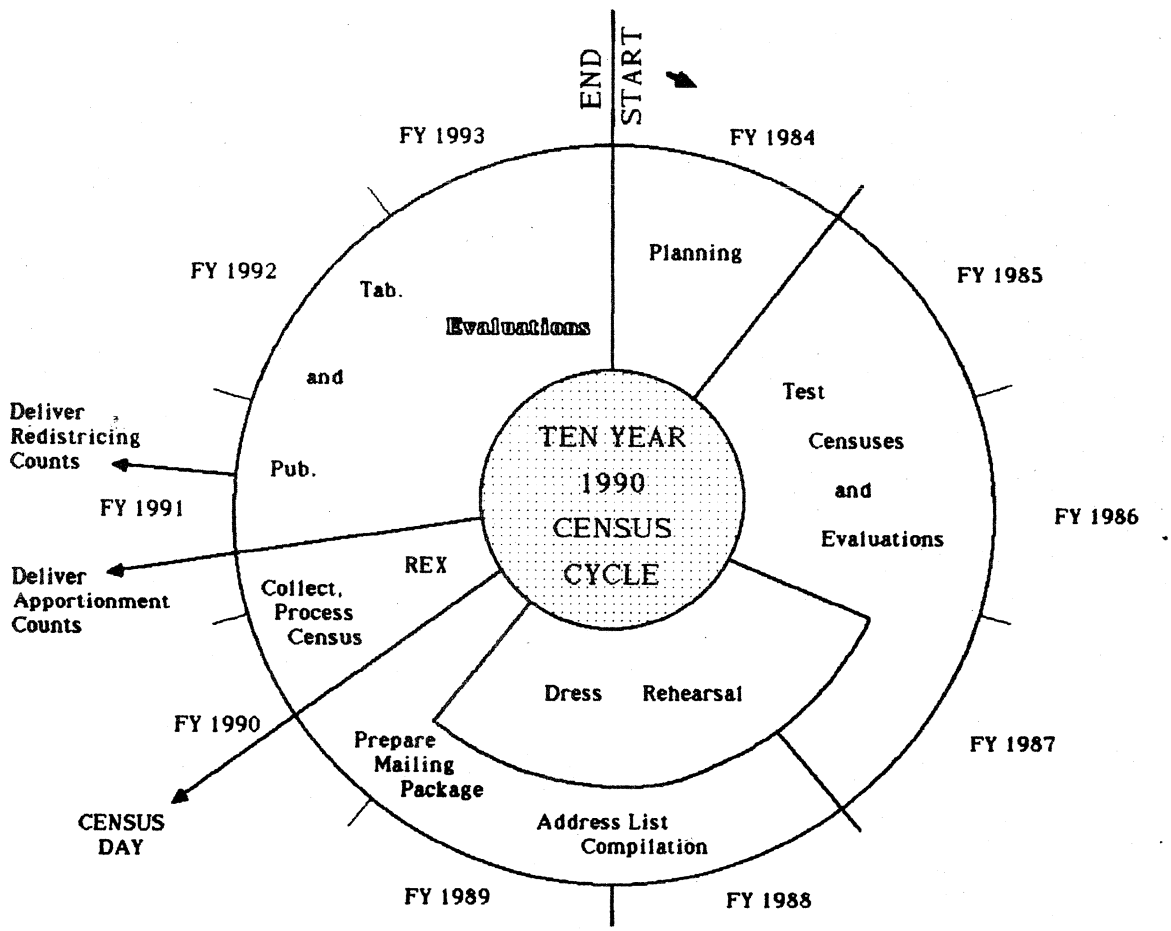
1. Develop accurate counts of the numbers of census tracts, BNAs, and governmental units proposed as design areas, along with a distribution by size class and total housing unit counts, and

2. Investigate the appropriate choice of subcounty design areas on a state-by-state basis.

The Committee requests that a report on this be made at the next Advisory Committee meeting."

Ten Year Census Cycle

FOR PLANNING & IMPLEMENTING THE 1990 CENSUS



We will have 449 District Offices (DOs) to handle most of the data collection activities that will require nearly 300,000 temporary employees at peak. Each DO will have a small mini-computer system to track and control operations and progress.

Additional management and control support for these offices will be supplied from the Regional Census Centers located near our 12 permanent regional field offices. These RCCs also will house equipment for producing maps and for updating the geographic data base (TIGER).

There will be 11 field Processing Offices (POs) with large mini-computer systems and FACT 90 data capture equipment. For about one-fourth of the DOs (those in the most difficult to enumerate areas), the PO will perform the initial check in of questionnaires returned by mail, edit the questionnaires, and perform telephone followup of failed edit questionnaires. All other DOs will perform these operations themselves.

The master Address Control File will be maintained at Headquarters. Part of the Baltimore PO will be used as a site for final testing and staging of all software/hardware systems to be deployed to the various field and processing offices.

Urban Address List Development is a combination of several operations that will produce a computerized address list to control the mailout and other data collection/processing operations for 56 million addresses in the most urban areas of the country.

In early 1988 we will purchase computerized address lists (also known as Tape Address Registers) from vendors (VENDOR FILE PROCUREMENT). From the resulting file we will label address cards for the U.S. Postal Service to use in checking the completeness of the list in late 1988 (TAR ADVANCE POST OFFICE CHECK, or APOC).

Also during 1988, these address lists will be computer coded to initial census geography, with clerical coding of those addresses not coded by the computer (GEOCODING). Once the APOC and geocoding results have been incorporated into the files, the addresses will be printed for use in mid-1989 for a field check of the completeness and accuracy of the list (PRECANVASS). Particular attention is given to multi-unit buildings where unique apartment designations are needed for accurate delivery of the census questionnaires.

Any addresses with geographic problems at this point, plus any still uncoded from the initial geocoding operation, will be printed on cards and sent for field geocoding in early 1990 (YELLOW CARDS).

Rural Address List Development is a combination of several operations that will produce a computerized address list to control the mailout and other data collection/processing operations for about 32 million addresses in suburban and rural areas.

Maps must be produced for all these areas so that enumerators can canvass and list all the addresses during 1988 (PRELIST). The listings then must be keyed (along with the appropriate geographic codes the enumerators assign by referencing the maps).

From the resulting file we will label address cards for the U.S. Postal Service to use in checking the completeness of the list in early 1989 (PRELIST APOC). Once the APOC results are received, any added addresses or other changes to the Prelist file are field verified in the summer of 1989 (APOC RECONCILIATION).

Cycle 1 Block Splits will take place in 1989 and will involve clerical and field work to assign addresses to the correct portions of those blocks on our maps which are split by political tabulation boundaries. This first cycle is done for those jurisdictions where these boundaries are not likely to change by January 1990.

Questionnaire Package Activities involves the printing, labelling, and assembly of the questionnaire packages to be mailed (or delivered by enumerators) to almost 100 million addresses. Most of this work will take place from late 1989 to early 1990 using the address lists that result from the urban and rural address list development operations. The mailing packages then will go to the U.S. Postal Service to prepare for delivery of the questionnaires. A separate labelling/assembly will take place for addresses resulting from the late prelist (see below), and these packages will be sent to the USPS in a separate shipment.

Precensus Local Review will start in late 1989 and continue to early 1990 and is an opportunity for local officials to review the initial address counts and identify areas that may need to be recanvassed due to potential coverage errors. The Precensus Local Review will not include those areas where the address list will be prepared from late prelist (see below) or those areas where we will not use the mail census approach at all (see List/Enumerate, below). However, we will produce maps for local officials to review, even in areas where counts are not available.

Special Place Prelist will be conducted in January 1990 in order to separately identify regular housing units and group quarters within special places (dormitories, jails, hospitals, and the like). A questionnaire mailing package must then be prepared for the regular housing units (for example, the permanent quarters of the jail warden), while enumerators will need to visit the group quarters later (see group quarters enumeration, below) to enumerate those persons (for example, the inmates of the jail).

Late Prelist will be conducted in fall of 1989 for selected counties (mostly in Appalachia and the South) where we cannot develop lists of mailing addresses suitable for USPS delivery. Like prelist, maps must be generated for the enumerators to canvass the areas and list all the addresses. These addresses will then be keyed (along with the associated geographic codes the enumerators will assign by referencing the maps) and added to the address control file to be used for controlling check-in (see below) and other collection/processing activities. The keyed control file also will generate both the address lists and the file for labelling the questionnaire packages to be used for about 11 million addresses during Update/Leave enumeration (see below).

Casing/Time-of-Delivery Checks are conducted by the USPS just prior to, and during, the delivery of the questionnaires in March 1990 to check for any addresses for which there is no questionnaire (or more than one questionnaire) and to identify any questionnaires which cannot be delivered because they don't have a recognizable mailing address. For the most part, added addresses and units for which the questionnaire could not be delivered will have to be enumerated by an enumerator during nonresponse follow-up (see below).

DISTRICT OFFICE DATA COLLECTION OPERATIONS

Check-in/Surname Keying will take place in April 1990. The mail and enumerator return questionnaires will be checked in using a bar code wand, and a file with the ID numbers of these forms will be kept in the office as well as transmitted to headquarters to update the master address control file (ACF). Clerks will need to key, and the file also will contain, the surnames of each household in multi-unit buildings and for those households in areas without street-house number type addresses. This information will be critical to the enumerators conducting nonresponse followup (see below) in areas with such addresses because it will help them determine which households already have returned a questionnaire.

Group Quarters/T-Night Enumeration will take place soon after census day to enumerate most of those persons who live in

special places and other locations that cannot be enumerated using standard procedures (for example, persons living in shelters or other transient quarters).

Update/Leave enumeration will be used for those areas where the address list is compiled during Late Prelist. A few weeks before census day, enumerators will use a printout of the addresses from Late Prelist to re-canvass the areas and update the list for any new or missed housing units. At the same time, they will leave addressed questionnaires at each unit to be completed by the household and returned by mail.

List/Enumerate will be used for about 6.5 million addresses in the most rural/sparsely populated areas of the country where it is not efficient to compile an address list prior to the enumeration. Instead, a few weeks before census day, the USPS will deliver unaddressed short-form questionnaires to each housing unit in these areas. The instructions with the form will ask households to complete the form and hold it for an enumerator to visit. Enumerators will canvass the areas; list each address and spot its location on a map; and pick up the completed forms. For those households designated to be asked the additional sample questions, the enumerators also will collect this information. The addresses from these areas later must be keyed (see Conventional Area Keying, below) to control other operations and so that ultimately the ACF will be a computerized file of all addresses from the 1990 census .

Nonresponse Follow-up will begin in late April/early May of 1990. Enumerators must visit each address for which no completed questionnaire was checked in. They will receive an assignment control list generated from the ACF which will show each unit to be visited as well as the surrounding units (and, for multi-unit structures and areas without street/house number addresses, the list will show surnames of the households that already returned a form). Completed enumerator returns are checked in on the DO control list (and a tape of the ID numbers is transmitted to the ACF again).

Edit and Repair in the DOs is a clerical operation to review each completed questionnaire for completeness using preset edit and tolerance rules. Some errors can be repaired by the clerks (for example, age can be computed if birthdate is provided). Forms which pass the edit can be shipped to the processing office for data capture (see below). Those forms that fail edit will need followup to collect the missing information. We first will attempt to do this by phone (see Telephone Follow-up, below), but where this is not possible, a personal visit will be needed (see Field Follow-up, below).

Telephone Follow-up from the DOs will be conducted to collect missing information for questionnaires that failed the clerical edit. This only can be done for those questionnaires where the household provided their telephone number when they

filled out the form, or where the number can be obtained from a phone book. If the household is contacted, no further followup is done even if all the information cannot be obtained, and these forms then can be sent to the PO for data capture. If no contact can be made by phone, then the form must be followed-up by personal visit (see Field Follow-up, below).

Cycle 2 Block Splits will take place in June 1990 and involves essentially the same steps as Cycle 1 Block Splits to ensure that housing units are assigned to the correct (Jan. 1, 1990) political tabulation geography. This second cycle is needed because we will not receive all final information on boundary changes until March 1990.

Field Follow-up will take place beginning late June 1990, and has two primary purposes. The first is to conduct personal visit followup to those households for which the questionnaire failed edit (and for which the follow-up could not be done by phone). The second is to visit all units that were classified as vacant or delete during Nonresponse Follow-up in order to verify that the unit is not occupied (past results have shown that a significant proportion of them are occupied).

Post Census Local Review will begin in late August 1990, and is done to give local officials from all functioning governmental units an opportunity to review block counts for all final tabulation areas. If potential coverage errors are identified, field work will be necessary (Local Review Recanvass) to make any necessary corrections and enumerate any missed units.

PROCESSING OFFICE DATA CAPTURE OPERATIONS

Address Control File Update/Maintenance will largely be a centralized operation. Added units and other changes to the address inventory will be sent from the DOs to a single PO (probably Baltimore) where records will be keyed and transmitted to headquarters. Periodically, an extract of the most current version of the ACF will be sent to the POs and DOs. Another major component of ACF maintenance will be to receive the files sent from the DOs with various status information about each unit (such as the ID numbers, plus any surnames, for checked in questionnaires). Among other things, this will allow information backup for the files being kept in the DOs.

Check In/Laser Sort is analogous to the check in being done in the district offices. For those DOs in the most difficult to enumerate areas of the country, the processing office will handle almost all activities except actual data collection. Thus, mail returns for these areas will go to the PO rather than the DO. Because of the larger volume they must handle, the POs will use laser sorters to read the barcodes on the

questionnaires and thereby create a file with the ID numbers of mail returns. The PO also will do the keying of surnames, and the file of ID numbers and surnames will be sent to headquarters to update the ACF.

Open/Batching is performed once the mail returns are checked in. The questionnaires must be removed from the return envelope and prepared for either the surname keying operation or for FACT 90 Data Capture.

Surname Keying As in the DOs, surnames for mail response households must be keyed for all units in multi-unit structures and for units with rural addresses. This information is needed to assist the nonresponse enumerators in locating the specific units that have not returned a form.

FACT 90 Data Capture is the primary means for converting all the data on the questionnaires into computer readable form. A microfilm of the forms is made; the film is developed; and then a device interprets the information on the film and records it on a computer file. For mail returns that come directly to the POs, this is done as soon as check in (and surname keying, where needed) is complete. This will allow an automated edit of the data on each form (see below). For mail and enumerator returns sent to the PO from the DOs, all edits and failed edit followup will have been completed before the form is sent to the PO for data capture. Note that this information must later be merged with the data that must be captured by keying (all the write-in answers, such as occupation, must by keyed - see Write In Keying, below. Also, all the data from the forms used for special places enumeration must be keyed).

Edit/Repair in the POs is slightly different than in the DOs. Because the mail returns in the POs will go directly to data capture, the initial edit can be done by computer rather than clerically. After the forms that fail this edit are identified, clerks will attempt to repair as many errors as possible (which is done simultaneously with the clerical edit in the DOs). Those forms that still fail edit must then go to Telephone follow-up (see below) from the PO. For those that cannot be followed up by telephone, the questionnaire will be sent to the DO to conduct personal visit followup.

Telephone Follow-up in the POs is analogous to the same operation described above for the DOs.

Sample Write-in Keying is that portion of the data capture operation that cannot be done via FACT 90 because the responses are text (the FACT 90 system will film these answers and can detect the presence of such write-ins, but the interpretive part of the system can only read the responses where the small FOSDIC circles are filled). This involves such questions as Income, Occupation, Industry, and the like.

Once these data are keyed, some of them will need to be coded (see Coding, below) to standard categories before all this information is merged with the data captured by FACT 90 for the same forms.

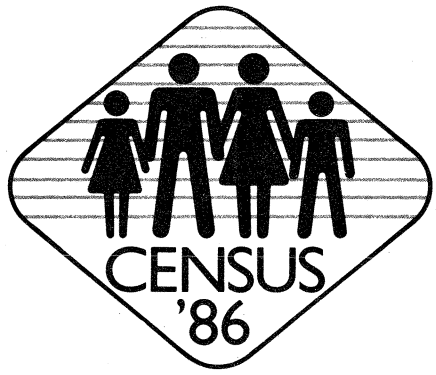
Coding is that part of the data capture operations that involves assigning standard codes (needed for tabulation purposes) to various write-in answers to open-ended questions on the form (such as Occupation). There are three coding operations: General Coding; Industry & Occupation Coding; and Place of Work, Migration, Place of Birth Coding. Much of the coding will be automated, but clerical work will be needed to handle those cases the automated system cannot code.

Tabulation/Publication Operations involves a number of operations and products from the 1990 census. A final review and allocation (for missing data) must take place, and various summary tape files must be prepared (each involves different subsets of the questionnaire items cross-classified and summarized at different levels of geography). For sample data, additional steps take place to weight the sample totals to 100% levels and to calculate standard errors for the resulting estimates.

Census of Puerto Rico is one of several censuses conducted for United States territories and trust lands in conjunction with the decennial census program. To the extent possible, the same forms, systems, and procedures will be used, but some variations will be needed. For example, the form for Puerto Rico will be in Spanish, and some different questions will be asked. Data collection will be via List/Enumerate; there will be 11 DOs and a small-scale PO in Puerto Rico to manage and control the data collection and some of the initial processing; FACT 90 will be used for data capture along with clerical coding of all write-in responses; and final processing, tabulation, and publication will be done stateside.

Ⅳ. 뉴질랜드의 1986年 센서스 現況 및 1991年 센서스 準備

1. 1986年 센서스를 爲한 弘報 Guide



Publicity Campaign Guide

NEW ZEALAND CENSUS OF POPULATION AND DWELLINGS

1986

1986 CENSUS OF POPULATION AND DWELLINGS

PUBLICITY CAMPAIGN GUIDE

PREFACE

This Guide provides details of the objectives of the Publicity Campaign for the 1986 Census of Population and Dwellings and the various components of this programme. It describes the advertising, promotional and training activities planned to meet both national and local requirements and the responsibilities of the department's permanent staff and field officers in these areas.

Good relations with the public of New Zealand concerning the census enumeration process will be promoted through media advertising, press conferences, talks to community and servicing groups, radio discussions, meetings with persons in charge of institutions and inquiry centres. Departmental and field staff assisting in these activities will be given special media training.

In addition, the public will be informed about the forthcoming Census through the distribution of Household Leaflets and non-English Language Leaflets. Posters, Stickers and Small Labels will also be displayed in appropriate locations, and distributed to selected organisations and individuals.

A special Census information programme is to be organised for Primary and Secondary Schools.

Greater public awareness of the Census, a higher standard of enumeration and improved data accuracy will result from a successful Publicity Campaign.

I therefore urge those involved in the various publicity programmes to aim at achieving the maximum possible public co-operation in this the department's most important statistical collection.

R.F. WELPLY
Deputy Government Statistician

Department of Statistics,
WELLINGTON

September 1985

CHAPTER 1

INTRODUCTION

Effective advertising and public relations are important ingredients in ensuring the success of the 1986 Census of Population and Dwellings. It is believed that a major planned information programme - directed at all levels of society - will improve the accuracy of census results.

This booklet will broadly outline the forthcoming national and local publicity activites planned for the promotion of the Census, and define the role of each tier of the field organisation in relation to the local campaign.

In addition to this booklet, each Regional Controller, Area Manager and Supervisor will receive an 'Information Kit', which will provide the background and support material required to run the publicity campaign at local level - including:

* visual material used in the national campaign;
* guidelines for answering both routine and critical queries; and
* statistical information relating to each Area Manager's District.

Publicity Programme Objectives

The goal of the promotional programme is to reach the total population with a series of convincing and persuasive messages aimed at motivating them towards full co-operation with the 1986 Census. Particular objectives of this programme include:

* to make the public aware that a census is to be held, and when;
* to ensure that all respondents are aware of their legal obligations to the Census;
* to promote public confidence in the confidentiality of information gathered in the Census;
* to provide information about the Census organisation and the procedures used;
* to explain the importance of the Census, the value of each question, and the uses to which the information is put;
* to advise where assistance can be obtained by those requiring questionnaires and advice regarding their completion.

CHAPTER 2

PUBLICITY AT THE NATIONAL LEVEL

(National Promotional Activities)

THE NATIONAL CAMPAIGN IS BEING CO-ORDINATED BY THE DEPARTMENT'S POPULATION DIVISION IN THE CHRISTCHURCH OFFICE. IT WILL CONCERN THE MOST VISIBLE ASPECTS OF THE CAMPAIGN, INCLUDING EXTENSIVE MEDIA ADVERTISING.

SECTION 1

THE MEDIA ADVERTISING CAMPAIGN

(SEE MEDIA SCHEDULE AT THE REAR OF THIS BOOKLET FOR DATES AND TIMES.)

1. Television Commercials

Two TV commercials (30 second/10 second) promoting the Census will be shown, commencing shortly before questionnaire delivery begins.

The commercials pick up the census slogan 'We all count for New Zealand', and feature ordinary New Zealanders (plus some well known 'personalities') engaged in various lifestyle activities. The basic message is that everyone, from every walk of life, must complete a questionnaire.

2. Television Film

A 30 minute film, made in co-operation with TVNZ, is to be screened close to Census night.

The film will cover all aspects of the Census project, from planning and field operations, to production of statistics and their ultimate users.

3. Radio Commercials

A 30-second commercial will be broadcast at different times on all radio stations, beginning around the same date as the TV advertisements.

Their message is similar to that of the TV Advertisements, i.e. 'Everyone fills in a questionnaire on March 4th'.

Radio will also incorporate multi-language messages.

4. Press Advertisements

Both daily and weekly newspapers will carry half-page promotional advertisements, (including 'Truth', 'NZ Times', 'Sunday News').

The obligatory listings of Census Supervisors' names and office addresses will also be published by the major papers (in their Public Notices columns).

Articles about the census are currently being prepared for a number of weekly magazines, and trade journals.

5. News Conferences

A National News Conference is planned for 13 November 1985. Venue: Wellington. This Conference, to be conducted by senior personnel of the Department of Statistics, will enable the Department to both inform, and seek the co-operation of, the major elements of the media. Topics to be covered during the conference include: the questionnaire content and evaluation; the forthcoming advertising campaign; the basic enumeration process; the proposed output strategy to meet users requirements; confidentiality of census data and the cost of the census. It is also intended to hold a second conference in Wellington in early February. Topics will include: enumeration timetable and procedures; and the marketing strategy for census output.

In addition, impromptu regional Conferences may be arranged during the fortnight leading up to Census Date, if there is a need to give further explanations about Census questions, procedures, etc.

Regional Controllers are expected to take part in the News Conferences within their regions of responsibility.

6. National Publicity Tours

Participation in local media activities by senior departmental staff, (i.e. interviews, talk-backs, meetings), is expected to commence in the 3rd week of February, and continue until Census Day. These media events will be organised by Regional Controllers and/or Area Managers, in consultation with the Department.

7. Media Relations Training

Regional Controllers are required to participate in a 2-day media-communications course, to be conducted in Wellington on 16 and 17 September. Area Managers and Supervisors will receive similar instruction by means of a video film - which will be shown at their training courses. Aspects of the film will be suitable for general training of field staff in public relations techniques.

SECTION 2

OTHER NATIONWIDE ACTIVITIES

1. Census Household Leaflet

Distribution of the Leaflet to all occupied homes, will be undertaken in conjunction with questionnaire delivery by Enumerators. It will provide a basic rationale for the census: the reasons for; who uses the data; confidentiality; and where to get help.

2. Non-English Language Leaflet

A multi-language leaflet, covering 6 Pacific Island languages, plus N.Z. Maori, is being prepared, based on the content of the Household Leaflet. This will also be delivered with questionnaires, as required.

3. Posters/Notices/Stickers/Small Labels

Posters and Notices will be available for distribution (primarily by Area Managers) to Local Authority offices, libraries, schools, Post Offices, Government departments and other community centres, as well as to workplaces of major employers, business houses, etc. Specially designed posters may also be displayed in public transport (buses and trains).

Arrangements have also been made for stickers incorporating the Census logo to be carried on vehicles of a Rental Car firm close to census date. These can also be displayed by enumeration personnel. Small stick-on labels will also be available for distribution to all primary schools.

4. School Projects

The co-operation of the Education Department has been obtained to assist in the preparation of classroom teaching units - for both primary and secondary schools - using a census theme.

5. Other

A range of miscellaneous activities is being arranged, as appropriate.

CHAPTER 3

PUBLICITY AT THE LOCAL LEVEL

(Community Support Activities)

THE LOCAL PROMOTIONAL CAMPAIGN IS TO BE DEVELOPED, CO-ORDINATED, AND CARRIED OUT BY THE 14 AREA MANAGERS, WITH SUPPORT FROM THEIR REGIONAL CONTROLLERS AND TRAINING OFFICERS.

SECTION 1

OBJECTIVES OF THE LOCAL CAMPAIGN

The broad goals of the local campaign are identical to those of the nationwide promotion;

* to make the public aware of the Census, and its importance;
* to explain the nature of our census requirements;
* to indicate how assistance can be obtained.

It is hoped that this community-based exercise will fill any gaps in coverage left by the more formal national programme. It provides an opportunity to reach people who may not be responsive to conventional advertising; whose census-night circumstances are unusual; whose first language is not English, or who require personal assistance in filling out the questionnaires.

SECTION 2

PUBLICITY RESPONSIBILITIES

(The respective roles of field staff)

EACH TIER OF THE FIELD ORGANISATION HAS A PART TO PLAY IN THE LOCAL CAMPAIGN.

1. Overall responsibility for regional publicity will rest with the 3 Regional Controllers.

2. In turn, Controllers will delegate responsibility for each local campaign to the appropriate Area Manager.

3. Regional Controllers can expect to become involved in some of the local activities outlined in this Chapter and they will be required to monitor the progress of the publicity campaign in their region.

4. Since Area Managers are the 'men-on-the-spot', however, the majority of decisions involving local publicity matters, plus most media contact, will involve them alone.

5. The exception to the above are RADIO ON-AIR 'TALK-BACKS' - which Area Managers must not become involved in.

6. Supervisors' telephone numbers will be contained in the Census Household Leaflet delivered to each dwelling, and their names, addresses and telephone numbers will be advertised in the Public Notices columns of major newspapers. This should satisfy much of the purely routine inquiry activity.

7. Similary, Enumerators will handle low-level queries from householders.

8. Supervisors will generally have only minor roles to play in the publicity campaign, and any inquiries to them for information from TV, radio or newspaper reporters should be transferred to Area Managers for reply unless special arrangements have been made previously with Area Managers.

   Area Managers will involve their Supervisors in publicity as and when considered appropriate.

9. Handling Controversial Issues

Any aspect of the 1986 Census - questionnaire topics (including those not accepted for 1986); field staff recruitment and behaviour; departmental policy; etc. - may become the subject of controversy. Some of these aspects may be questioned by well-organised pressure groups, through the media. Both Regional Controllers and Area Managers must use their judgement in making public statements on sensitive issues.

WHERE AN OFFICER FEELS THAT THE ANSWER REQUIRES GREATER EXPERTISE THAN HE/SHE HAS ACCESS TO (OR) THAT HE/SHE DOES NOT HAVE THE AUTHORITY TO ANSWER, (OR) WHEN IT INVOLVES AN ACCUSATION OF MISCONDUCT, the inquiry should be passed on to the next level of authority, i.e. to Regional Controllers, or to the Department of Statistics.

In general, ANY questions that field officers are unable to answer should be referred to a higher level. Obviously, this will not include routine queries that can be checked out, and a reply given at a later time.

SECTION 3

EXAMPLES OF LOCAL PROJECTS

PUBLICITY PROJECTS MAY INVOLVE THE LOCAL MEDIA - RADIO, REGIONAL TV, NEWSPAPERS - OR OTHER COMMUNITY ACTION AND SERVICE GROUPS.

Area Managers reported after the 1981 Census that, although the national radio and television networks were used for basic pre-Census publicity, the local radio stations and press were relied on to provide the more detailed census publicity at the local level. Experience in 1981 also showed that these media were generally very good.

Information dissemination in the widest sense of the word, however, requires making the best use of all the avenues available for publicising the census.
Activities may include:

* Interviews (live or pre-recorded) on local radio or regional TV programmes.
* Radio 'talk backs' (off-line).
* Regional television film of an aspect of enumeration.
* News releases for local radio or press.
* Articles, charts, etc. for local newspapers.
* Talks to service clubs, schools, PTAs and other community organisations.
* Distribution of posters/notices/stickers/displays to - public places, vehicles, business and work places.
* Liaison with Maori, Pacific Island and other ethnic organisations.
* Liaison with Information Centres and Citizens' Advice Bureaux.
* Visits to all motor camps, large hotels or motels, workcamps, hospitals, prisons, etc.

1. Use of Radio Programmes

Radio programmes have the potential to reach large audiences, although many in these audiences will retain only part of what is broadcast in any programme.

Information that is presented on the radio must, therefore, be easily understood, concise and accurate.

Many local radio stations broadcast local current affairs programmes and news bulletins, which present items of general interest to the community (without charge). In addition, a radio station may run 'community programmes' that could be suitable for census publicity. Area Managers should contact the local radio station(s) and determine what is available.

A radio station may offer you the facility of either a 'talk back' off-line or an on-air 'talk back' show. (The difference between the two types of 'talk back' is that in the off-line show requests for information are received from listeners at the start of the show and are answered at intervals during the show. This gives the participator time to prepare accurate and relevant responses, rather than making the instant replies required in the on-air show.) On-air shows are difficult to handle and, accordingly, Area Managers must NOT participate in them. Senior officers of the department will visit the major centres of New Zealand just prior to the census and any 'talk back' shows available may be tied in with these visits. Regional Controllers may be required to participate in these programmes.

Off-air inquiry lines were provided by an Auckland radio station in 1981 and produced an excellent public response. Similar arrangements should, therefore, be investigated for 1986. It is anticipated that both Area Managers and Regional Controllers would become involved in these, possibly in conjunction with departmental officers.

2. Use of Regional Television Programmes

Regional news presenters can be approached to provide interviews or direct filming of the enumeration of a particular area. Care must, however, be taken to ensure the privacy of the public and confidentiality is not breached.

3. Use of Local Press

Local daily newspapers may provide you with publicity outlets in the form of articles or interviews about the census. Many communities publish their own weekly newspaper, which is usually distributed free of charge to every household.

You may be able to arrange to have items on the Census, such as a photograph of local Enumerators or the local Supervisor, published in these newspapers before and/or after census date.

NOTE: Advertising on any basis other than free is to be arranged by the Department of Statistics or the Regional Controller.

4. Talks to Clubs, Schools, PTA's, etc.

Talks to groups in your area, will be of varying success in terms of making the public aware of the Census. For example, contact with service clubs (i.e. Rotary, Lions, Jaycees, etc.) will probably be of minimal value as support for the census although they will be of general interest to such clubs, since they usually consist of well-informed people who would be aware of the census.

Talks to local community groups will likewise differ in their worth, and, because of time restrictions, you may have to be selective as to which groups you address. The use of visual aids, flip-charts, over-head projectors and transparencies, diagrams, and graphs, (any of those which are used in training field staff, and are appropriate, could be used) will be to your advantage when giving talks.

Area Managers' reports on 1981 publicity, praised talks to schools - mainly Primary Schools - as a means of improving communication with parents, particularly in localities where the main language spoken at home was not English.

5. Supply of Posters, Notices, etc.

It is intended to provide Area Managers with supplies of 2 types of census posters - a 'Glossy' advertising poster (with photographs): the other in 'Notice' format, advising where assistance can be obtained. Area Managers may also wish to prepare their own notices for use in particular venues. Supplies of Census stickers and small stick-on labels will also be available for distribution.

A variety of community and business premises can provide outlets for display, including: (i) 'Glossies' - schools, universities, railway stations, airports, polytechnics, town halls, community centres, banks, large retailers, picture theatres, sports complexes, commercial premises, and malls. (ii) 'Notices' - Post Offices, Government Departments (especially Labour, Social Welfare, Inland Revenue), Housing Corporation, libraries, churches, hotels and motels, Inquiries Offices, Area Managers Offices, hospital/doctors/dentists waiting rooms, town notice boards, club rooms, major workplaces. As a general principle, advertising posters should be displayed where people pass them but do not always stop to study their detail. 'Notice' format posters should be in places where people have time to read them in detail and note the designated contacts and their telephone numbers.

NOTE: The provision of Notices to Post Offices should be carried out by Census Supervisors in conjunction with their delivery of extra questionnaires to Post Offices.

6. Liaison with Ethnic Organisations

Departmental officers will be holding discussions about our census requirements with prominent Maori and Pacific Islander organisations at a national level, and it is important that these be followed-up at the community level by Area Managers. A list of influential persons in these groups will be forwarded to Area Managers at a later date, together with suggested areas of discussion, i.e. staff recruitment; interpreters; talks to local groups; provisions for additional assistance in completing questionnaires.

Other ethnic associations (Vietnamese, Cambodians, Greeks etc.) located primarily in the main centres, may also welcome the opportunity to make arrangements for the assistance of their members.

7. Liaison with Local Authorities etc.

Local Authorities may be able to provide you with assistance with publicity, for example, by making their local 'Information Centre' available to assist with local enquiries on the census - i.e. referrals for contacts, questionnaires, etc. Some Local Authorities produce an information letter that accompanies the regular Rates Bill, and you may be given the opportunity to include information on the census in such a letter.

The local branches of the Citizens' Advice Bureau could be contacted to enlist their assistance in supplying information on the Census to individuals with queries. You could arrange for them to hold the names and addresses of local contacts on census matters, and they could also be asked to provide basic information on the time and date of the census as opportunities arise.

8. Visits to Institutions

All institutions and group-quarters - hotels, motels, motor camps, work-camps, hospitals, prisons etc. - should be visited by either Area Managers or Supervisors prior to the start of Census Questionnaire delivery. (Circulars about the census will have been previously forwarded to most of these establishments.) In some instances, Area Managers may find it desirable to accompany their Supervisors on visits to the larger complexes.

9. Telephone Inquiry Centres

Census inquiry lines are being set up in each of the Department's offices in the 4 main centres - Auckland, Wellington, Christchurch and Dunedin. Staffed by departmental officers (as well as the resident Area Managers), these lines will provide an information service for approximately 50 percent of the population.

No free-dialling facility is planned, however, and inquirers from outside these areas will be catered for by the regular Area Manager and Supervisor office lines.

NOTE: For publicity purposes, all of the above offices have been designated 'Census Inquiry Centres'.

SECTION 4

ASPECTS OF CENSUS REQUIRED TO BE PUBLICISED

THE INFORMATION YOU PROVIDE SHOULD COMPLEMENT AND EXPAND ON THE MATERIAL PRESENTED IN THE NATIONAL CAMPAIGN. THIS WILL INCLUDE:

1. The Timing of the Census

'The Census is coming on 4th March.'

2. Enumeration Logistics

The basic features of Delivery and Collection; i.e. the fact that a Census Enumerator will be calling on every household to leave ONE DWELLING QUESTIONNAIRE, plus ONE PERSONAL QUESTIONNAIRE for each person who is expected to be in the dwelling on Census night.

It is important for the public to be aware that the Census enumeration, although actually taken at a 'point in time' on Tuesday 4 March, is spread over many weeks. Approximately two weeks before census date, Enumerators will begin to deliver census questionnaires and documents to every occupied dwelling in New Zealand. The collection of completed questionnaires will not, in most cases, be immediately following census night but up to 8 days after.

3. Field Staff Identities and Arrangements for Assistance

This aspect is especially important in 1986, now that the Post Office is no longer actively involved in the Census.

Publicity at the local level must include information on the official staff employed to conduct the Census (mostly about Supervisors and Enumerators), and who can be contacted, and where, with respect to Census matters. You are expected to pass on the names, etc. of local Supervisors to community newspapers who may be able to make some provision for census publicity in this respect.

As well as explaining the role of Enumerators, you should publicise the contacts for extra questionnaires - i.e. Area Managers, Supervisors, or Enumerators, - and that supplies of questionnaires are available at all Post Offices.

Publicity should also be given on the availability of the 'Language Leaflet' and the 'Household Leaflet' - the latter which will be delivered to all households. The Household Leaflet will carry the appropriate Supervisor's phone number, and all Area Managers' numbers.

4. Arrangements for Unforeseen or Unusual Circumstances

This may involve one of the following, or situations peculiar to a particular locality:

* households missed during delivery or collection;
* insufficient questionnaires left;
* aged, non-literate or disabled householders;
* travellers before/during/after census date;
* camping parties in inaccessible localities;
* dwellings empty on census night;
* non-English speaking households.

In general, during the DELIVERY phase, publicity should advise those respondents who have not received a questionnaire by midday on 3 March, 1986 to contact the nearest Supervisor (rather than their local Post Office). Supervisors will be listed in local newspapers in each region on Monday 3 March.

During the COLLECTION phase, publicity should be aimed at informing anyone who was not enumerated on Census night to make contact with a District Supervisor (or their nearest Post Office) to fulfil their Census requirements.

5. Census History and Background

Appropriate material will be provided in the Information Kit.

6. Confidentiality

The provisions made to protect the privacy of individual answers are an important aspect of the department's public relations programme. Publicity should cover the following points: that all questionnaires are confidential to the Department of Statistics; that employees engaged in census work must all sign the Declaration of Secrecy; that names and addresses, although collected, are not placed on computer files but are used to assist in determining family relationships; that the laws binding the Department to secrecy over-ride every other Act of Parliament. Confidentiality should be presented as more than a legal requirement, however: the Department's concern with strict privacy also reflects its determination to retain public confidence.

7. Legal Requirements

Publicity should highlight the legal obligation of respondents under the Statistics Act of 1975 to complete census questionnaires, viz:

(i) Every person in New Zealand at midnight of 4 March, 1986 is legally bound to obtain and complete a Census Personal Questionnaire (or to have a questionnaire filled out on their behalf).

(ii) The occupier or person in charge of a dwelling is legally responsible for completing and signing a Dwelling Questionnaire and for making sure that each person in the household at census date completes, or has completed for them, a Personal Questionnaire.

8. Other Stages in the Census Cycle

i.e. Planning; processing; publication. Appropriate material will be provided in the Information Kit.

9. Uses and Users of Census Statistics

Information kits will contain material about the ways in which information from each question is used. Practical examples of statistics' usage will also be provided.

Describing the use to which census data can be put by way of an example relevant to a local community, would be constructive. For example, you could explain how census data are incorporated in planning for new schools or new shopping centres, say, by analysing in a given area such factors as: the number of people, changes in the numbers between censuses and the likely growth in numbers in the future; the numbers of people in different age groups; family and household structures in the area, and other details.

10. General Progress in Delivery and Collection Phases

Statements from District Supervisors concerning the completion of either phase of enumeration in a particular LOCALITY are to be avoided - until the whole District has been canvassed. However, general statements on progress (for example, 'enumeration is proceeding smoothly'), help maintain interest in the local enumeration.

11. Post-Census Statement of Appreciation

At the end of the collection phase, an appreciation, on behalf of the Department of Statistics, may be announced to the public who co-operated with the census. You may make reference to the forthcoming release of results, but no figures are to be released by you until a 'News Release' is issued by the Department. Copies of the 'News Release' will be sent to the Area Manager following the department's checking of the Supervisors' summaries of population and dwellings. The copy will be forwarded to Area Managers through the appropriate Regional Controller's office.

SECTION 5

PREPARATION FOR THE LOCAL CAMPAIGN

THE MORE PREPARATORY WORK YOU CARRY OUT PRIOR TO THE PEAK PUBLICITY PERIOD (15 FEBRUARY - 10 MARCH), THE BETTER YOU WILL BE ABLE TO RESPOND TO DEMANDS FOR INFORMATION DURING THAT TIME.

* Make yourself known to local journalists, editors, club secretaries school principals, etc. in order to: establish census requirements, fix timetables for later publicity; establish yourself as a reliable source.

* Prepare in advance as much of the publicity material as you can. This includes speech notes, news releases, articles, notices, flip-charts, transparencies for overhead projectors, graphs and diagrams. (The Information Kit will provide you with information that can be used and modified.)

* In writing speech-notes, consider the most appropriate format for the particular group addressed, in terms of the level of technical information offered and the points of greatest interest to the audience.

Media Skills

The next Chapter of this Guide is devoted to techniques for obtaining the best value from activities involving the media. Training in media-communications has also been planned for both Regional Controllers and Area Managers.

As a general rule, you will find it helpful to familiarise yourself with the various approaches used by the local media, in presenting their material to their audiences. For example, an interview may be a low-key, information-giving exercise for a newspaper, or an interview-centred, high pressure interrogation for radio or television.

It is preferable that you pre-record question-and-answer sessions for the radio. If you are involved in live sessions, however, you should be fully aware of the question line to be pursued before participating in the session.

CHAPTER 4

HANDLING THE MEDIA

PREVIOUS EXPERIENCE HAS HIGHLIGHTED SOME IMPORTANT POINTS TO BEAR IN MIND WHEN DEALING WITH THE MEDIA. REMEMBER, AREA MANAGERS SHOULD NOT BECOME INVOLVED IN ON-AIR 'TALK-BACK' RADIO SHOWS. FOR ALL OTHER MEDIA INTERVIEWS AND CONTACTS, HOWEVER, THE FOLLOWING HINTS SHOULD BE HELPFUL.

In the case of interviews:

* check what the interview is about, and familiarise yourself with the subject;
* talk honestly and directly, being as factual and concise as you can: bear in mind that the colourful bits are more likely to be used;
* work out a priority list of what you want to say in an interview, you may only have five minutes to put your message across;
* re-emphasise the key points in an interview;
* make it very clear if something is 'off the record' but try and avoid such references;
* remember to ring and remind the media about an event nearer the date;
* use jargon and officialese as little as possible;
* don't fob reporters off if approached, or suggest someone else to do the interview if it is your responsibility to do it;
* don't answer immediately if you don't know the answer, don't be afraid to say you will get back to them with it;
* don't insist on knowing a reporter's exact questions - just ask about question line;
* don't overestimate how informed a reporter is - make sure they know the background;
* don't ever lie, and don't try to avoid questions;
* don't expect a story to be 100 percent favourable and/or accurate;
* don't blame a reporter for a headline, caption or editing;

In all other cases:

* work out how you can best expand on a press release for an interview;
* keep typed double-spaced news statements short, with your name and telephone number on them.

1986 CENSUS OF POPULATION AND DWELLINGS

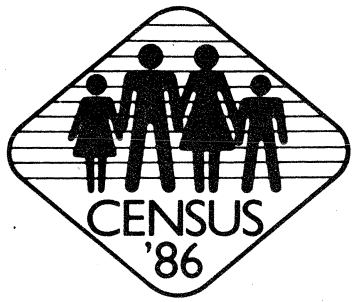
MEDIA ADVERTISING SCHEDULE

Times/Description	February											February/March							March																	
	20	21	22	23	24	25	26	27	28	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16											
	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S											
Television 6–10p.m.																																				
30 seconds (No. of Spots)	1	1	2		1		1			1		1	1																							
10 seconds (No. of Spots)		1	1		2		2		3	2		2	2																							
Community Service																																				
Radio – National																																				
46 Stations 6a.m.–7p.m.																																				
30 seconds (No. of Spots)	1	2	3			4		4		4			4																							
Community Service																																				
Newspapers																																				
25 Dailies 40cm x 6 col.							X			X			X																							
2 Sundays 40cm x 6 col.				X							X																									
1 Weekly 40cm x 6 col.						X																														
25 Dailies 30cm x 4 col.																								X												
(Thank-You Ad.)																																				

Source: Ogilvy and Mather Limited.

2. 1986年 센서스를 爲한 Media Kit

NEW ZEALAND CENSUS OF
POPULATION AND DWELLINGS TUESDAY, 4 MARCH 1986



Media Kit

Department of Statistics

NEW ZEALAND CENSUS OF POPULATION AND DWELLINGS

4 MARCH 1986

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GENERAL FACTS ABOUT THE 1986 POPULATION CENSUS

Introduction

The 28th five-yearly Census of Population and Dwellings is to be taken on Tuesday, 4 March 1986.

The Department of Statistics will count everyone present in New Zealand at midnight on that day. New Zealanders who are temporarily overseas on census night are not counted; overseas tourists visiting this country are counted.

A questionnaire will also need to be filled in for each dwelling which is occupied on census night.

The Need for a Census

The census is needed to provide up-to-date facts about the country's largest asset - its people. It provides the only complete and regular stock-taking of population and dwellings in New Zealand.

Only by means of a census can the characteristics of all persons and dwellings be recorded at a single point in time across the entire country.

Statistical information from the 1986 Census is needed by Government. A precise knowledge of the present and future composition of the population is basic to the implementation of national policies e.g. education, health, employment, energy, transport, social welfare, recreation and housing. Census data by geographical area are crucial to decisions about new school construction and the siting of hospitals; the provision of postal and telephone services; highways; extensions to airports, bus and rail services, to name but a few applications which affect everyday life.

Since 1887 the electoral function of the census has remained the same. Small area population counts provide the basis of the redrawing of the country's Electorate Boundaries so as to ensure equal representation in Parliament.

Local and regional government draw on information from the census when establishing priorities for their regions. Census figures are the basis for grants to community programmes, sports and recreational funding.

From suburban stores to national corporations, New Zealand business firms rely on census statistics for insight into future markets for a wide range of goods and services.

Census data can be very helpful to community groups seeking finance for new facilities or in campaigning for or against particular projects.

Demographers, economists, sociologists, students and other professional researchers must have access to facts on which to base their analyses of various trends and events, which in turn improves our understanding of changes within society.

Census Questionnaire Content and Submissions

Questionnaires are updated each census to meet the changing needs of New Zealand's society.

Submissions on the content of the 1986 Census were received from 125 organisations and persons. Each submission was carefully evaluated to assess whether the population could be expected to provide the information to an acceptable level of accuracy. The proposed statistics also had to have significant community value and be of a nature not to promote unfavourable public attitudes to co-operation in the census generally.

Some of the questions must by law (Statistics Act 1975) be included in every census - while optional questions are asked at the Government Statistician's discretion.

Most of the topics covered by the 1986 Census questionnaire were also included in the previous census. However, there are fewer topics in both the Dwelling and Personal questionnaires, these having been reduced by seven and four respectively.

Fewer questions and improved questionnaire layout will result in the public needing less time to fill in their questionnaire. About two-thirds of all questions will be answered by ticking the appropriate box, while the remainder only require a few words or numbers.

The 1986 Population Census questionnaires have been developed using the most exhaustive assessment procedures of any census to date and it is expected they will lead to a very high level of correct and fully completed questionnaires.

Field Organisation and Field Staff Recruiting

During the census operation, the Department of Statistics employs some 5,000 temporary field staff.

Initially, three Regional Controllers are appointed to direct the census operation in their broad regions. Also appointed at this time, are three Regional Training Officers who provide specialised instruction to staff.

A further team of 14 Area Managers co-ordinates the census operation in their particular areas of New Zealand.

A temporary workforce of 190 Census Supervisors and 4,600 Enumerators, are recruited throughout New Zealand. Each Supervisor works out of one of 160 centrally-located Census Offices, and is in charge of approximately 25 Enumerators, who are themselves responsible for distributing and collecting questionnaires in their local district.

The remainder of the temporary workforce is made up of Special Enumerators (for large hospitals, hotels, etc.), interpreters for the Maori and Pacific Island Polynesian communities, and clerks.

All field staff visiting dwellings at census time wear an official badge, identifying them as census officers. On the reverse side of the badge is a Certificate of Authority bearing their name.

Census Publicity Campaign

A national publicity programme, using TV, radio and newspaper advertisements starts just prior to the time of questionnaire delivery. It will be supplemented by a range of promotional activities conducted at community level, including the display of posters, contact notices and bus posters. A school teaching programme will also be conducted throughout New Zealand during February.

Various other measures being used to increase public understanding of the nature and purpose of the Census, include the availability of interpreters; the recruitment of staff belonging to ethnic populations, and publicising of the Telephone Enquiry Service which operates out of the Census Offices. Senior staff of the Department will cover all regions of the country talking to community groups and participating in media interviews during February.

Enumerators will also leave a leaflet at every dwelling explaining the main reasons for the census. They are also equipped with a multi-language leaflet on the census in each of the major Pacific Island languages and NZ Maori.

The Enumeration Exercise

Each household receives census questionnaires in the fortnight prior to 4 March 1986, and is asked to answer the questions on the evening of the 4th. The questionnaires are delivered and picked up by the Enumerators.

At least two questionnaires are delivered to every household; one contains questions about the dwelling, and one or more, depending on the number of people living there, contains questions about the occupants themselves. Each person in the dwelling answers his or her own Personal

Questionnaire, while one person in each dwelling answers the Dwelling Questionnaire.

Questionnaires for small children and sick or handicapped people, are answered on their behalf by another occupant of the dwelling.

If a household has not received census questionnaires by midday on Monday 3 March, they should contact either their local Census Supervisor or call at the nearest Post Office for these. Supervisors names and offices are published in the Public Notices column of newspapers on Monday 3 March.

If after several calls to collect questionnaires, the Enumerator is unable to find anyone at home, an addressed envelope is left at the dwelling, and the householder can post the questionnaires back to the local census office.

Confidentiality of Census Statistics

The Statistics Act 1975 protects the confidentiality of census answers. Only census employees can see an individual's replies- and they must sign a Declaration of Secrecy. In the history of the Department of Statistics, no census employee has ever been charged with a violation of the law. No other Government department, or any court of law, has the power to obtain census information about individuals, for whatever reason. Census statistics are only published for population sub-groups, so as to prevent identification of individuals.

All census procedures are designed to avoid situations which could lead to confidentiality being broken. Enumerators are generally assigned to areas away from their own neighbourhood, and persons may seal their Personal Questionnaires in an envelope for greater privacy, also, names and addresses are never allowed to be entered on any computer.

Output of Census Statistics

Four weeks after the census, the first of the 1986 population counts will be released to the public. During the succeeding weeks more detailed

population and dwelling counts for counties, cities, and other local authority areas will become available. In July 1986, the first information about specific topics - such as the birthplace, age, and marital status of the population - will be published. From then on until the middle of 1988, census data will continue to become available in the various census reports.

The Department of Statistics will publish an estimated 5,500 pages of 1986 Census statistics both at a national and geographical level which will be available also on microfiche and computer tapes.

Where information is sought that is not available from existing published data, the Department of Statistics provides the facilities for users to select and programme their own census statistics tables. However, the Department does not allow the computer tapes containing records of individuals to be examined by anyone outside the Department. All processing of additional information is carried out by departmental staff, and clients see only the resulting statistics.

WHY DO WE NEED A CENSUS?

New Zealand is a free country, where we can live, travel and meet without controls on our behaviour. Because of this, the census is needed to provide up-to-date facts about the country's largest asset - its people. This information which is required to assist us in planning for our future, is obtained from the only complete and regular stock-taking of population and dwellings in New Zealand.

As long as New Zealanders continue to have families, occupy a home, go to school, work, travel, get sick, grow old and die, then a census is required to help plan the future need for new houses, schools, factories, transport services, hospitals and welfare services for the aged.

The census also indicates how many carpenters, teachers, machinists, drivers, doctors, nurses and professional and voluntary community workers need to be trained.

In order to provide the goods and services that people use, we have to know where people are and what they need. The answers you give to the census questions will help build up a picture of each community so that these future needs can be provided for.

Major users of census information include: business firms and corporations, central government, local and regional authorities, community groups, professional researchers and students.

All these organisations and individuals require reliable information on which to base policies, plan for the future and improve our understanding of changes within society.

1986 POPULATION CENSUS PUBLICITY CAMPAIGN

National Publicity

The success of the 1986 Census of Population and Dwellings depends heavily on public awareness of the survey and their willingness to participate.

To achieve this, considerable emphasis has been placed on developing an effective advertising and public relations campaign.

The campaign will make all New Zealanders aware of the purpose of the census and their responsibility to complete the census questionnaire.

It also highlights the importance of the census as an information source in preparing for the future growth and development of the country, so that the public can appreciate the benefits of their participation in the census.

To communicate these objectives the Department has employed the services of Ogilvy and Mather, who have prepared a comprehensive national advertising campaign using all the major media.

Radio advertising will feature multi-language versions of our census advertising message to ensure people of all cultures understand the importance of this event and their obligation to participate. Advertising on radio will begin on 20 February 1986 two days before the distribution of census questionnaires commences.

Television advertising will also commence on 20 February 1986 and continue until census night. The focus of this advertising will be the importance of every individual's contribution to New Zealand's wellbeing.

The importance of the census in planning for the future will also be featured.

Advertising in newspapers will explain people's statutory obligations and also cover areas such as confidentiality of information, privacy and reasons why a census is necessary. It will commence on 23 February in the Sunday newspapers.

A 30 minute film, made in co-operation with TVNZ, is to be screened close to census night. It will cover the census from many aspects, from questionnaire design and field operations to the processing of information and the production of statistics for their ultimate users.

An explanatory brochure will accompany all census questionnaires delivered to households. Those households requiring assistance in a language other than English will be supplied with a leaflet about the census which is written in other languages.

Awareness posters and contact notices will be displayed in local authority offices, libraries, schools, Government departments, community centres, hospitals, the workplaces of major employers, business houses, etc. Also, specially designed posters will be displayed in municipal buses.

Arrangements have also been made for stickers incorporating the census logo to be carried on rental cars and the vehicles of enumeration personnel. A stick-on label with the census logo will be made available to every primary and secondary school child.

The Department of Education is producing classroom teaching units - for both primary and secondary schools - using a census theme.

Two national news conferences are planned - for 13 November 1985 and early February 1986 - the venues to be in Wellington.

In February, senior departmental staff will tour the country participating in regional and local media activities - including talkback programmes and interviews with the local news media.

Local Publicity

Local publicity activities will involve the production of articles and interviews with the local media, and talks to community and service groups, and schools. Posters, notices and stickers will be distributed through the local network by Ditrict Supervisors. Liaison activities with ethnic organisations, institutions and local authorities will also take place with local census operations staff.

CENSUS LOGO AND SLOGAN

The logo for the 1986 Census of Population and Dwellings was produced by the advertising agency, Ogilvy and Mather.

It is a diamond-shaped design consisting of four persons with hands joined; a representation of a family group.

The colours of the logo - black figures and letters on a white background with a red border and horizontal lines - depict the ethnic diversity of New Zealand.

Market research was used to help choose this logo from a series of draft designs.

Opinions on this logo obtained from the public were that:

- It shows unity and togetherness in the New Zealand family and represents all the family.
- The average person belongs to a family.
- It involves the total population.
- The colouring and shape were appealing.

A number of slogans were designed for field testing by Ogilvy and Mather, with opinions on the alternatives being obtained from the same market research test.

The slogan adopted is "We all count for New Zealand".

This was considered the best slogan in that:

- It presented the idea that every one of us is involved in the census.

- The theme of unification is evident, i.e. we are all important to New Zealand.

- Everybody benefits now and in the future - men, women and children.

The Department of Statistics is confident that both the logo and the slogan will help promote awareness of the census.

1986 POPULATION CENSUS QUESTIONNAIRE TEST PROGRAMME

The testing of the questionnaires for the forthcoming Census of Population and Dwellings to be conducted on Tuesday 4 March 1986 was the most extensive ever carried out for a census by the Department of Statistics.

Several thousand New Zealand households played a key part in deciding the content of the Personal and Dwelling questionnaires for this five-yearly census. During the period from August 1983 to November 1984, some 3,500 families, and other households participated in a series of eight questionnaire tests.

The tests were held to show whether any proposed questions were ambiguous or confusing, and whether information of the required accuracy could be obtained from a particular question wording. The tests also indicated whether individual questions might be viewed as infringing too far on the privacy of the public.

Two pilot tests involved the completion of full personal and dwelling questionnaires by those surveyed and were effectively a dress rehearsal for the census proper. The other six pre-tests were of short questionnaires in which up to six selected questions were tested, with follow-up interviews with respondents to pinpoint problems in the correct understanding of the questions and the ability to supply the relevant information.

The tests were conducted in selected towns and rural areas. These areas were carefully chosen to ensure that a statistically representative cross-section of the community was surveyed.

The improvements to the questions that resulted from such testing should help make answering census questionnaires easier for the public and provide users with more timely and accurate information.

CRITERIA FOR ASKING QUESTIONS IN THE 1986 POPULATION CENSUS

The needs of information users and the interests of the public determine what questions are included in the 1986 Population Census.

Each census, questionnaires are updated to meet the changing needs of New Zealand's society. Census questions need to be simple enough for people to answer in a reasonably short time, and are most effective for collecting information that people can give accurately from memory. No questions are included which unduly invade the privacy of the individual.

The Census of Population and Dwellings is taken under the authority of the Statistics Act 1975, which states that the name, address, sex, age and ethnic origin of every person in New Zealand and the location, number of rooms, type of ownership, and number of occupants of every dwelling, must be included in each census.

Optional questions are included in the census at the Government Statistician's discretion.

The judgment as to whether particular questions should be included or deleted from the census depend on:

- How easily and quickly the question can be answered.
- How accurate the information will be.
- How many questions are needed.
- What use is the information to the community.

- How sensitive will the public find the question, and will there be a negative reaction.

- Are there better ways of getting the information.

- Does the question apply to enough people to justify its inclusion in the census.

In deciding on the suitability of questions, possible users of the information were consulted. Those questions that justified testing the public response were included in one of the six questionnaire tests carried out in 1983 and 1984. The final constraint is the size of the printed questionnaire, which limits the total number of questions that can be asked.

The 1986 New Zealand Population Census questionnaires have been developed using the most exhaustive assessment procedures of any census to date, and it is expected they will lead to an even higher level of correct and fully completed questionnaires in 1986 than in previous censuses.

OUTLINE OF THE '1986 CENSUS QUESTIONNAIRE CONTENT AND SUBMISSIONS REPORT'

The '1986 Census of Population and Dwellings Questionnaire Content and Submissions Report' - the first in a series of six Information Reports to be published by the Department of Statistics - is due for release during November.

It will provide details of the procedures adopted by the Department in selecting the topics to be included in the 1986 Census Personal and Dwellings Questionnaires.

A comprehensive coverage of all aspects of the questionnaire design exercise involving:

- the call for submissions;
- the evaluation of submissions;
- the evaluation criteria;
- field testing of questionnaires and question format options;

is given in this report.

The Appendices in the report contain a list of sponsors of submissions, topics included in each census from 1951 to 1986 and copies of the 1986 Census Questionnaires, and submission forms.

1986 POPULATION CENSUS FIELD ORGANISATION AND RECRUITMENT OF FIELD STAFF

Introduction

In order to count over three million people and one million dwellings at the same time, the Department of Statistics must mount a large scale field operation simultaneously in all parts of the country.

This operation involves the distribution of questionnaires to every person and dwelling in New Zealand and the subsequent collection of the completed questionnaires.

Enumeration Areas

The first task in planning the field operation is to divide the country into some 4,600 small areas known as sub-districts. The boundaries of each sub-district must be clearly recognisable on the ground and must coincide with the boundaries of local authority areas.

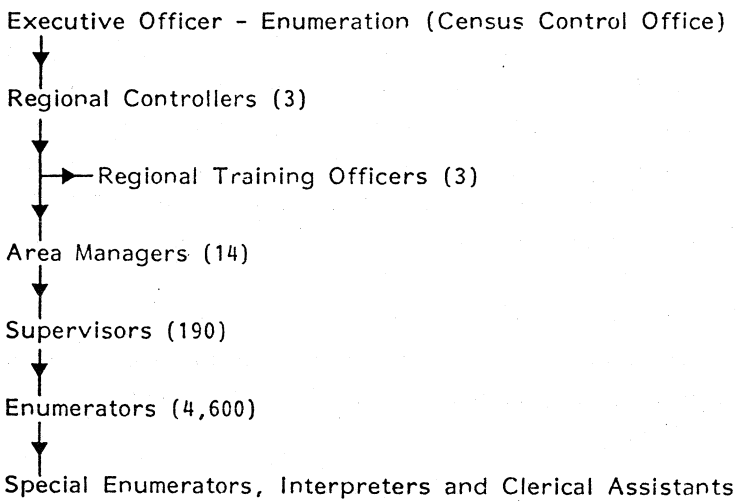
The size of each sub-district varies considerably, and is based on the number of dwellings an Enumerator can handle in 10-12 days. On average, a rural sub-district will contain 150-250 dwellings and an urban sub-district 250-350.

Because almost half the population shifts house between censuses, sub-district boundaries are reviewed prior to each census. The 1986 Census boundaries were drawn on the basis of 1981 Census population and dwelling counts, but take into consideration new housing and demolitions since 1981, so that Enumerator workloads remain roughly equal.

The Census Field Staff

A large temporary workforce, some 5,000 in all will be recruited around New Zealand for the 1986 Census field operation.

The following chart explains the field staff organisation structure:



First, three Regional Controllers - two in the North Island and one in the South Island - are responsible for directing the census field operation in their broad regions. The three Regional Training Officers undertake the training of Supervisors. A team of 14 Area Managers is appointed to co-ordinate the field activities in their districts. They are responsible for administrative functions. Each of the Supervisors is responsible for training approximately 25 Enumerators appointed to his or her district and for supervising their work.

The appointed Enumerators carry out the task of delivering questionnaires to, and collecting from households in their sub-districts.

The Recruitment of Census Field Staff

All temporary census field staff are recruited from among the general public.

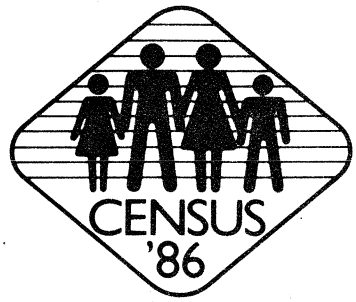
The campaign to fill the 4,600 Enumerator posts will commence in December 1985 and final appointments will be made in early February 1986.

Supervisors will be looking for active people as Enumerators. They will need to be in good health and have the stamina to deliver and collect questionnaires at 200-300 dwellings. Clerical experience and the ability to understand and apply the detailed instructions they receive during training will be necessary. Maturity and responsibility are also required qualities, particularly in view of the confidential and public nature of the work.

When appointed, census officers sign a Declaration of Secrecy, binding them to keep private any information in the questionnaires.

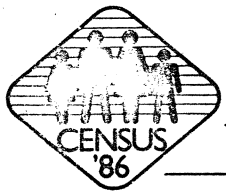
3. 1986年 센서스를 爲한
Supplementary Information

NEW ZEALAND CENSUS OF
POPULATION AND DWELLINGS TUESDAY, 4 MARCH 1986



Supplementary Information

Department of Statistics



NEW ZEALAND CENSUS OF POPULATION AND DWELLINGS

4 MARCH 1986

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5. CONFIDENTIALITY OF POPULATION CENSUS INFORMATION
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9. BASIC POPULATION COUNTS ARE ALREADY AVAILABLE

CENSUS JUSTIFICATION

Question: "Why do we need a Population Census?"

Answer: THE FIVE-YEARLY CENSUS OF POPULATION AND DWELLINGS IS NEEDED BECAUSE PEOPLE CHANGE - THEY MOVE HOUSE, MARRY, HAVE CHILDREN, DIE, AND BEGIN OR STOP WORKING.

THESE CHANGES AFFECT WHERE SCHOOLS, HOSPITALS, ROADS, DRAINS, SHOPS AND MANY OTHER SERVICES ARE NEEDED, AND ONLY A REGULAR STOCK-TAKING OF THE COUNTRY'S LARGEST RESOURCE - ITS PEOPLE, MEASURES THIS ACCURATELY.

- The results from the census are used to:
  - define problems
  - measure needs
  - formulate policies
  - allocate resources
  - monitor progress
  - predict future needs.

- They do all these things by providing up-to-date facts about society. How many people live in each town, city or rural area? And what kind of people are they? - young or old, married or single, two or one parent families, unemployed or working?

- Census material is used by central government, local authorities, manufacturers, retailers, trade unions, charities, community groups and students - among others.

- For government and local councils, the facts are the basis of planning for essential services like new schools, hospital beds, public transport, pensioner housing, welfare assistance.

- They are essential in establishing priorities for services, e.g. hospitals, and where facilities should be placed to benefit the people who most need them.

- And since it takes time to set up such services, planners must take the future population into account. Census facts allow predictions to be made - such as the number of children entering schools in 10 years time.

- The same information which is used by government to identify needs, can be used by companies to help them decide where to build a new factory or store, or whether to market a new product.

NAMES AND ADDRESSES

Question: "Why do I have to give my name and address?"

Answer: YOUR NAME AND ADDRESS IS USED FOR STATISTICAL PURPOSES ONLY. IT ENSURES THAT:

- EACH DWELLING AND EVERY PERSON IN IT HAS BEEN COUNTED, AND COUNTED ONLY ONCE.
- ANY INFORMATION MISSING FROM YOUR QUESTIONNAIRE CAN BE OBTAINED BY THE ENUMERATOR THROUGH PERSONAL CONTACT.
- WHEN QUESTIONNAIRES ARRIVE AT THE PROCESSING CENTRE PEOPLE PRESENT IN THE DWELLING CAN BE CLASSIFIED INTO FAMILY GROUPINGS.
- ANSWERS MISSED OFF THE QUESTIONNAIRE MAY BE DERIVED AT THE PROCESSING CENTRE, E.G. 'SEX' CAN OFTEN BE ESTABLISHED FROM 'NAME'.

- Although every dwelling is given a separate identity number, any errors which were made in allocating these numbers would be impossible to correct unless there was a record of its actual street location.
- The classification of people into family groupings is especially important where there is more than one family in a dwelling.
- Finally, the Census questionnaire is a legal document, and the name ensures that a person has completed a form as the law requires.

INVASION OF PRIVACY

Question: "Why are many census questions so personal?"

Answer: TO ANSWER ANY QUESTION ABOUT OURSELVES INVOLVES REVEALING PERSONAL FACTS. BUT TO OBTAIN ANY INFORMATION ABOUT THE SOCIETY WE LIVE IN, THE CENSUS HAS TO ASK QUESTIONS ABOUT PEOPLE - THAT'S WHAT THE CENSUS IS ALL ABOUT.

- No question is asked unless there is a proven use for the information it provides - a use which benefits a wide section of the population.
- The statistics we produce are about different groups in society, and one person's answers can't be identified from the statistics. However, we need every person's co-operation if we are to produce accurate statistics.
- Everyone in New Zealand on 4 March 1986 has to provide the same information as you.
- The personal nature of the questions is the reason why the Department of Statistics places such emphasis on keeping the supplied answers confidential.
- Remember, the information collected is for statistical purposes only.

CONFIDENTIALITY OF QUESTIONNAIRES

Question: "Will Enumerators keep what they see on the questionnaires confidential?"

Answer: YES. EVERYBODY WHO WORKS ON THE CENSUS - AND THIS INCLUDES THOSE WHO DELIVER AND COLLECT THE QUESTIONNAIRES - IS BOUND TO SECRECY. THE STATISTICS ACT FORBIDS YOUR CENSUS RESPONSES BEING DISCLOSED TO ANYONE OUTSIDE THE DEPARTMENT OF STATISTICS, AND EVERY EMPLOYEE MUST SIGN A LEGAL DECLARATION OF SECRECY BEFORE STARTING WORK.

- The law provides severe penalities for anyone who reveals personal information. But the Department of Statistics is proud of the fact that it has never had to prosecute an employee for breaking confidentiality.

- Where possible, we assign Enumerators to areas away from where they live. This lessens the chances of their knowing the households they have to visit.

- But, because we recognise that people may still feel uncomfortable about giving their census papers to a local resident, we permit people to seal their Personal Questionnaire inside an envelope before handing it over. The envelope then goes directly to the District Supervisor. Only the District Supervisor will see the questionnaire before it reaches the Processing Centre in Christchurch.

CONFIDENTIALITY OF POPULATION CENSUS INFORMATION

Question: "How do I know my answers won't be passed on to another person or department?"

Answer: ALL THE ANSWERS GIVEN IN THE CENSUS ARE CONFIDENTIAL, AND NO OTHER GOVERNMENT DEPARTMENT HAS THE POWER TO OBTAIN A PERSON'S CENSUS FORMS - FOR ANY REASON. THIS INCLUDES INLAND REVENUE, THE POLICE DEPARTMENT, THE COURTS AND SOCIAL WELFARE.

- Your privacy is guaranteed by law. Under the Statistics Act of 1975, the disclosure of information in any manner which would identify any specific person is prohibited. Access to individual questionnaires is limited to only those persons who have sworn a Declaration of Secrecy. This means that personal information is only available to authorised persons.

- To make absolutely sure, all the personal records which the department keeps are anonymous records - no names or addresses are put into the computer. So nowhere on the computer is information held which could link your personal answers to your identity.

THE INFORMATION IS AVAILABLE ELSEWHERE

Question: "Why is the taxpayers money wasted on a census when most of the answers can be obtained from other Government Departments?"

Answer: ONLY THE CENSUS COLLECTS THE WIDE RANGE OF COMPLETE INFORMATION NEEDED AT A GIVEN TIME. FOR EXAMPLE, THE INCOMES OF PEOPLE IN DIFFERENT AGE GROUPS OR THE NUMBER OF HOURS WORKED BY WOMEN WITH PRE-SCHOOL CHILDREN BY FAMILY INCOME.

o It's true that most other government departments hold administrative records about people, BUT:

- Few collect information about the whole population. (For example, the Inland Revenue Department does not require tax returns from those with incomes under $11,500; the Labour Department does not concern itself with the employment activities of sole proprietors or farmers.)

- Many of the records may be out of date (especially where people have only occasional contact with government agencies).

- Most departments ask only a few questions on their special interest (for example, the Inland Revenue Department does not ask taxpayers age; the Labour Department collects no information on working spouses or number of dependents).

Even if all administrative records could be linked together by some means, they would not substitute for the census. Pooling of information between government departments is carried out in some countries, but in New Zealand many departments are forbidden by law to pass on personal information they have received from the public - just as the Statistics Department is.

Using administrative records to replace the census would involve assigning a compulsory identification number to every New Zealander, from birth onwards. Many people would see this as too great an enfringement of personal liberty.

OVERSEAS CENSUSES

Question: "Why don't other countries ask personal questions?"

Answer: THEY DO. THE QUESTIONS ASKED IN MODERN CENSUSES ARE VIRTUALLY THE SAME IN EVERY DEVELOPED COUNTRY. THIS IS A REFLECTION OF THE FACT THAT ALL GOVERNMENTS NEED CERTAIN BASIC INFORMATION ABOUT THEIR SOCIETIES TO HELP THEM PLAN FOR THE FUTURE.

- In fact, the New Zealand Census asks fewer personal questions than almost all other countries.

- During the 1980-81 round of world censuses, for example, the United States asked 46 questions of every person; Canada asked 36 and Australia, 34. The New Zealand Personal Questionnaire had only 29 questions.

- Questions common to most countries include name, age, sex, marital status, relationship, ethnic origin, birthplace, present and past address, income, hours of work, industry, occupation, workplace, education, and method of transport to work.

- The New Zealand 1986 Census Personal Questionnaire contains four fewer questions than in 1981. In contrast Australia intends to retain the same number of questions in its 1986 Census questionnaire.

ONE OCCUPIER

Question: "Why does the Department still insist on one 'occupier', when many homes are jointly-owned by husband and wife?"

Answer: BY RESTRICTING THE 'OCCUPIER' TO ONE PERSON ONLY, A SINGLE 'REFERENCE PERSON' IS ESTABLISHED TO WHOM EVERYONE ELSE IN THE DWELLING CAN THEN STATE THEIR RELATIONSHIP.

- For some people, the Relationship-to-Occupier question is already the most difficult of all census questions.

- Allowing a couple to report themselves as joint-occupiers could cause serious confusion for other people sharing the dwelling, since they would have to state their relationship to each 'joint-occupier'. (In New Zealand, 100,000 families share their home with others.) Family statistics are used by many users of census data, and the occupier is a critical person in defining families.

- Both the 'occupier' question and the question on 'relationship to occupier' are mainly asked for processing purposes.

- By combining the 'relationship to occupier' answers with others, such as Name, we can work out the family's structure; for instance, whether it is a one-parent or two-parent family; or whether there are several generations living in one dwelling.

- Finally, there is the legal aspect of the question. By law, one person in the dwelling must take responsibility for seeing that the dwelling questionnaire is completed and that everyone in that dwelling fills out a personal questionnaire. That person is termed the 'occupier'.

BASIC POPULATION COUNTS ARE ALREADY AVAILABLE

Question: "Why is it necessary to count us every five years when we know how many people there are from births, deaths and migration statistics?"

Answer: BIRTHS, DEATHS AND MIGRATION STATISTICS ALLOW US TO ESTIMATE HOW THE POPULATION HAS CHANGED IN NUMBER IN BETWEEN CENSUSES. THE LOCATION OF PERSONS WITHIN NEW ZEALAND, AND HOW THEY LIVE TOGETHER IN HOUSEHOLDS, IS OF CRITICAL IMPORTANCE TO REGIONAL POLICIES AND PLANS. ONLY THE CENSUS PROVIDES THIS.

- Births, deaths and especially external migration statistics are subject to various errors which over time reduce the accuracy of national population estimates. It, therefore, becomes necessary to obtain regular census population counts as a base for estimation.

- There is no way of estimating the population in regions of the country with certainty. This is because there is no record of the total numbers of people who move house (i.e. migrate internally).

- Households change, as families grow and people die, marry, separate and have children. These changes in households are critical to local planning, and are only available from a census.

4. 1986年 센서스調査票

Department of Statistics

CENSUS 86 — We all count for New Zealand

New Zealand Census of Population and Dwellings

Tuesday, 4 March 1986

CS/00/03

District No.
Sub District No.
Meshblock No.
Questionnaire No.
For Office Use Only

Personal Questionnaire

The information you provide will remain confidential to the Department of Statistics

- A Personal Questionnaire is legally required to be filled in by or for every man, woman and child (including baby) living in New Zealand at midnight on 4 March 1986.
- This completed questionnaire will be seen only by employees of the Department of Statistics who have taken a statutory declaration of secrecy. The information you provide will be used for statistical purposes only and identifiable details about you or your household will not be disclosed to any other government department, organisation or person.
- This Census is taken under the authority of Section 23 (1) of the Statistics Act 1975.

S. KUZMICICH
Government Statistician

Please refer to the guide notes before you fill in this questionnaire

For each question, please either tick box ☐ *or enter number eg:* 4 *or print answer eg:* Surname or family name SMITH

Name

Surname or family name

First or Christian names

Address of where you are on Census night

- *DO NOT give P.O. Box or Rural Delivery numbers*

Street number and name

Suburb or rural locality

City or town or county

1 Where do you usually live?

1 Usually live at the above address

2 Usually live elsewhere in New Zealand at the address below

Street number and name

Suburb or rural locality

City or town or county

3 New Zealand resident with no fixed address

4 Usually live overseas

Please state country

2 How long have you lived at your usual address?

years *(If under 1 year write '0')*

3 Where did you usually live five years ago?

(at the last Census on 24 March 1981)

1 Same as usual address now

2 Lived elsewhere in New Zealand at the address below

Street number and name

Suburb or rural locality

City or town or county

3 Not alive 5 years ago

4 Lived overseas in March 1981

Please state country

4 Sex

6 Male

7 Female

5 Date of birth

day | month | 1 | year

6 What is your relationship to the occupier?

(the person answering the Dwelling Questionnaire)

01 I am the occupier

02 Husband or wife of occupier

03 Daughter or son of occupier

Other relative *(such as grandchild, mother-in-law)*

Please state

Not a relative *(such as flatmate, boarder, hotel guest)*

Please state

7 **What country were you born in?**

1 New Zealand
2 Australia
3 England
4 Scotland
5 The Netherlands
6 Western Samoa
7 Cook Islands
8 Other country *(such as Eire, India, Fiji)*

Please state

8 **If you were born overseas, how many years have you lived in New Zealand?**

| years *(If under 1 year write '0')*

9 **What is your ethnic origin?**

Tick the box or boxes which apply to you

(1) European 87%
(2) New Zealand Maori
(3) Samoan
(4) Cook Island Maori
(5) Niuean
(6) Tongan
(7) Chinese
(8) Indian
(9) Other *(such as Fijian, Tokelauan)*

Please state

10 **What is your religion?**

01 Anglican
02 Presbyterian
03 Catholic
04 Methodist
05 Baptist
06 No religion
07 Other religion *(such as Ratana, Hindu)*

Please state

08 Object to answering this question

- **Answer the remaining questions if you are aged 15 years or over**
  (that is, if you were born on or before 4 March 1971)
- **If you are under 15 years, answer no more questions, but please sign at the bottom of the back page.**

11 **What are your living arrangements?**

1 Living with legal husband or wife
2 Living with a partner as a couple *(de facto marriage)*
3 Living alone
4 Living with other persons *(such as parents, flatmates)*

Please state

12 **What is your present marital status?**

1 Never married
2 Married, first time
3 Remarried
4 Separated
5 Divorced
6 Widowed

13 **What Social Welfare payments have you received during the last 12 months?**

Tick the box or boxes which apply to you

(1) None
(2) Family Benefit
(3) Family Care
(4) National Superannuation
(5) Domestic Purposes Benefit
(6) Unemployment Benefit
(7) Sickness or Invalid's Benefit
(8) Widow's Benefit
(9) War Pension
(0) Other

Please state

14 What will be your income before tax for the year ending 31 March 1986?

Include income from all sources

- Wages, salary
- Social Welfare payments *(including National Superannuation)*
- Family Care, Family Benefit
- Interest, dividends, rent, commission
- Fringe benefits or income in kind
- Business or farming income *(less expenses)*
- Accident Compensation weekly payments
- Bursary, Scholarship
- Superannuation

01	Nil or Loss
02	$1000 or less per year (Less than $19 per week)
03	$1,001–$2,500 per year ($19 and less than $48 per week)
04	$2,501–$5,000 per year ($48 and less than $96 per week)
05	$5,001–$7,500 per year ($96 and less than $144 per week)
06	$7,501–$10,000 per year ($144 and less than $192 per week)
07	$10,001–$12,500 per year ($192 and less than $240 per week)
08	$12,501–$15,000 per year ($240 and less than $288 per week)
09	$15,001–$17,500 per year ($288 and less than $337 per week)
10	$17,501–$20,000 per year ($337 and less than $385 per week)
11	$20,001–$25,000 per year ($385 and less than $481 per week)
12	$25,001–$30,000 per year ($481 and less than $577 per week)
13	$30,001–$35,000 per year ($577 and less than $673 per week)
14	$35,001–$40,000 per year ($673 and less than $769 per week)
15	$40,001–$50,000 per year ($769 and less than $962 per week)
16	$50,001 and over per year ($962 and over per week)

15 How many hours of voluntary work do you do on a regular weekly basis?

- *For example, Meals on Wheels, sports administration, marriage counselling, Te Kohanga Reo*

1	Nil hours
2	1–4 hours per week
3	5–9 hours per week
4	10–14 hours per week
5	15 or more hours per week

16 What is your main work or activity?

01	Home duties—looking after children
02	Home duties—not looking after children
03	Full-time student
04	Retired
05	Unemployed
06	Paid job, business, farming or profession
07	Unpaid work in a family business
08	Other *(such as hospital patient)*

Please state

17 What is your highest school qualification?

1	No school qualification
2	School Certificate, 1 or 2 passes
3	School Certificate, 3 or more passes
4	6th Form Certificate, Endorsed School Certificate
5	University Entrance, Matriculation
6	Higher School Certificate, Higher Leaving Certificate
7	University Bursary, Scholarship
8	Other school qualification

Please state

18 What qualifications have you obtained since leaving school?

Tick the box or boxes which apply to you

⓪①	Still at school
⓪②	No qualification since leaving school
⓪③	Trade Certificate, Advanced Trade Certificate
⓪④	Nursing Certificate or Diploma
⓪⑤	Teachers Certificate or Diploma
⓪⑥	Technicians Certificate
⓪⑦	New Zealand Certificate or Diploma *(awarded by the TCA or AAVA)*
⓪⑧	University Certificate or Diploma below Bachelor level
⓪⑨	Bachelors Degree
⑩	Postgraduate Degree, Certificate or Diploma
⑪	Other qualification

Please state

19 **Did you look for paid work in the last 4 weeks?**

1 Yes — looked for full-time work

2 Yes — looked for part-time work

3 No — did not look for work

20 **Do you work in a job, business, farm or profession?**

6 Yes — working ► **Answer all questions 21 to 27**

7 No ► **Answer no more questions. Please sign box at bottom of page**

21 **In your work, are you . . .**

1 Working for wages or salary

2 Self-employed and not employing others

3 Employer of others in own business

4 Unpaid worker in a family business

22 **How many hours did you work last week?**

- *If on holiday, sick or absent for other reasons, state usual hours*

Hours worked last week in main job

and

Hours worked last week in other jobs
(If nil hours write '0')

23 **What is your present occupation?**

- *For example, builder's labourer, maintenance fitter, sheep farmer, primary teacher, general office clerk.*

In your work what are your main tasks or duties?

24 **Who do you work for?**

- *Please state name of business, firm, government department or other organisation*

25 **Where do you work?**

- *If street address is not known, give building name or shopping centre*

Street number and name

Suburb or rural locality

City or town or county

OR Work at home

26 **What is the main activity at your place of work?**

- **State fully**
  For example, public health nursing, video hire, shirt manufacturing, sheep farming.

27 **What is your main means of travel to work?**

Tick one box only

1 Public bus

2 Train

3 Drive a private car, truck or van

4 Drive a company car, truck or van

5 Passenger in car, truck, van or company bus

6 Bicycle

7 Motor cycle, power cycle

8 Walk

9 Other means

0 Work at home

Signature: I declare that the information I have given is true and complete as far as I know: *Sign here*

Guide to filling in your Personal Questionnaire

Department of Statistics

CS/00/04

New Zealand Census of Population and Dwellings

Tuesday, 4 March 1986

Notes:

- Do not fill in your questionnaire before 4 March 1986.
- Your completed questionnaire will be collected by the Census enumerator along with the other Census questionnaires completed by persons in this dwelling.
- If additional privacy is desired, you may hand your completed questionnaire in a sealed envelope to the occupier or the Census enumerator. Write your name and the questionnaire numbers on the outside of the envelope. The numbers are in the four boxes on the top right hand side of the front page.

Name and address on Census night

- Name and address are asked to make sure that all persons in each dwelling are counted once. Names are also used to allocate household members to a family group.
- Names and addresses are not recorded in the computer processing of Census statistics.
- If a baby has not yet been given a name, write 'baby' instead of first names.

The Questions

1 Where do you usually live?

- Indicate the address you have lived at (or plan to live at) for at least three months.
- If you have more than one New Zealand address, write the one where you spend the most time.
- Primary and secondary school pupils who board away from home and usually return home at the end of each term, should tick box 2 and write the usual address of their parent or guardian.
- If you are a university or tertiary student, trainee, or other person living away from home, give your present address if you have been (or will be) there for three months or more.
- If you usually live overseas, write the name of the country lived in.

2 How long have you lived at your usual address?

- Exclude temporary absences when estimating how long you have lived at your usual address.
- If your usual address is overseas, write '0' for this question.

3 Where did you usually live five years ago?

- If you are a New Zealand resident who was overseas at the last Census (on 24 March 1981) then:
  - — if you were absent for less than three months, write your usual address before you left New Zealand.
  - —if you were absent for more than three months, write the name of the overseas country in which you were staying at that date.
- If you are not a resident of New Zealand and you did not live in New Zealand on 24 March 1981, tick box 4 and write the name of the country you lived in at that time.

5 Date of birth

- Write the day, month and year you were born, in the boxes.
  For example, if you were born on 5 December 1942, you would write in the boxes as follows:

5	1 2	1 9 4 2
day	month	year

- If you cannot recall your exact date of birth, please write the year in which you were born. If this is not known, write your age at your last birthday alongside the question.

6 What is your relationship to the occupier?

- The occupier in a private dwelling is the person chosen to fill in the Dwelling Questionnaire.
- The occupier in a non-private dwelling is usually the proprietor, manager or other person in charge on Census night. He or she need not be living in the dwelling on Census night.

- If you are the de facto husband or wife of the occupier, tick box 02.
- If you are an adopted child or stepchild of the occupier, or a child of the de facto husband or wife of the occupier, tick box 03.
- If you are a flatmate, boarder, foster-child, visitor (not related to the occupier), paying guest in a motel or hotel, patient, inmate or a resident staff member, tick the 'Not a relative' box and write your relationship to the occupier in the space provided.

7 What country were you born in?

- Give the present name of the country in which you were born.

8 Years lived in New Zealand

- Count the total number of years you have lived in New Zealand. Leave out temporary absences.
- If you were born in New Zealand, do **not** answer this question.

9 Ethnic Origin

- If you have more than one origin, tick as many boxes as are necessary to describe your ethnic origin.

10 Religion

- You have a legal right not to answer this question, provided you tick the 'Object to answering' box.
- For children, tick the box or write the religion (if any) according to the way in which they are being brought up.

11 Living arrangements

- If you or your partner are temporarily away from your usual place of residence, answer this question as if you were both living at your usual address. Ignore any temporary absence which is due to a business trip, holiday, hospital stay, or similar reason.

12 Present marital status

- If you are single and have never been married, tick box 1.
- If you are legally married, that is you have signed a marriage certificate, tick box 2 or 3, as appropriate.
- If you are married, but permanently living apart from your husband or wife, tick box 4 whether or not you have a legal separation agreement or order.
- If your marriage has been dissolved, tick box 5.

13 Social Welfare payments received

- Payments received by one family member on behalf of other family members should be shown on the questionnaire of the person the payment is made to. For example, the Family Benefit is generally paid to the mother. This should be recorded on her questionnaire ONLY.
- If you receive an emergency benefit, tick the box for the benefit you have applied for. For example, if you receive an Emergency Maintenance Allowance, tick the box 'Domestic Purposes Benefit'.
- If you are unsure of the type of benefit you receive, tick the 'Other' box and describe the benefit.
- If you receive a pension from another country, tick the 'Other' box and write 'Overseas Pension'.

14 Income from all sources

- Income consists of money received from the sources listed in the question, as well as the assessed value of fringe benefits and payments in kind.
- DO NOT include housekeeping allowances, pocket money, board and other payments which you receive from members of your household.
- Include the income you have received since 1 April 1985 and estimate how much you will receive to 31 March 1986.
- Add the money you receive from all sources and tick the appropriate box.
- If you receive fringe benefits or income in kind, such as housing, board and goods or services supplied free by your employer, include the assessed value in your income estimate.
- DO NOT include lump sums you have received from Accident Compensation, superannuation funds, insurances, lottery wins or other such sources.
- If you receive income from overseas, convert it to New Zealand dollars.
- Include the total amount of National Superannuation payments you have received. The estimated total amount for the year ending 31 March 1986 would be

BEFORE TAX

	Per Year	Per Week
	$	$
Married (each person)	6,118	121
Single	7,478	148

- Unemployment Benefit is taxed before you receive it, unless you have dependent children. Include the before-tax amount in your income estimate.

15 Hours of Voluntary Work

- Voluntary work is unpaid work you do for a community organisation or privately, which will benefit persons outside your household or family.
- Estimate the average number of hours per week and tick the appropriate box.
- DO NOT include time spent doing housework in your own home.
- DO NOT include any time you spend working in a family business without pay or profit.

16 Main work or activity

- Tick the category which applies to your main work or activity.
- If more than one category is applicable to you, choose the one at which you spend the most time.
- If you regularly work without pay or profit in a family business, tick box 07.
- If you are a hospital patient, sickness beneficiary or invalid, tick box 08 and describe your situation.
- If you are on a temporary work scheme, such as PEP or VOTP, tick box 06.

17 Highest school qualification

- DO NOT include partially completed courses.
- If you have obtained a school qualification since leaving school, tick the appropriate box.
- If you have school qualifications from another country, tick the New Zealand equivalents. The following table may assist:

New Zealand School Qualification	Usual Age (Years) Qualification Obtained	Usual Years at Secondary School
School Certificate	15-16	3
6th Form Certificate, Endorsed School Certificate	16-17	4
University Entrance, Matriculation	16-17	4
Higher School Certificate, Higher Leaving Certificate	17-18	5
University Bursary, Scholarship	17-18	5

18 Qualifications obtained since leaving school

- Include all certificates, degrees or diplomas obtained since leaving school.
- If you obtained school qualifications since leaving school, tick the appropriate box in question 17.
- DO NOT include partially completed qualifications.
- If you have qualifications from another country, tick the New Zealand equivalent. If there is no suitable New Zealand equivalent, tick the 'Other qualification' box and write the qualification in full.

19 Did you look for paid work in the last 4 weeks?

- Looking for work means doing at least one of the following over the last four weeks:
  - — applying for a job (such as contacting an employer or answering a newspaper advertisement)
  - — contacting an employment agency
  - — contacting the Department of Labour's Employment Service
  - — placing an advertisement for work in a newspaper
  - — asking friends or relatives for a job.
- Full-time work is 30 hours or more per week.
- Part-time work is less than 30 hours per week.

20 Do you work in a job, business, farm or profession?

- If you work on a temporary work scheme such as PEP, answer 'yes' and complete questions 21 to 27.
- If you are an unpaid worker in a family business, answer 'yes' and complete questions 21 to 27.
- If you are not working now, but are waiting to start a new job, answer 'yes' and complete questions 21 to 27 for your previous job.
- If you are a school leaver who has been hired and is waiting to start a first job, answer 'yes' and complete questions 21 to 27 for your new job.
- If you do not work in a job, business, farm or profession, answer 'no', and then sign the questionnaire.

21 Employment status

- If you have two or more jobs answer this question for your main job (the one at which you spend the most time).
- If you are working on a commission only basis, tick box 1.
- If you are a partner in a business, tick box 2 or 3, as appropriate.
- If you regularly work without pay or profit in a family business, tick box 4.

22 Hours worked last week

- If you have two or more jobs, state the hours for your main job first. State the hours for the other job or jobs in the second box.
- If you have only one job, write '0' in the second box.
- Include overtime hours worked last week.
- If on holiday, sick or temporarily absent from work last week, give usual hours worked.
- Do not include unpaid household or voluntary work.

23 Present occupation

- If you have more than one job, business or professional practice, write down what you do in your main job.
- If you are a trainee or apprentice, include that in the description.

Examples of occupations, tasks and duties are:

Occupation	Task or Duties
bookkeeper	preparing company accounts
civil engineer	designing and supervising bridge construction
clerical supervisor	checking the work of insurance clerks
council labourer	weeding gardens, keeping parks tidy
factory supervisor	controlling a frozen vegetable process line
interior design consultant	advising customers on colour schemes
key punch operator	keying data into a computer
knitwear machinist	making cardigans
laboratory technician	carrying out diagnostic tests on blood
motor vehicle mechanic	repairing cars
process worker	assembling television sets
shop assistant	making and selling takeaway foods
truck driver	driving petrol tanker
working proprietor	selling books and stationery

24 Who do you work for?

- If your employer does not have a trading name, give his or her name.
- If you work in your own business, give your trading or business name. If you do not have a trading or business name, write 'self'.

25 Where do you work?

- If you do not know the street name and number, give the name of the building.
- If you have more than one job, write the address of your place of work for your main job.
- If you have no fixed workplace (for example, if you are a milk vendor, driver, sales representative), give the address of the depot, headquarters or reporting point you operate from. If you have no fixed reporting or assembly point, but travel from your home to various work locations, write 'no fixed address'.
- If you work at home or in the same building as you live (for example, if you are a farmer, dressmaker or dairy proprietor) tick the 'Work at home' box.
- If you are working on a ship, write the name of the port at which the ship is berthed on Census night. If the ship is not berthed on Census night, write the name of the next port of call.

26 The main activity at your place of work

- Main activity refers to your employer's predominant business, industry or service.

Examples of employers' activities are:

beef farming
brewing
cartage contracting
commercial printing
health food retailing
leather bag manufacturing
market gardening
meat freezing works
metal furniture manufacturing
motor vehicle upholstering
Post Office mail service
private school
property valuation
road construction
town milk supply
trading bank

27 Main means of travel to work

- If you have more than one means of travel to work, tick the box for the means of transport you usually use to travel the greatest distance.
- If you travel to work in different ways during the week, or if you have no fixed place of work, tick the box that describes how you travel most often.
- If you are a farmer living and working on a farm, tick box 0.
- If your place of work is in the same building as you live, tick box 0.

Department of Statistics

CENSUS 86 — We all count for New Zealand

New Zealand Census of Population and Dwellings

Tuesday, 4 March 1986

CS/00/01

District No.
Sub District No.
Meshblock No.
Questionnaire No.

Dwelling Questionnaire

Instructions

- A Dwelling Questionnaire is legally required to be filled in for every dwelling which is occupied on Census night.
- If this is a private dwelling, the person who fills in the Dwelling Questionnaire should be either:
  — a person who owns this dwelling,
  — or, if a rental dwelling, a person in whose name the dwelling is rented,
  — or any other responsible person.
  This person, who must be living in the dwelling on Census night, is called the **occupier.**
- If this is not a private dwelling, the person who fills in the Dwelling Questionnaire should be either the proprietor, superintendent or other person in charge on Census night. This person is called the **occupier.**
- The **occupier** is also required to ensure that a Personal Questionnaire is filled in for every person (including baby) present in the dwelling on Census night.
- Persons arriving at or returning to this dwelling between midnight on 4 March and noon on 5 March must fill in a Personal Questionnaire at this dwelling, unless one has been filled in at another dwelling.

The information you provide will remain confidential to the Department of Statistics.

- This completed questionnaire will be seen only by employees of the Department of Statistics who have taken a statutory declaration of secrecy. The information you provide will be used for statistical purposes only and identifiable details about you or your household or dwelling will not be disclosed to any other government department, organisation or person.
- This Census is taken under the authority of Section 23 (1) of the Statistics Act 1975.

S. KUZMICICH
Government Statistician

Please refer to the guide notes before you fill in this questionnaire

For each question, please either tick box ☑ *or enter number eg:* 4 *or print answer eg:* Street number and name 4 HIGH ST.

Name of occupier

Surname or family name

First or Christian names

Address of this dwelling

DO NOT give P.O. Box or Rural Delivery numbers

Street number and name

Suburb or rural locality

City or town or county

- If an institution, hotel, motel, hospital, school hostel, camp, boarding house or ship

Please give name

If this dwelling is in a rural locality, rural township, or county ... *please state*

Name of nearest Post Office

Distance to nearest Post Office by usual route | km or | miles

1 How many persons are present in this dwelling on the night of 4 March 1986? ***(include babies)***

| | | | persons

2 Is this dwelling

either

(a) a private dwelling?

01	Separate house
02	Two flats or houses joined together
03	Three or more flats or houses joined together
04	Flat or house attached to a business or shop
05	Bach, crib or hut *(not in a work camp)*
06	Caravan, cabin or tent in a motor camp
07	Other

Please state

or

(b) not a private dwelling?

11	Hotel, motel or guest house
12	Boarding house or rooming house
	Other *(such as hospital, construction camp)*

Please state

- The following questions are for ***private dwellings*** only.
- If not a private dwelling — please sign at bottom of this page

3 **How many bedrooms are there in this dwelling?**

bedrooms

4 **Is this dwelling**

01 Owned with a mortgage

02 Owned without a mortgage

03 Provided rent-free

04 Rented or leased

5 **If you rent or lease this dwelling:**

(a) How much is the WEEKLY rent?

$ _____ . _____ per week

dollars *cents*

(b) Who do you rent or lease from?

1 Private organisation, person or real estate agency

2 Housing Corporation

3 Other government department *(including hospital or education board)*

4 Local authority *(including council, electric power board or harbour board)*

(c) Is this dwelling rented or leased on a furnished basis?

5 No—unfurnished

6 Yes—furnished

(d) Do you rent or lease from your employer?

7 No—not rented from employer

8 Yes—rented from employer

6 **What do you use to heat this dwelling?**

Tick one or more boxes

① Electricity

② Gas

③ Wood

④ Coke or coal

⑤ Oil *(including kerosene)*

⑥ Other

Please state _____

⑦ No means of heating

7 **What type of hot water supply do you have in this dwelling?**

Tick one or more boxes

① Electric

② Gas

③ Other *(such as wood, solar)*

④ No hot water supply

8 **How many motor vehicles available for private use do persons in this dwelling have in their care on Census night?**

Do not include: motor bikes, scooters, tractors

0 None

1 One

2 Two

3 Three

4 Four

5 Five or more

9 **Persons away on Census night (4 March 1986)**

List below:

- Those persons who are temporarily away (for less than 3 months) on Census night, but who usually live at this dwelling, such as persons on business, on holiday, or in hospital.
- Children at boarding school.
- Mother and baby at a maternity hospital.

Do NOT list below:

- Those persons who are away for longer than 3 months, but who usually live in this dwelling, such as long-term hospital patients, armed forces personnel overseas.
- University or tertiary students who live away from this dwelling for most of the year.

	ABSENT PERSON 1	ABSENT PERSON 2	ABSENT PERSON 3	ABSENT PERSON 4
Surname or family name				
First or Christian names				
Sex				
Age *(in years)*				
Marital status *(such as married)*				
Relationship to you *(such as son)*				
Address or location on 4 March 1986				

FOR OFFICE USE ONLY

Signature: I declare that the information I have given is true and complete as far as I know: *Sign here*

Guide to filling in your Dwelling Questionnaire

Department of Statistics

New Zealand Census of Population and Dwellings

Tuesday, 4 March 1986

Selecting an Occupier

- Where a private dwelling is owned or rented jointly by two or more persons, choose **any** one who is living in the dwelling on Census night to be the **occupier**.
- The occupier in a **non-private** dwelling is usually the proprietor, manager or other person in charge on Census night. He or she need not be living in the dwelling on Census night.

What is a dwelling?

- The term dwelling means any building or structure, whether permanent or temporary, which is being wholly or partly used as living quarters for a household.
- A **private dwelling** is one which is lived in by a private household.
- A **private household** consists of one or more persons living together, who usually have one or more meals together daily. Boarders and temporary visitors are also household members.
- Caravans, cabins or huts in motor camps which are occupied on Census night are private dwellings if the occupants have been, or will be, living in them for three months or more.
- Each self-contained flat or house within a retirement village or complex is a private dwelling.
- Managers, proprietors, persons-in-charge or staff of institutions, camps and other non-private households are considered to be living in a separate private dwelling, if they have self-contained living quarters within the institution or camp.
- A **non-private dwelling** is an accommodation unit catering for a number of generally unrelated persons, comprising a non-private household. Examples are hotels, motels, boarding houses, camps, ships or institutions such as a hospital or prison.

The Questions

1 How many persons are present?

- Count all persons, including children and babies, who spent the night of Tuesday 4 March in this dwelling and enter the number in the space provided.
  For example, if four persons were present on Census night, complete the box as follows:

  [4] persons

- Include persons who are away on Census night, but who return before noon on Wednesday 5 March and have not completed a questionnaire somewhere else, e.g. shiftworkers.
- Include visitors who arrive at this dwelling before noon on Wednesday 5 March and have not completed a questionnaire elsewhere.

2 Type of dwelling

- Answer either question (a) or (b). Tick only one box.

(a) *Private dwelling*

- A 'separate house' is a house which stands apart from any other house, flat or business premises.
- 'Joined together' means connected or joined by a common wall, garage, carport or shed to another dwelling.
- If you live in a town house, apartment, ownership unit or villa, which is joined to another dwelling, tick box 02 or 03, as appropriate.

(b) *Non-private dwelling*

- If you live in a hostel, convent, prison, youth camp, recreational camp, commune, ship or military barracks, tick the 'Other' box and state the type of dwelling.

3 Bedrooms

- Count all bedrooms, including spare bedrooms.
- If this dwelling is a bed-sitter, cabin or caravan which does not have a separate bedroom, count this as one bedroom.
- Include caravans and sleepouts which are used as extra bedrooms.

4 Is this dwelling owned or rented?

- This question only applies to the dwelling you occupy and not to the land on which it is situated.
- If this dwelling is being bought under hire-purchase (such as a caravan), tick box 01.
- Owner-occupants of ownership flats purchased under unit title, stratum title, composite leasehold title, licence to occupy or similar, should tick box 01 or 02, as appropriate.

5 If you rent or lease this dwelling

- Do not include mortgage repayments as weekly rent.
- If you do not rent on a weekly basis, give the equivalent weekly rate.
- If this dwelling is a hired caravan in a motor camp, include site fees in the total rent paid.
- If the rent for this dwelling includes rent or lease payments for a farm, business or shop, estimate the weekly rent for your living quarters only.
- If this dwelling is rented on a partly furnished basis, tick box 6.

6 Heating this dwelling

- If you use more than one type of heating, tick the boxes which apply.

7 Type of hot water supply

- If you have more than one method of heating the water supply, tick the boxes which apply.

8 Motor vehicles

- *Include:*
  - — cars, station-wagons, vans, trucks, utility vehicles, four-wheel drive vehicles and other vehicles used on public roads;
  - — privately-owned and business vehicles, **if** they are available for the private use of persons in the dwelling;
  - — vehicles which are hired, borrowed or leased or supplied by an employer;
  - — vehicles which are temporarily under repair.
- *Do not include:*
  - — motor bikes, scooters, or farm machinery;
  - — vehicles used **exclusively** for business.

NEW ZEALAND CENSUS OF POPULATION AND DWELLINGS

Tuesday, 24 March 1986

PERSONAL QUESTIONNAIRE

1 FULL NAME

Surname or Family Name

Christian or First Name(s)

2 SEX

( ) Male ( ) Female

3 DATE OF BIRTH

MONTH	DAY	YEAR
( ) JAN		1
( ) FEB		
( ) MAR	(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)	(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)
( ) APR	(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)	(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)
( ) MAY	(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)	(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)
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( ) NOV	(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)	(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)
( ) DEC	(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)	(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

4 COUNTRY OF BIRTH

( ) New Zealand
( ) Australia
( ) England
( ) Scotland
( ) Wales
( ) Samoa
( ) Cook Is
( ) Niue
( ) Tonga
( ) Other SPECIFY:

Country

5 ETHNIC ORIGIN

( ) Full European/Caucasian
( ) Full New Zealand Maori
( ) Full Samoan
( ) Full Cook Is. Maori
( ) Full Niuean
( ) Full Tongan
( ) Full Chinese
( ) Full Indian

Other SPECIFY:

e.g. N.Z. Maori · European

6 RELIGION

( ) Anglican
( ) Presbyterian
( ) Roman Catholic
( ) Methodist
( ) Baptist
( ) No Religion
( ) Object

Other SPECIFY:

Religion

7 RELATIONSHIP TO OCCUPIER: Answer A or B

A. PRIVATE DWELLING e.g. (house or flat)

( ) Occupier
( ) Husband/Wife
( ) Son/Daughter
( ) Flatmate
( ) Other SPECIFY

( ) Visitor/Guest
( ) Boarder
( ) Grandchild
( ) Father/Mother (in law)

( ) Brother, Sister
( ) Nephew, Niece/Cousin

e.g. son-in-law, lodger, foster-child)

B. NON-PRIVATE DWELLING e.g. (hotel, motel, ship, hospital, hostel)

( ) Person in charge
( ) Member of family or non-paying guest of person in charge
( ) Resident staff
( ) Paying guest, patient, resident or inmate

8 FULL ADDRESS ON CENSUS NIGHT:

(DO NOT GIVE P.O. BOX OR RURAL DELIVERY NUMBERS)

SPECIFY

Number in street and name of street, road, etc

Name of suburb or rural locality (if any)

Name of city, town or county

9 USUAL RESIDENTIAL ADDRESS

( ) Same as in question 8
( ) Other New Zealand address SPECIFY:

Number in street and name of street, road, etc.

Name of suburb or rural locality (if any)

Name of city, town or county

( ) Living overseas
SPECIFY:

Country

10 USUAL RESIDENTIAL ADDRESS ONE YEAR AGO (24 MARCH 1985)

( ) Same as in question 9
( ) Born since 23 March 1985
( ) Other New Zealand address SPECIFY

Number in street and name of street, road, etc.

Name of suburb or rural locality (if any)

Name of city, town or county

( ) Living overseas
SPECIFY:

Country

11 USUAL RESIDENTIAL ADDRESS AT PREVIOUS CENSUS (24 MARCH 1981)

( ) Same as question 8
( ) Same as question 9
( ) Born since 23 March 1981
( ) Other New Zealand address SPECIFY

Number in street and name of street, road, etc.

Name of suburb or rural locality (if any)

Name of city, town or county

( ) Living overseas
SPECIFY

Country

If you are aged over 15 and are
(a) a New Zealand resident
(b) a visitor who is, has been or intends working in New Zealand
(c) a member of the family of an overseas resident who is working in New Zealand

CONTINUE TO THE RIGHT

OTHERWISE PLEASE TURN OVER AND SIGN AT BOTTOM OF QUESTIONNAIRE

12 CIGARETTE SMOKING

( ) Never smoked

( ) Do not smoke now but used to smoke regularly (one or more per day)

If you currently smoke indicate number of cigarettes smoked yesterday

(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

13 MARITAL STATUS Answer A and B

A.

( ) Never married
( ) Married
( ) Married but permanently separated
( ) Widowed
( ) Divorced

B. Are you living in a de facto relationship as husband/wife?

( ) Yes
( ) No

14 CHILDREN BORN

If a woman indicate number of children born alive to you

(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

If not applicable mark

PLEASE TURN OVER

05494-001

P 7 4 2 1 P 7 4 2 1

15 EMPLOYMENT STATUS

- Working for wages or salary
- Self-employed and employing labour
- Self-employed not employing labour
- Relative assisting in business (farm, shop, etc.) and not receiving wages
- Unemployed and seeking work
- Retired
- Full-time student
- Household duties (unpaid)
- Other SPECIFY:

e.g., invalid

16 OCCUPATION

Job profession, trade or type of work, in which you work full or part-time or as an unpaid relative assisting

SPECIFY:

State fully, e.g., sheep farmer, auto-electrician, builder's labourer, dental nurse, wages clerk

17 MAIN MEANS OF TRAVEL TO WORK

- Public Bus
- Train
- Passenger in car, truck, van, etc
- Drive car, truck or van
- Motorcycle, power cycle
- Bicycle
- Walk
- Other means
- Work at home
- Not Applicable

18 HOURS WORKED PER WEEK: for financial reward and unpaid assisting in business, farm, shop

	None	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-59	60+
Number of hours worked per week in MAIN job	○	○	○	○	○	○	○	○	○	○	○	○	○
Number of hours worked per week in second job (if any)	○	○	○	○	○	○	○	○	○	○	○	○	○
Number of hours worked per week in other job(s) (if any)	○	○	○	○	○	○	○	○	○	○	○	○	○
Total number of hours worked per week in all jobs	○	○	○	○	○	○	○	○	○	○	○	○	○

19 NAME OF EMPLOYING ORGANIZATION

If unemployed give name of previous employer

SPECIFY

Not Applicable

20 ADDRESS OF WORKPLACE

SPECIFY:

Number in street and name of street, road, etc.

Name of suburb or rural locality (if any)

Name of city, town or county

Not Applicable

21 TYPE OF WORK CARRIED OUT BY EMPLOYING ORGANIZATION

If unemployed give type of work of previous employer

SPECIFY

Not Applicable

22 SOCIAL WELFARE BENEFITS:

Including National Superannuation, Family Benefits and War Pensions. Answer A and B indicating the types of Benefit and amount received **during the year ended 31 March 1986.**

A. TYPES OF BENEFIT RECEIVED

- None
- Family Benefit
- National Superannuation
- Unemployment Benefit
- Sickness Benefit
- Domestic Purposes Benefit
- Widows Benefit
- Invalids Benefit
- War Pension
- Miners Benefit
- Orphans Benefit
- Other Benefit SPECIFY

B. INCOME FROM ALL BENEFITS

- Nil
- $ 1- 999
- $1,000-1,999
- $2,000-2,999
- $3,000-3,999
- $4,000-4,999
- $ 5,000-5,999
- $ 6,000-7,999
- $ 8,000-9,999
- $10,000 +

23 GROSS INCOME FROM ALL SOURCES EXCEPT SOCIAL WELFARE BENEFITS:

Include wages, salary, interest, dividends, Accident Compensation, Bursary, net business income, rents and assessed value of housing, goods or services where supplied free by employer, received **during the year ended 31 March 1986.**

- Nil
- $ 1- 999
- $ 1,000- 1,999
- $ 2,000- 3,999
- $ 4,000- 5,999
- $ 6,000- 8,999
- $ 9,000-11,999
- $12,000-14,999
- $15,000-17,999
- $18,000-20,999
- $21,000-23,999
- $24,000-26,999
- $27,000-29,999
- $30,000-34,999
- $35,000-39,999
- $40,000-44,999
- $45,000-49,999
- $50,000-54,999
- $55,000-59,999
- $60,000-64,999
- $65,000-69,999
- $70,000 +

24 HIGHEST SCHOOL LEVEL ATTENDED

- No Schooling
- Primary or Intermediate Schooling
- Secondary School Form 3
- Secondary School Form 4
- Secondary School Form 5
- Secondary School Form 6
- Secondary School Form 7

25 HIGHEST SCHOOL QUALIFICATION

- No school qualification
- 1 or 2 passes in School Certificate
- School Certificate or 3 or more passes in School Certificate
- Sixth Form Certificate in 1, 2 or 3 subjects
- Endorsed School Certificate, Sixth Form Certificate in 4 or more subjects
- University Entrance, Matriculation
- Higher School Certificate, Higher Leaving Certificate
- University Scholarship A, or B Bursary

26 OTHER EDUCATION

Past attendance	Current attendance
None	None
University	University
Teachers College	Teachers College
Poly/Tech Institute	Poly/Tech Institute
Other SPECIFY:	Other SPECIFY:

27 HIGHEST ACADEMIC, VOCATIONAL OR PROFESSIONAL QUALIFICATION

- Still at school
- No qualifications

SPECIFY:

28 SIGNATURE

I CERTIFY THAT THE PARTICULARS GIVEN ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

Signature

5 . Computer Assisted Coding

COMPUTER ASSISTED CODING

Report on the
Computer Assisted Coding
Processing Phase of the 1986
Census of Population and Dwellings

dt126087/IDB

1.0 INTRODUCTION

1.1 Objective of Review

The primary objective of this review is to evaluate the 1986 Computer Assisted Coding (CAC) operation, and to put forward proposals and recommendations for the 1991 CAC processing.

2.0 SYSTEM OPERATION

2.1 Description of 1986 System Operation

The CAC/Editing system took the operator to each record and checked for flagged fields. A flagged field is a field that requires coding or the correction of out-of-range edits.

If any flagged fields were present, these fields came up on the VDU screen for coding. The system was flexible so that a field or record could be bypassed if the operator was unable to select an appropriate code, and accessed at a later time. When a meshblock was re-accessed, the system automatically checked from the first record onwards.

Once all data for a record had been input, it was edited for inter-field edits. Any edit failures were displayed, along with fields determined most likely to be in error. Corrections were entered using CAC facilities for coded fields, or entered directly for numeric fields.

When all CAC and inter-field edits had been completed in a meshblock, a screen would show whether there was any inter-record editing to be carried out. This editing looked at all records in a dwelling and checked for inconsistencies in coding. These edits were displayed on a printout and were available for the operator shortly after CAC had been completed on a meshblock. If a record was altered to correct inter-record edits, the record would also be re-checked to ensure no inter-field edits failed. When the screen showed inter-record edits were clear for that meshblock it could be unloaded.

The system allowed for an operator to have had up to 25 meshblocks at any one time in various stages of completion, although only one meshblock could be accessed at a time.

2.2 Suggested Improvements to CAC System

Although the CAC system was well developed, there were features that could be improved on to refine and speed up the system.

Following, is a list of suggested improvements, giving an outline of each problem and a reason for possible improvement.

2.2.1 Processing Sequence

The Business Directory (BD) and the fields associated with it, i.e. industry, sector and work address, should come up before occupation in the processing sequence.

Often during the CAC processing the code assigned to occupation was dependant on the industry and sector displayed on the BD. This was especially true for farmers who did not indicate their occupation or industry in enough detail to enable the operator to determine the most

appropriate code. In many cases by by-passing occupation and keying in a description via the BD, the industry would be determined, thus enabling coding of occupation. However, to action this coding the operator had to enter the record details screen and flag the required field to bring up 'occupation'.

This process was time consuming and could be eliminated by changing the processing sequence of the fields.

2.2.2 Automatic Coding

There should be automatic coding of work address if travel = work at home.

The system could automatically code the appropriate meshblock or area unit from the usual address. This facility would be particularly useful when processing rural areas, as the agriculture directory does not code to meshblock area unit, and many people working on farms live there as well.

This facility would reduce operator workload considerably and could be extended to other areas.

2.2.3 Loading Files

The BD and occupation files were both updated only twice during the Census processing.

All BD amendments went via BD Auckland and were checked and approved by them before EDP could load changes onto our system. This was not satisfactory as the time lapse was often weeks, and by the time amendments had been made to the file the operators had made a large number of errors (i.e. if they didn't see corrections displayed on the notice board), or they had moved into another LGR.

Similarly changes to the occupation file had to be loaded onto the system via EDP, which was carried out when it was convenient with them.

It is suggested that CAC supervisors have a facility to load BD and occupation files and any others when necessary, onto our system so that they can be updated as errors are found. BD corrections on our file could be brought to the attention of the Auckland section.

An overnight update facility would be less complex than an immediate update.

2.2.4 Limit on Time Response

Consideration should be given to limiting the search time, so that if information is keyed in incorrectly the response time is reduced.

A limit could be set on the number of retrievals from the dictionary file and when this is exceeded the operator would be asked if they wished to continue or quit.

This function would speed up the processing, particularly when a number of operators were keying in incorrect information at one time.

2.2.5 Conversion Key

The CAC system in its present state only shows standard(1)* meshblock numbers, whereas all meshblock numbering used for enumeration was in admin.(2) This was a real problem and consideration should be given to have all numbering for CAC purposes as admin. so that the big problem of converting numbers is eliminated.

Locating usual residential address and work address was made more difficult by having standard meshblock numbering displayed on the screen, but to check this meshblock(s) in the enumerator book the standard number had to be converted to admin., and then converted back again to recognise standard meshblock codes in the computer.

Admin. numbers would be converted to standard during Rationalisation.

2.2.6 Countback Facility

A countback facility allowed the operator to go back 10 records from the one being worked on in that meshblock.

If an operator wanted to change a field more than 10 records back, the meshblock had to be re-entered and the dwelling and personal record required, keyed in on the meshblock selection screen. This would take the operator to the record, but to bring up the appropriate field, the record details screen would need to be accessed.

At present, the procedure involved to count back more than 10 records is cumbersome. The facility to directly address any record would be preferable.

* (1) Standard numbers which were made up of 8 digits in the 1986 Census were used to code addresses at CAC. They were also used by other sections in the department, and figures were published in this form. Standard numbers have historical continuity even when meshblocks have been divided.

(2) Administrative numbers are 7 digits, and were used during the enumeration process. Each meshblock was described in terms of a district number (3 digits), sub-district number (2 digits) and a meshblock number (2 digits). The admin. numbers change from one Census to the next, and have no historical continuity.

2.2.7 Direct File Matching

The feasibility of direct file matching is being evaluated.

The project involves reviewing all CAC data files and removing unnecessary letters and words and testing the feasibility of automatically allocating a code when a direct match is keyed in. It is expected this will prove satisfactory with some fields e.g. country, but not so for others e.g. occupation. If direct file matching proved feasible with some fields it could speed up the CAC processing.

2.2.8 Automatic Editing

The feasibility of automatic editing is being evaluated.

The project involves investigating edits to determine whether it would be feasible to automatically assign a pre-determined value to a specific field failing an edit e.g. If Birthplace = New Zealand, YRSNZ = 99, and if any other value has been allocated to the field, it will automatically be changed to '99'.

Automatic editing would take place after the CAC/Edit phase and would reduce the number of manual corrections required.

2.2.9 Inter-active Editing

Inter-record editing could be inter-active rather than hardcopy.

This would mean that all inter-record edits would be displayed on the screen either: -

(i) at the end of the meshblock
or (ii) at the end of each dwelling

Inter-active editing would mean that inter-record editing could be actioned immediately instead of at a latter time when the printouts were run off. It would eliminate the extra time spent re-accessing the meshblock to action edit changes.

2.3 Additional Features

2.3.1 PF Keys

2.3.1.1 Occupation and Industry Expansions

There was only one expansion for each field
(i) Occupation - the occupation expansion accessed the task file, which was a summarised description of each code from the NZSCO. This file was compiled by Input clerks, with little knowledge of many occupations, and parts are

poorly constructed so that it's often misleading, doing more harm than good.

(ii) Industry - the industry expansion contained a list of all descriptions held on file for a selected code.

These 2 fields caused approximately 40% of all errors, so it is suggested for 1991, that 2 expansions for occupation and industry are available to help CAC operators select the most appropriate code.

These include: -

(i) NZSCO and NZSIC descriptions - for occupation this would include a revised task file, constructed by someone knowledgeable in occupations, as a thorough understanding would be essential. A similar type of file could be constructed for industry.

(ii) Description List - a list of all descriptions held on file for a selected code e.g.

0421 - deck officer, master
0421 - master mariner
0421 - mate, ship
0421 - nautical school instructor
0421 - navigating officer, ship
0421 - ship's captain
0421 - ship's master
0421 - ship's officer, deck

In addition it is suggested that:-

(i) - codes could be displayed in minor groups for occupation e.g. Minor Group 56 - launderers, drycleaners and pressers.

5601 - launderer
5602 - dry cleaner
5603 - spotter
5604 - presser
5609 - other launderers, drycleaners and pressers

(ii) - codes could be displayed in major groups for industry e.g.major group 811 - Financing

81110 - Central Banking
81120 - Trading Banking
81130 - Savings Banking
81190 - Other Banking n.e.c.

2.3.1.2 Recall key for labour force fields

The repeat facility for subsequent records in a dwelling as in usual address, address 5 years ago, ethnic origin, birthplace and religion should be extended to include occupation, industry, workaddress and the BD.

In smaller urban and rural areas, employment can be dominated by a few businesses, and whole households will sometimes work for the same employer.

It is suggested to leave the fields with a repeat facility as they were, and having a recall facility for Labour force fields. The number of times a repeat facility was required for these fields was not large (mainly farming jobs), and it would be more of a hindrance than a help. A PF key could be pushed to recall details of that field in the previous record, and the code entered without typing in a description.

2.3.1.3 Access of labour force fields

There could be additional selection facilities to enable access of occupation, BD, industry and workaddress fields, from any of these fields.

Operators often flicked between different fields to resolve problems, but accessing these fields through the record details was often cumbersome and time consuming.

2.3.1.4 Record Details Keys

It was often time consuming and cumbersome moving around the record details screen.

Consideration could be given to having two PF keys to access the record details screen, one could bring up the fields on the left hand side and the other bring up the fields on the right hand side. By using these PF keys to access labour force fields, the RHS could be brought up instantly and the cursor moved down to the appropriate field, instead of having to skip the cursor across the screen.

An alternative is to bypass the record details screen and enter the field to be selected from any CAC screen which would mean direct movement from one field to another.

2.3.1.5 Sector expansion

Sector classification was a difficult area of coding. It would be a help if a more comprehensive list of examples was available on the terminal. This additional information could be accessed through the expansion key, as was the case with other fields.

2.5 PF Key Operation

PF keys were an essential component in operating the CAC system, and most keys were used frequently.

Using the 'not specified' and 'by-pass' keys in conjunction with the alt key, ensured they were not accidentally pushed. Also, the positioning of these keys on the top row of the keyboard, away from the keys frequently used, was another safeguard.

The reset key, PF1, also used in conjunction with the alt key, was rarely used by operators. It could have been used when it was discovered that data had been coded to the wrong record, although it would only work for the record being currently worked on. Perhaps operators were unaware of such a key, or found little use for it. It is suggested that this key is unnecessary in the future.

2.6 Screen Format

There was consistency in the layout of the screens, with Batch and Record identifiers displayed at the top of each screen. The record identifier was a helpful check for operators to ensure that the information was being keyed in from the correct questionnaire.

The PF key numbers and their functions, available for use with that screen, were listed at the bottom of the screen. Most operators preferred to key in information in lower case, but this was entirely a matter of preference.

3.0 CODE AND DESCRIPTION FILES

3.1 Introduction

There were 2 types of files used for processing the 1986 Census.

1. Description files
   - these are long lists of codes, used only to code fields on the personal questionnaire
   - to allocate a code to a response, the CAC operator typed in a description and the computer 'searched' the appropriate file for a match(es) which it displayed on the screen.
2. Code lists
   - these are similar to description files, but much shorter, and are used to code fields on both dwelling and personal questionnaires.
   - the code list will display all the codes for a field on the screen, and the CAC operator will select the most appropriate code.

Apart from responses requiring access to code lists and descriptive files there were also numeric responses. The numeric values were keyed in at data capture, and unless an edit had failed the field did not come to the attention of the CAC operator.

3.2 Description Files

There were 10 description files used for the processing of the 1986 Census, they were: -

1. Business Directory
2. Agriculture Register
3. Street Listing
4. Occupation
5. Industry
6. Country
7. Ethnic Origin
8. Religion
9. Other Quals
10. Relationship

3.2.1 Business Directory

3.2.1.1 Introduction

The Business Directory (BD) which included most of the registered businesses in New Zealand, was developed and maintained by the BD Development Section in Auckland.

The 2 major advantages of the BD were: -
(i) A substantial decrease in the amount of time required to code labour force questions. If the employer was listed on the BD, codes were allocated for industry, sector and workaddress with only one key depression.

(ii) A more constant allocation of industry codes than had been possible by using the industry file. The code allocated by the BD was the principal industry of that activity unit, rather than an industry as perceived by the respondent.

3.2.1.2 Evaluation

The BD was a very good aid to coding industry, sector and work address, but in too many cases it was unreliable.

BD errors occurred when a business came up at the address stated by the respondent, but when entered, a different meshblock was allocated to that given by the street listing i.e. BD and street listing were inconsistent. Although the BD was not always at fault, in the majority of cases it was proved to be in error. This created a feeling of distrust, and CAC operators would often check work address via the street listing, to double check the BD. This was time consuming and defeated the purpose of the BD facility. When BD errors were found, CAC operators advised supervisors, and wrote amendments on the noticeboard so that others were aware of it, for future coding. The main problem was that many were unaware of the error unless they had seen it on the noticeboard.

Another problem arose when a business had more than one branch in a street and the respondent had not given a number. There was confusion as to whether to select one address and code to that meshblock, or to use area unit, local authority or local government region to cover all the choices. However the decision was, if in doubt, to use the coding hierarchy i.e. meshblock area unit LA LGR NS., so that all of the businesses in the street were included, and not just a selected one.

After a number of amendments to the BD had accumulated, they were sent to Auckland so that corrections could be made. They were later returned and EDP loaded them on the CAC file. There was a time lapse of several weeks before corrections were actioned. By the time the BD was corrected the CAC operators were out of the area and were finding new errors which required the same procedure for correction. Updating the BD file only occurred twice during the CAC processing.

Recommendations

- that the BD be completely reviewed and updated by the BD development section in Auckland.

- that CAC supervisors have a facility to make amendments to the BD file so that immediate action can be taken.

- that attention be given to the 'BD matching problems' so that as many as possible can be eliminated.

3.2.2 Agriculture Register

3.2.2.1 Introduction

The agriculture register was accessed through the BD and helped to code many of the farmers. It performed a similar function to the BD but coded only industry and sector with one key depression. The work address was coded to local authority, but the field automatically came up for CAC, as it was required to be either meshblock or area unit level.

3.2.2.2 Evaluation

The agriculture register was found to be outdated on many occasions, and when there were discrepancies between the agriculture register and the respondents description, the decision was to code as stated by the respondent.

Sector came up as an edit when '0' or '250' was coded, as these were not on the CAC sector file. This would then have to be changed to the most appropriate code. The reason for this was that the agriculture register did not use the NZSISC, but a 1 digit code 0 9, and this code series was converted to the equivalent NZSISC code; however there were some anomalies.

The work address on the agriculture file was often just a P.O. Box or the accountant's office, which made coding very difficult, especially if the respondents description was inadequate.

Many farmers worked at home which enabled the CAC operator to allocate the appropriate code, but it was often a time consuming procedure. This could be alleviated by incorporating a facility into the system to automatically code work address if travel = work at home.

3.2.2.3 Recommendations

- that the agriculture register be updated if it is to be used in 1991.

- that sector classification on the agriculture register be consistent with the NZSISC.

- that work address be automatically coded to usual residential address if travel = work at home.

3.2.3 Street Listing

3.2.3.1 Introduction

The street listing was compiled by Regional Stats, who were responsible for its maintenance and regular updating. It was used for matching respondents answers to questions requiring an address code i.e. usual residential address (USRES), address 5 years ago (AU5YR), and work address (WKADD).

The level of coding required for each question was: -

(i) USRES - meshblock - 8 digit code
(ii) AU5YR - area unit - 6 digit code
(iii) WKADD - either meshblock or area unit.

> The system was set up to automatically capture the level of coding required for that area. Generally meshblock level was required for urban areas, and area unit for rural areas, but there were exceptions.

If the CAC operator could not allocate a code to the meshblock level required, the cursor could be put in a different position and capture AU, LA or LGR.

The street listing screen displayed the following information: -

- questionnaires identification i.e. district, sub-district, meshblock, DQ and PQ
- the street name and type
- the range of street numbers applicable
- the meshblock number
- the area unit number
- the Local Authority (code and name)
- the Local Government Region (code and name)
- the word(s) matched on
- the number of words matched on
- the level at which the address was matched.

3.2.3.2 Evaluation

The street listing was easy to use, but a number of problems arose that required the operator to use referencing materials to allocate the most appropriate code. One of the biggest problems with referencing location was having all meshblock numbering on the terminal in standard numbers and enumerator books and maps in admin. The conversion from one set of numbers to the other was time consuming and some operators, even at the end of CAC, could not easily convert numbers. Consideration should be given to using admin. numbers for all CAC purposes in 1991.

When no numbers were supplied on the street listing, only zeros, it was difficult to determine the correct meshblock. This occurred in inner city areas, examples of which include, Dunedin, Wellington and Hamilton.

There was a level of coding required for each location field. However, this was not always adhered to, not only because the respondent had given insufficient information, but often operators were not prepared to put the extra time and effort into locating an address using referencing material. Quality control accepted area unit even if meshblock was preferred, which did not encourage operators to reference. In the latter stages of the CAC processing operators were continually asking whether it was quality or quantity of work that was most important they believed it was quantity.

Before 1991 consideration must be given to the level of coding required. If for example, work address is required to meshblock level for most urban areas, this must be carried out and a determined effort made to locate the meshblock whenever possible. After checking with Output, assurance was given that work address, if required to meshblock, should be coded to that level, as figures were published that were of interest to transport boards, town planners and civil defence etc.

Suggestions for amendments to the street listing were sent to Regional Stats, but any action was very slow and then the amendments were not loaded onto the CAC file.

3.2.3.3 Recommendations

- that enumerators give street numbers or at least numbers at intersections in inner city streets, also name large buildings and businesses.

- that CAC supervisors have a facility to make amendments to the street listing file so that immediate action can be taken.

- that every effort is made to code addresses to the level required.

3.2.4 Occupation

3.2.4.1 Introduction

The occupation file which was based on the N.Z. Standard Classification of occupations, NZSCO, was created by Input Development. There were 5037 descriptions, each with a four digit numeric code.

Occupation proved to be a difficult area to code and accounted for 24% of all CAC errors. There were a large number of inconsistencies in this field, 31% in total, but due to the vague, ambiguous or multi-response on the PQ, different interpretations had to be considered.

The NZSCO is in the process of review at present, as it is outdated, and often difficult to allocate a suitable code to an occupation.

3.2.4.2 Evaluation

Occupation, although often difficult to code was made easier by respondents stating their main tasks or duties, as asked on the questionnaire. This helped provide valuable information and narrow down some of the obscure occupations. It was often very difficult allocating a suitable code to some occupations, especially in areas of high technology and job scheme programmes. Some of these occupations were coded to general areas rather than specific, and for this reason the necessity to update the NZSCO, and in turn the occupation file became apparent.

It became apparent during the processing that it was essential to have CAC operators who could interpret occupational responses using other information, and then re-word the response to try and find a match on the file. There were problems with interpretation of a description e.g. a farmer working on his own behalf, opposed to a farmer working for someone else. Decisions regarding allocating codes for managers, directors, supervisors, charge hands, bosses, etc. were not clear. There were inconsistencies arising from coding to the respondent's authorative position or their main duties.

To help operator's code the occupation field a task file was created, which could be accessed through the PF expansion key. This file was created by the Input Development Section after the 2nd Pilot, when a description of each code was compiled which was basically a 'summarised version' of the NZSCO description.

The task file often did more harm than good, as some descriptions were poorly constructed and misleading. When compared with the NZSCO description some of the important facts were missing, or emphasis had been placed on the wrong area, giving an incorrect picture of an occupation. CAC operators became very wary of this file and found in many cases it was worth a check in the NZSCO for a complete description.

The idea of the task file was sound, and it is suggested that it be retained. However, it should be completely reviewed by persons knowledgeable in occupational coding, and structured to include all the tasks of each code, using the NZSCO as the guiding factor.

Some operators had difficulty allocating a code in the correct group, and for this reason a facility to display all codes and descriptions within a minor group would be worth considering. Another aid to coding occupation, would be a facility to display on screen, a list of all descriptions held on file for a selected code.

During the CAC processing, the occupation file was updated only twice, and then action was not immediate. For this reason the facility to load our own files would be an advantage, rather than through EDP.

3.2.4.3 Recommendations

- that the NZSCO be reviewed, and the occupation file be updated.

- that all CAC operators involved in occupational coding are able to interpret responses using other information on the questionnaire and can then re-word-the response to try and find a match on the file.

- that CAC supervisors have the facility to load the occupation file, so that it can be continually updated.

- that the expansion key has 2 facilities to help code occupation fields:
  (i) revised task file
  (ii) list all descriptions for a selected code

- that minor group headings be displayed along with matched responses.

3.2.5 Industry

3.2.5.1 Introduction

The industry file which was based on the N.Z. Standard Industrial Classification, NZSIC, was created by Input Development. The file contained 7807 descriptions, each with a 5 digit numeric code.

The file was used to allocate codes to the industry response when the employer's name was not on the BD. Approximately 16% of all CAC errors were attributed to the industry field.

The NZSIC is in the process of review, as it is outdated.

3.2.5.2 Evaluation

As with occupation coding, it is imperative that operators involved with industry coding be fully trained on how to interpret information on the questionnaire so that an appropriate code be allocated. Too many operators were unsure of coding industry and confused it with occupation.

There were discrepancies between the industry code allocated using the industry file and the code allocated using the BD. The code allocated using the BD was for the principal industry of the business, whereas the industry coded using the industry file was that perceived by the respondent or CAC operator.

The industry expansion which displayed a list of all descriptions held on file for a selected code was a help making a coding decision. In addition to this extra facilities to help code industry fields should be considered. These include: -

(i) NZSIC description - a good summarised description of each code.

(ii) Major groups - a display on screen of all codes with descriptions within a major group.

The NZSIC is at present in the process of review by a branch of the Auckland office of the department. A draft outline, which is not a major change to the present NZSIC, is in the process of being approved. There will be an extensive revision, that will take 2-3 years, when the new international classification is finalised in 1989 (at the earliest), but this will not be ready for the 1991 Census. The 1987 version will probably remain in force until 1993 or 1994.

3.2.5.3 Recommendations

- that the NZSIC be reviewed and the industry file updated.

- that CAC operators involved in industry coding have thorough training.

- that the expansion key has 2 additional facilities to help code industry fields
  (i) NZSIC descriptions
  (ii) list all descriptions for a selected code

3.2.6 Country

3.2.6.1 Introduction

The country file contained 903 descriptions and is based on the N.Z. Standard Country codes. The code is a 3 digit numeric code. The country file was used for processing: -
(i) usual address - if overseas
(ii) 5 year ago address - if overseas
(iii) Country of Birth

3.2.6.2 Evaluation

This posed no real problems, and any problem, almost without exception, could be resolved with the help of an atlas.

3.2.6.3 Recommendations

- that no changes be made to the file unless a country is officially renamed.

3.2.7 Ethnic Origin

3.2.7.1 Introduction

There are 205 descriptions on the file each with a 2 digit numeric code.

3.2.7.2 Evaluation

The file was found to be comprehensive and easy to use.

There was confusion when box 1 "European" was ticked, and also "New Zealander" was written beside the description or in the "other" box. CAC operators were not sure whether to code to '01' European, '30' New Zealander or both '01' and '30'.

After a discussion with the Output Section, it was found that respondents who stated 'New Zealander', were in fact included in the 'European' figures published, and a footnote was included stating this fact. It was found that approximately 1% of the total figures released for 'European' had stated 'New Zealander'. A study on the occurrence of 'New Zealander', as an ethnic origin response, showed that the response was significantly higher in areas where there was a large maori population. It indicated that persons who were non-maori, and possibly 3rd to 4th generation New Zealanders, considered themselves as 'New Zealanders' rather than 'Europeans'. It is suggested for 1991 that if a respondent states both 'European' and 'New Zealander', that only 'European' is coded.

When a respondent stated 'Pakeha' there was confusion as this description was not on the file. The term 'Pakeha' was used in a similar way to 'New Zealander' and as it is considered by Output to be 'European' it should be coded as such. It is suggested that 'pakeha' be included on the file under code '01'.

3.2.7.3 Recommendations

- that respondents who states both 'European' and 'New Zealander' are only coded to 'European'.

- that 'pakeha' be included on the file under code '01'.

3.2.8 Religion

3.2.8.1 Introduction

The religion file contained 1233 descriptions, each with a 3 digit numeric code. When descriptions related to the same religion, the allocated codes were the same, but where it was not clear whether descriptions were related to the same religion different codes were given.

3.2.8.2 Evaluation

On the whole the religion file was satisfactory. In some cases it was difficult to determine whether a religion that was not on the file was genuine, or not, but there was a code to take care of that situation, i.e. 521 - other specified religion. It was not the position of the CAC operator to make a decision as to the authenticity of the case.

If a respondent stated a religion that was not on the file, CAC staff had been directed to put it on the reference sheet. When the file was reviewed, this information was helpful in deciding whether or not there were sufficient people belonging to a religion to consider allocating a code. Originally, it was decided that if 10 people belonged to a religion that a code be allocated to that religion, however that number was later reduced to 5. During the CAC processing the file was updated twice. The recording of new religions could be automated.

3.2.8.3 Recommendations

- that updating of the file be carried out if necessary and that it be an ongoing project.

3.2.9 Other Qualifications

3.2.9.1 Introduction

The 'other qualifications' file was compiled by Input Development from manual lists used during the 1981 Census, and from university and technical institute calendars.

The file contains 990 descriptions each with a 2 digit numeric code.

3.2.9.2 Evaluation

The coding of this question was a real problem for the CAC operator as there was uncertainty as to what was required from the question.

The question only came up for CAC when the 'other' box was ticked which was not a frequent occurrence, as compared with other fields, but it accounted for approximately 6% of all CAC errors.

The operators were continuously having to make a decision as to whether a qualification was valid or not. There was no decision made as to whether hobby courses were acceptable, or whether it was only educational qualifications. When a qualification was stated that was not on the file, there were inconsistencies in the coding, as some operators would code it to "other", some to "not specified" and others to "no quals". There was no decision made as how to treat such responses and different operators' interpretation of the question made for the large number of inconsistencies created. This problem was magnified when quality control was carried out on a meshblock, as it caused ill feeling when a CAC operator was marked wrong, when in fact, there had been no clear definition of a valid qualification that all coders could apply. The CAC and Reference supervisors were of the opinion that if there was doubt with a response, to code to other, and write the response on the reference worksheet. The reason for this action was that there would be information for future reference, but if coded to "no quals" or "not specified", this information was lost.

There was no information available to help code many of the overseas countries quals, particularly USA, Canada and Pacific Islands.

3.2.9.3 Recommendations

- that a clear definition of what constitutes a 'valid' qualification be given.
- that all specified "other" responses not considered 'valid' be coded to "not specified".
- that the file be reviewed to ensure that all descriptions are in fact 'valid', and to add or delete descriptions as required.

3.2.10 Relationship

3.2.10.1 Introduction

This file was changed from a short code list to a descriptive file after the 2nd Pilot test, when it was found that the CAC operators had to scroll through 7 screens to view the complete list of options. This was time consuming, and could be eliminated by entering a description which the computer would search for, and then display the match(es) on the screen.

3.2.10.2 Evaluation

This field was coded at pre-capture and keyed in at data capture, so usually only came to the attention of the CAC operator if an edit had failed.

The code '18', other occupant, was often used incorrectly. The purpose of this code was to allocate a code to a not specified response in a private dwelling, but it was used when an alternative code could have been allocated e.g. nun not living in a convent. If the respondent just stated 'relative' for relationship to the occupier, they were coded to '18', as there was no code for 'relative not specified'.

Consideration should be given to allocating a code to include school children boarding away from home for the week and returning home in the weekends. Some coders were allocating '13' for relationship and '9' for family code, whereas others were allocating '12', '14' or '15' and '1' or '7' respectively.

3.2.10.3 Recommendations

- that additional codes be added to the file, to include: -
  (i) relative not specified
  (ii) child boarding away from home during the school week.

3.3 Code Lists

3.3.1 Introduction

To code the 1986 Census a number of short code lists were created.

The code lists were used to code and edit questions which were either: - (i) tick box responses e.g. living arrangements
or (ii) derived from re-formatting procedure e.g. dwelling record type

Most code lists included a not specified code. Exceptions included:
- Personal Record type
  Q1 - Usual Residence indicator and usual residential address
  Q3 - 5 Year ago indicator and 5 year ago address
  Q4 - Sex
  Q5 - Date of birth (numeric field)
  Q6 - Relationship and Family Code
  Q20 - Job indicator

on the personal questionnaire, and dwelling record type and number of occupants on the dwelling questionnaire.

The value was imputed using information from other questions e.g. if respondent receives widow benefit, sex = female.

3.3.2 Evaluation

The code lists on the whole were very good and created few problems. The two code lists that created some problems were school qualifications and sector.

(i) School Qualifications
This question only came to the attention of the CAC operator if the "other" box was ticked. This came up at the inter-field editing stage and was a check to see if the code could be reallocated; if this was the case the operator actioned the change. As with 'other quals', the main problem was coding overseas qualifications, particularly USA, Canada and Pacific Islands. There were inconsistencies with 'no school quals', 'other quals' and 'not specified', as it was often difficult to determine if a response, was in fact, a valid school qualification.

This problem was never resolved during the Census processing, but to improve consistency in the future more research will need to be carried out to improve the list of valid school quals. It would also be a help to produce a list of invalid school quals.

(ii) Sector
This was difficult to understand, and few operators and supervisors had a really good understanding of Sector Classification. For the next Census, consideration should be given to having a knowledgeable person on sector classification conduct the training session.

The choice of sector codes was relatively small, 20 in all, which helped reduce the chance of errors or inconsistencies. Approximately 10% of all CAC errors were made coding this field.

The most common inconsistency was between '111' and '112' for unlisted businesses, as it was impossible to determine whether the company was registered or not. Many coded to '112', whereas others would code to '111' or '999'. There was no written decision, although '112' was verbally agreed upon by many, and favoured by quality control. It would be invaluable in future, to have the latest list of registered companies available on the Reference Section.

To improve sector coding in 1991 a more comprehensive list of examples would need to be available via an expansion key.

3.3.3 Recommendations

- that information on overseas school quals is available, and their equivalence to NZ quals determined.

- that thorough training on sector classification be given.

- that the sector code list include more comprehensive examples accessable via an expansion PF key.

4.0 JOB ORGANISATION

4.1 The Roster

4.1.1 Introduction

The CAC/Edit processing of the 1986 Census was carried out between April 1986 and May 1987.

There were 26 VDU's available for the job, and 84 CAC operators and 5 Referencing clerks employed. However, during the training course 6 CAC staff left, leaving 78. Two shifts operated and staff were employed to work on a specific shift. The am shift operated between 7.00am - 2.30pm, and the pm shift between 2.30pm - 10.00pm. Each operator worked a 7 hour day with ½ hour for a meal break.

The roster allowed operators to work 1 hour on the VDU and ½ hour referencing. All meal and tea breaks were rostered in the referencing time so that VDU time would not be lost. Theoretically, that meant the 26 VDU's were operating continuously 15 hours a day.

4.1.2 Evaluation of the CAC/Edit Roster

Each shift had 39 CAC operators, allowing for 3 groups of 13. The roster allowed for 26 staff to be on the terminals at one time, and 13 referencing in the Reference room. This roster had to be strictly adhered to. If staff were absent, the time allocated to them on the VDU, could be used by staff rostered for referencing.

The Roster

AM Shift	PM Shift	Group 1	Group 2	Group 3
7.00-7.30	2.30-3.00			
7.30-8.00	3.00-3.30			
8.00-8.30	3.30-4.00			
8.30-9.00	4.00-4.30			
9.00-9.30	4.30-5.00			
9.30-10.00	5.00-5.30			
10.00-10.30	5.30-6.00			tea pm
10.30-11.00	6.00-6.30	tea pm		
11.00-11.30	6.30-7.00		lunch am tea pm	
11.30-12.00	7.00-7.30			lunch am
12.00-12.30	7.30-8.00	lunch am		
12.30-1.00	8.00-8.30			
1.00-1.30	8.30-9.00			
1.30-2.00	9.00-9.30			
2.00-2.30	9.30-10.00			

VDU time

referencing time

Proposed Time Allocation Per Day

Total Work Time (hrs)	Total CAC Time (hrs)	Reference (hrs)			% of total time		
		Gross	Teabreak	Net	CAC	Referencing	teabreaks
7	5	2	1/3	$1^2/_3$	71.4	23.8	4.8

The proposed time allocated for CAC was 71.4% of the total work time, and for referencing 23.8%.

It was interesting to compare the proposed time allocated for CAC with the actual logon times, which were produced monthly for each operator.

The CAC logon times over 4 months were taken, and both the median and average figures were calculated on an hourly basis. Operators whose logon times were less than 40 hours a month were not considered, as in most cases these were supervisors, or operators who had been absent or had resigned during that month.

Actual CAC Logon Time Per Day

	Total Work Time (hrs)	Figures of Median Operator		Figures of Average Operator	
		logon time (hrs)	% of Total Time	logon time (hrs)	% of Total Time
Jan '87 - Feb '87	7	3.5	50	3.6	51.4
Feb - Mar	7	3.4	48.6	3.4	48.6
Mar - Apr	7	3.5	50	3.6	51.4
Apr - May	7	4.1	58.6	3.9	55.7

It is interesting to note that the median and average operators figures are very close.

When the proposed and actual CAC time was compared, the actual time was 13% - 23% lower than the proposed time. The logon time was lower than might have been expected, as from March staff who left were not replaced, thus freeing up more terminals and allowing individual operators more computer time.

The possible reasons for the lower logon time include:-

(i) LGR's being worked on required more referencing.
(ii) high absenteeism.

The roster suited some people, but others found it too inflexible. During the referencing time, operators had to sit in the Reference room regardless of whether or not they had referencing to do. In the early stages of the CAC processing, the ½ hour allocated was necessary to gain knowledge and understanding of the reference section; however, with more experience ½ hour was often too long. Although alternative work was found for staff not fully employed with referencing, this was not entirely satisfactory and was often carried out begrudgingly.

Most of the major staff problems were created during the referencing time, as staff not fully occupied, would talk in groups, read newspapers, and generally waste time. These habits developed prior to the CAC census processing, when staff training was extended due to computer system problems, and operators became bored. This was unfortunate as it was difficult to break these habits, and much unpleasantness was created when supervisors reprimanded staff.

In the latter 3-4 months of the CAC processing when staff vacancies were not being replaced, the situation of 1 VDU per operator arose. This allowed for maximum flexibility of the roster, as it enabled CAC operators to spend more time on the VDU if they had no referencing.

The main problem with this, was that after one hour on a VDU an operator was entitled, by PSA agreement, to a 10 minute break. However, when operators had no referencing, they just sat in the Reference room disturbing others who were trying to work.

In future, the situation of staff sitting in the Reference room with no referencing must be avoided, as this was the basis of many of the problems encountered.

4.1.3 Proposals and Recommendations for 1991

The proposals for 1991 are based on one shift for the CAC processing, as this immediately eliminates many of the problems encountered with a double shift operation. An operator would work a 7½ hour day and have ½ hour for lunch. All tea and lunch breaks within a group would be taken at the same time. An important requirement is the operation of a flexible roster.

There should be one VDU per operator, or as close as possible to a 1:1 ratio, so the roster would allow maximum flexibility. Operators would spend one hour on a terminal, and then would be entitled by PSA agreement, to a 10 minute break. During the break these staff would stay in the CAC area. Not all operators would take these breaks at one time, so the terminals would not come to a sudden halt.

One supervisor would be responsible for a small group, and a good rapport between the supervisor and operators should develop. The supervisors, with more feedback from Quality Control, should be well aware of the quality and output of work produced from operators within their group.

4.2 Proposals for 1991 CAC processing

A number of ways of carrying out the CAC processing for the 1991 Census have been considered. The preferred proposal is that CAC, Referencing and Editing be split into 3 phases.

1. CAC - up to labour force questions - data entry only.
2. CAC - only labour force questions - data entry only.
3. Referencing/Editing

The pros and cons need to be considered.

Pros

- staff would become specialists in their field, hence quality should improve.
- staff in Phases 1 and 2 would be data entry operators only.
- the Reference area would be restricted to the Reference/Editors thus eliminating the problems encountered in 1986.
- staff would sit at set terminals in a group with a supervisor, so supervision of their whereabouts should be no problem.

Cons

- more storage space for meshblocks would be required for 3 phases working independently.
- the allocation of time and staff to each phase could pose a problem, especially in the early stages of the processing. Some phases may work faster or slower than anticipated, as there may be too many or too few allocated to a phase. However most problems could be rectified reasonably easily and phase numbers adjusted accordingly.
- there could be misinterpretation of information on worksheets by reference clerks, however, having the meshblocks available would rectify this problem.

After considering the pros and cons, it is suggested that splitting the CAC processing into 3 separate phases be a worthwhile consideration for 1991. The most important factor this method has in its favour is that staff would be specialists in their field. This should result in output being of a higher quality than in the past, when all staff carried out all 3 phases. Most of the major problems likely to be encountered could be rectified reasonably easily.

4.3 Work Organisation Recommendations for 1991

- that all meshblocks are bar coded, and optical bar readers are installed on all sections so that meshblocks can be located at all times.
- that CAC supervisors are employed as 'supervisors', and that menial chores are not included in their duties.
- that trolley-persons are employed for moving and checking meshblocks to and from the CAC area.
- that more shelving be available for operators to store meshblocks being worked on, and personal belongings.

4.4 Supervision Recommendations for 1991

- that CAC supervisors have thorough training with the CAC system themselves, before training and supervising staff.
- that supervisors duties are clearly defined in writing.
- that one supervisor is responsible for one group of CAC operators.
- that weekly/fortnightly meetings be held with all CAC and Reference supervisors and the Senior Supervisor.
- that meetings with all processing supervisors and Census Controller be held from time to time.
- that targets are set, and all supervisors and operators are aware of them.
- that team talks are regular and provide stimulation for a team effort.
- that an individual operator's error rate and thruput figures are available through a supervisor.
- that coding decisions are immediate and in writing.
- that there is more communication between CAC and Quality Control.
- that coding decisions made at CAC are passed immediately to Quality Control.
- that 'new operators' have adequate training by a supervisor.

5.0 WORKING ENVIRONMENT

5.1 Recommendations for 1991

- that workstations are arranged in groups of 4 around a centre point,
- that screens are removed from around individual terminals, but some are used to divide groups,
- that supervisors sit with the group they are responsible for,
- that more space is allowed for shelving, and it is not constructed in doorway areas,
- that more shelving is available for meshblock storage and personal use,
- that the equipment (workstation, chair, lamp, VDU, keyboard) remain the same or similar,
- that the section is set up with shelving before CAC training begins,
- that ventilation MUST be reviewed, and consideration given to installing an air conditioning system.

6.0 QUALITY OF WORK

6.1 Introdution

The Quality Control section was on level 1, and initially consisted on one supervisor and six staff involved with the quality control of CAC. The CAC and QC operators underwent the same training, and QC staff were selected because of their high quality of work during the training checks. During the processing there was a change in staff, with additional operators transferred from clerical phases and others resigning.

The QC staff's main duties included:-

(i) an independent duplication of CAC coding.

(ii) verification of a listing of inconsistencies produced by the QC comparisons.

(iii) data entry - running checks on meshblocks and operators.
- worksheet data for CAC.

Generally am. shift QC operators did duplicate coding of meshblocks coded by pm shift CAC operators, and visa versa. A QC clerk never verified a meshblock he or she had coded.

6.2 Checks undertaken

The checks undertaken by QC to monitor CAC quality included:

1. Coding consistency
2. Error rates
3. Numbers checked
4. Breakdown of errors by field.
5. 'not specified' and 'vague' coding.
6. Performance rate
7. Unusual code allocation

6.2.1. Coding Consistency

This consistency check was carried out to monitor the number of inconsistencies in coding and to provide information on the fields causing most trouble.

The CAC operator coded all records in a meshblock and then an independent duplication of that meshblock was carried out by QC operators. The 2 versions were compared by a SAS program and a list of inconsistent codes were printed out. This printout was used for QC verification, and errors for CAC and CAQ (QC operators doing duplicate coding of CAC) operators were recorded. This method did not pick up all errors, as in the case where both coders used the same incorrect code. Duplicate coding comparisons made the coding more accurate as well as providing reasons for inconsistencies, that should prove invaluable for future improvements and refinements to the CAC system. Some of the reasons for inconsistencies included: - different interpretations, pre-capture errors, data punch errors, computer errors, insufficient knowledge of coding some fields and no written coding decisions for some problems.

Consistency rates for the various fields checked, were kept on a cumulative (overall) basis. All fields whether actioned at CAC or not were compared. Attempts were made to obtain consistency checks on only those fields which came up for CAC actioning, but technical problems made these checks unreliable.

There were more inconsistencies in the coding of the occupation field than any other. The consistency of the occupation field was measured in 3 ways:

OCC 4 - Consistency between all 4 digits
OCC 3 - Consistency between the first 3 digits
OCC 2 - Consistency between the first 2 digits

The overall consistency of OCC 4 was approximately 81%, compared with 88% for OCC 2, which was not as large a difference as might have been expected. The main reasons for the inconsistencies were: -

(i) Multiple occupations.
(ii) Confusion in coding certain farm-related occupations e.g. general mixed farmer.
(iii) No clear policy on coding respondents with a specific occupation and also some degree of authority e.g. boss, supervisor.

Although coding occupation had the most inconsistencies, it was not the most common cause of error, as many of the inconsistencies were acceptable due to the subjective interpretation of a vague or ambiguous response.

6.2.2 Error Rates

Monitoring error rates was the main method for Quality Control to monitor Quality.

Error rates were calculated as follows: -

$$\frac{\text{number of errors}}{\text{number of codes compared}} \times 100$$

The calculation represents a 'true' error rate, but presumes that operators have a chance of making errors in all fields compared, even though many fields do not come up for CAC actioning. For this reason the calculation is biased in favour of the operator.

To investigate the error rates of CAC, see Table I for a fortnightly comparison of certain error rate statistics.

TABLE I

Fortnightly Error Rate Statistics for CAC

fortnight ending	meshblocks checked	overall error rate	Median %	Mean %	highest error rate	lowest error rate	error rate ⩾ 2%	error rate < 0.5%
6/6/86	66	1.61	1.36	1.44	3.18	0.00	11	7
20/6	105	1.47	1.20	1.25	2.98	0.00	7	8
4/7	175	1.28	1.08	1.16	2.87	0.25	4	6
18/7	231	1.17	0.98	1.07	2.87	0.41	2	4
1/8	281	1.10	1.01	1.09	2.82	0.48	5	4
15/8	310	1.06	0.90	1.02	2.82	0.30	3	7
29/8	337	1.03	0.83	0.97	2.75	0.00	2	9
12/9	412	0.99	0.81	0.96	2.53	0.00	2	8
26/9			Data not availble					
10/10	538	0.90	0.79	0.86	2.30	0.37	2	7
24/10	657	0.89	0.75	0.85	2.11	0.37	2	7
7/11	740	0.87	0.75	0.83	2.01	0.32	2	9
21/11	806	0.85	0.74	0.81	2.00	0.32	1	8
5/12	885	0.84	0.72	0.80	1.98	0.32	0	9
19/12	919	0.82	0.71	0.79	1.98	0.32	0	8
31/12	986	0.81	0.68	0.77	1.87	0.32	0	8
9/1/87	1004	0.81	0.68	0.79	2.05	0.32	1	8
23/1	1124	0.83	0.70	0.83	1.87	0.41	0	4
6/2			Data not available					
20/2	1269	0.82	0.68	0.79	1.86	0.41	0	4
6/3	1389	0.81	0.68	0.77	1.77	0.40	0	5
20/3	1432	0.80	0.68	0.76	1.79	0.40	0	5
3/4	1479	0.80	0.68	0.77	1.75	0.39	0	6
24/4	1548	0.78	0.68	0.75	1.66	0.35	0	7

1. The figures quoted are not the true rates for that fortnight but of coding done in earlier weeks.
2. Overall error rate is $\frac{\text{Total CAC errors}}{\text{Total CAC codes}} \times 100$
3. The median is the middle error rate when they are all put in order.
4. The mean is the sum of all the error rates, divided by the number of operators checked. (i.e. average.)

The table shows the overall error rate from early June 1986 to the end of April 1987 dropped from 1.61% to 0.78%, a drop of 0.83%.

The mean and overall rates became very close over large numbers, but the median error rate was significantly lower. This indicates a much larger range of error rates are higher than the median, than the range of rates below it.

The error rates $\geq$ 2% dropped from '11' in June to '0' in December, and apart from one month stayed at '0'.

The error rate < 0.5% showed little change from start to finish.

6.2.3 Numbers Checked

During the CAC processing, approximately 5.45% of the records processed at CAC had been recoded and checked by Quality Control. At the end of April 1987 214,115 records had been checked at Quality Control from the 3,925,323 processed through CAC. Table II shows the percentage of records quality controlled each month throughout the CAC processing. The percentage of records checked rose significantly in September when additional staff were taken on at Quality Control. In the latter few weeks of the CAC processing, quality control checks were cut dramatically as shown in the figures.

With only 5.45% of total records processed at CAC checked, this was hardly enough to be totally effective, and in future the aim should be to check a minimum of 10%. This should be possible with a refinement of the present Quality Control system, extra terminals, and top quality staff.

TABLE II

Percentage of CAC Records Quality Controlled

	CAC Records	CAQ Records	Current %	Overall %
01/04/86 - 31/05/86	233559	6470	2.77	2.77
01/06/86 - 30/06/86 June	291910	10638	3.64	
01/04/86 - 30/06/86	525469	17108		3.26
01/07/86 - 31/07/86 July	339937	16524	4.86	
01/04/86 - 31/07/86	865406	33632		3.88
01/08/86 - 31/08/86 Aug	362763	13576	3.74	
01/04/86 - 31/08/86	1228169	47208		3.84
01/09/86 - 30/09/86 Sept	349104	22897	6.56	
01/04/86 - 30/09/86	1577273	70105		4.44
01/10/86 - 31/10/86 Oct	410845	27808	6.77	
01/04/86 - 31/10/86	1988118	97913		4.92
01/11/86 - 30/11/86 Nov	314914	20359	6.46	
01/04/86 - 30/11/86	2303032	118272		5.14
01/12/86 - 31/12/86 Dec	294583	18070	6.13	
01/04/86 - 31/12/86	2597615	136342		5.25
01/01/87 - 31/01/87 Jan	314170	21414	6.82	
01/04/86 - 31/01/87	2911785	157756		5.42
01/02/87 - 28/02/87 Feb	328384	27696	8.43	
01/04/86 - 28/02/87	3240169	185452		5.72
01/03/87 - 31/03/87 Mar	343855	19869	5.78	
01/04/86 - 31/03/87	3584024	205321		5.73
01/04/87 - 30/04/87 Apr	341299	8794	2.58	
01/04/86 - 30/04/87	3925323	214115		5.45

6.2.4 Breakdown of Errors by Field

At Quality Control 13 fields were checked for inconsistencies. These were: -

Usual residence - USRES
Address 5 years ago - AU5YR
Relationship to occupier - RELN
Family code - FAMCO
Birthplace - BTHPL

Ethnic Origin - ETHOR1 - ETHOR 3
Religion - RELIG
School Qualifications - SCQLN
Other Qualifications - QUAL1 - QUAL3
Occupation - OCC
Industry - IND
Sector - SECT
Workaddress - WKADD
Absentee Code - ABS1

Apart from 4 of these fields (RELN, FAMCO, SCQLN, ABS1), all were CAC fields.

The breakdown of CAC errors by field was most useful in determining where the problem areas were. It was found, as expected, that the most troublesome fields were: -

(i) labour force - OCC, IND, SECT, WKADD
(ii) location - USRES, AU5YR, WKADD
(iii) qualifications - SCQLN, QUAL 1-3

Figures were produced on the breakdown of CAC errors in the 13 checked fields.

From the figures* in Table III, it can be deduced that: -

(i) 75.5% errors in labour force coding.
(ii) 36.4% errors in location coding.
(iii) 8.7% errors in qualifications.

* workaddress is included in (i) labour force coding and (ii) location coding which is why the total errors is more than 100%.

TABLE III Breakdown of CAC errors by field

FIELD	number of errors	% of all errors
USRES	411	2.23
AU5YR	1607	8.71
RELN	114	0.62
FAMCO	194	1.05
BTHPL	71	0.38
ETHOR	179	0.97
RELIG	337	1.83
QUALS	1111	6.02
OCC	4473	24.23
SECT	1760	9.53
WKADD	4696	25.44
IND	3005	16.28
SCQLN	502	2.72
TOTALS	18460	7.69

The total % of all errors, i.e. 7.69, is the average % of the 13 CAC fields.

There were also figures produced showing the breakdown of CAC errors by field and operator as shown in Table IV.

TABLE IV

BREAKDOWN OF CAC ERRORS BY FIELD AND OPERATOR (%) 17:11 TUESDAY, DECEMBER 9, 1986

OPERATOR	w.bs	Error Rate	USRES	AUSYR	RELN	FANCD	BTHPL	ETHOR	RELIG	SCOLN	QUALS	OCC	SECT	WKADD	IND
2	15	1.06	6.00	9.00	2.00	1.33	0.66	0.66	1.33	3.66	7.66	20.33	12.66	23.00	11.66
3	10	1.11	1.23	13.58	0.00	1.85	0.00	0.00	0.00	1.85	6.79	22.22	9.87	26.54	16.66
4	12	0.57	1.06	9.57	2.12	1.06	0.00	0.00	5.31	1.06	6.38	28.72	9.57	23.40	17.02
5	12	0.72	0.00	7.01	2.63	0.00	0.87	0.00	0.00	0.00	10.52	27.19	8.77	21.92	20.17
6	7	1.24	5.93	5.93	0.00	1.69	0.00	0.00	0.00	2.54	13.55	27.11	11.01	18.64	13.55
7	12	0.38	1.38	4.16	2.77	0.00	2.77	0.00	0.00	1.38	13.83	22.22	13.88	23.61	13.88
8	12	0.52	5.81	9.30	0.00	2.32	0.00	1.16	4.65	0.00	10.46	23.25	9.30	17.44	16.27
12	20	1.92	1.62	11.81	1.01	0.61	0.40	0.40	3.46	1.01	4.48	22.81	11.60	26.68	14.25
15	13	0.45	1.42	14.28	2.85	1.42	1.42	1.42	1.42	4.28	10.00	20.00	11.42	17.14	12.85
16	15	0.74	0.70	5.67	2.12	0.70	4.96	0.00	3.54	0.70	5.67	22.69	12.05	21.98	18.43
17	15	1.07	5.26	10.52	0.40	4.45	0.40	1.61	2.02	0.80	4.85	23.88	6.88	28.34	16.19
19	13	0.63	2.75	12.84	0.00	2.75	0.00	0.91	0.00	0.00	8.25	17.43	13.76	35.77	5.50
20	12	0.66	1.78	12.50	4.46	0.00	0.00	0.89	3.57	0.00	5.35	13.39	10.71	36.60	11.60
22	10	0.54	2.94	13.23	2.94	2.94	0.00	0.00	0.00	1.47	13.23	22.05	5.88	32.35	8.82
23	12	0.73	0.00	5.98	0.00	0.00	0.00	3.41	6.83	0.00	6.83	25.64	8.54	23.93	17.94
24	10	0.31	5.12	12.82	0.00	5.12	0.00	0.00	2.56	0.00	12.82	23.07	7.69	30.76	0.00
25	9	0.39	0.00	5.76	0.00	0.00	0.00	0.00	0.00	0.00	11.53	32.69	11.53	26.92	11.53
26	12	0.59	1.04	19.79	2.08	2.08	0.00	3.12	1.04	1.04	5.20	19.79	13.54	16.66	14.58
27	11	0.73	0.00	13.13	0.00	0.00	0.00	4.04	0.00	3.03	8.08	18.18	8.08	28.28	17.17
29	17	1.03	1.22	10.24	0.00	0.00	0.00	1.22	1.22	1.63	5.32	25.81	11.88	27.45	13.52
31	17	1.02	2.26	9.50	2.71	1.80	0.00	0.45	0.90	2.26	4.97	19.00	11.31	28.95	15.83
33	12	0.76	2.91	9.48	0.00	1.45	0.00	0.00	2.18	0.72	12.40	18.24	8.75	24.08	19.70
34	10	0.79	2.63	8.77	1.75	2.63	0.00	0.00	2.63	4.38	8.77	21.05	10.52	19.29	17.54
35	17	0.91	3.46	11.88	0.49	2.47	0.00	0.49	1.48	0.99	6.93	21.78	9.90	27.72	14.35
36	14	1.02	6.38	9.04	0.53	4.78	0.00	0.53	1.06	4.78	8.51	19.68	8.51	22.34	13.29
38	13	1.28	0.47	13.20	1.41	0.47	0.94	1.88	0.47	0.94	7.54	19.81	9.90	27.35	15.56
40	11	0.76	0.97	3.88	0.00	0.97	0.00	1.94	0.97	1.94	6.79	30.09	6.79	24.27	21.35
41	15	1.04	1.43	10.52	0.95	1.43	0.47	0.47	1.43	0.47	6.69	22.48	8.61	26.31	18.66
42	11	0.67	2.12	9.57	1.06	2.12	1.06	1.06	1.06	1.06	7.44	22.34	8.51	24.46	18.08
43	15	0.80	2.33	9.35	0.00	0.00	0.00	0.00	1.16	0.58	9.94	20.46	9.35	31.57	14.61
44	11	0.49	4.61	9.23	0.00	0.00	0.00	3.07	1.53	4.61	4.61	20.00	10.76	23.07	20.00
45	10	0.50	8.47	5.08	0.00	3.38	0.00	0.00	0.00	5.08	5.08	15.25	5.08	28.81	23.72
46	7	1.09	5.37	5.37	2.15	1.07	0.00	1.07	0.00	3.22	5.37	30.10	7.52	18.27	20.43
48	11	0.86	4.51	6.01	0.00	0.00	0.75	0.75	3.00	0.75	5.26	24.81	8.27	33.08	13.53
49	10	0.54	6.94	6.94	0.00	0.00	0.00	0.00	1.38	2.77	6.94	25.00	6.94	27.77	15.27
50	14	1.24	0.46	9.76	0.46	0.46	0.46	0.00	1.39	2.32	8.83	26.04	9.30	30.69	13.95
51	14	1.12	3.53	13.63	1.01	4.04	0.00	0.50	1.01	0.00	3.03	23.73	11.61	20.20	17.17
52	11	0.53	6.75	6.75	0.00	6.75	0.00	0.00	1.35	0.00	6.75	18.91	17.56	24.32	9.45
53	11	0.91	2.58	9.48	0.86	0.00	0.00	0.86	0.00	2.58	6.89	29.31	9.48	25.86	14.65
54	11	0.75	3.63	7.27	0.00	0.90	0.90	0.00	2.72	0.90	9.09	21.81	13.63	29.09	9.09
55	8	0.49	0.00	10.16	3.38	3.38	0.00	0.00	3.38	1.69	11.86	30.50	10.16	18.64	6.77
56	11	0.59	0.00	3.61	0.00	1.20	0.00	1.20	3.61	2.40	9.63	34.93	6.02	27.71	9.63
57	7	1.52	0.68	6.12	0.68	1.36	0.00	0.00	2.72	0.00	8.84	21.08	14.28	28.57	15.64
58	9	0.62	4.05	10.81	0.00	2.70	0.00	0.00	5.40	5.40	10.81	16.21	10.81	20.27	13.51
61	11	0.88	2.52	7.56	0.00	2.52	0.00	1.68	0.84	1.68	10.08	26.89	13.44	15.96	16.80
63	12	0.72	0.97	11.65	0.00	4.85	0.97	1.94	0.00	0.00	6.79	19.41	13.59	23.30	18.44
64	10	0.69	0.00	0.00	0.00	0.00	0.00	0.00	5.33	4.00	10.66	29.33	8.00	28.00	14.66
65	9	0.43	2.00	12.00	0.00	4.00	0.00	0.00	4.00	0.00	2.00	26.00	8.00	18.00	24.00
67	16	1.33	0.00	8.65	0.69	0.00	0.34	1.38	1.73	2.76	5.19	28.37	11.76	20.41	19.37
69	17	1.25	2.29	9.18	0.51	1.53	0.00	2.80	3.31	6.63	5.61	22.44	9.94	25.51	10.71
70	10	0.77	1.03	16.49	0.00	0.00	0.00	7.21	1.03	0.00	3.09	19.58	6.18	31.95	15.46
71	14	0.93	4.10	8.71	0.51	1.02	0.00	1.02	0.51	1.53	5.12	19.48	5.64	38.46	14.35
72	13	1.40	1.20	12.40	0.40	2.00	0.00	0.80	1.60	0.40	4.80	26.00	8.80	26.00	16.80
74	10	0.45	0.00	13.84	0.00	0.00	0.00	1.53	0.00	1.53	7.69	27.69	7.69	26.15	13.84
76	14	1.97	3.74	8.43	0.46	0.23	0.00	0.23	1.40	0.00	4.68	19.43	6.55	37.47	17.33
78	11	0.76	1.12	12.35	0.00	0.00	1.12	6.74	1.12	2.24	5.61	28.08	8.98	21.34	12.35
80	11	0.93	3.05	6.87	2.29	3.05	0.76	2.29	1.52	1.52	7.63	16.79	6.87	26.71	20.61
81	11	0.64	0.95	9.52	3.80	2.85	0.00	0.95	0.95	0.00	10.47	22.85	8.57	22.85	16.19
82	9	0.52	1.63	9.83	0.00	0.00	0.00	1.63	1.63	0.00	6.55	24.59	8.19	26.22	19.67
83	11	0.74	4.71	6.60	0.00	2.83	0.00	2.83	1.88	3.77	6.60	24.52	16.98	20.75	11.32
84	11	0.63	4.39	8.79	0.00	0.00	0.00	0.00	2.19	2.19	8.79	17.58	12.08	24.17	18.68
85	11	0.68	1.86	11.21	0.00	3.73	0.00	0.93	1.86	1.86	6.54	20.56	9.34	24.29	17.75
86	10	0.66	1.80	10.81	0.00	0.00	0.90	0.90	5.40	1.80	2.70	26.12	7.20	28.82	14.41
87	7	0.58	2.22	11.11	2.22	0.00	0.00	2.22	0.00	4.44	11.11	28.88	4.44	24.44	11.11
88	9	0.64	1.29	6.49	0.00	0.00	0.00	0.00	2.59	0.00	6.49	35.06	10.38	19.48	18.18
89	11	0.60	2.32	6.97	1.16	3.48	2.32	0.00	2.32	1.16	12.79	19.76	13.95	23.25	11.62
90	10	0.43	2.08	20.83	2.08	0.00	2.08	2.08	2.08	2.08	6.25	20.83	8.33	16.66	14.58
91	10	0.63	1.38	6.94	0.00	0.00	0.00	0.00	1.38	2.77	5.55	26.38	15.27	25.00	15.27
92	10	0.40	3.17	6.34	1.58	3.17	0.00	0.00	1.58	0.00	11.11	14.28	7.93	30.15	20.63
93	11	0.60	6.60	16.98	0.94	4.71	0.94	0.00	0.94	1.88	2.83	26.41	12.26	10.37	15.09
94	11	0.69	1.85	16.66	1.85	0.92	0.00	0.00	0.92	0.92	7.40	25.00	8.33	20.37	15.74
95	8	1.23	0.00	12.96	0.00	0.00	0.00	1.85	1.85	2.77	6.48	25.92	5.55	25.92	17.59
96	9	0.58	6.00	10.00	0.00	0.00	0.00	2.00	0.00	2.00	6.00	26.00	6.00	24.00	18.00
97	8	0.66	3.17	6.34	0.00	0.00	0.00	0.00	1.58	6.34	3.17	23.80	12.69	28.57	14.28
98	10	0.55	0.00	5.26	0.00	0.00	0.00	1.31	2.63	0.00	9.21	27.63	10.52	27.63	17.10

There were figures produced for individual fields that came up for CAC actioning, however technical problems prevented accurate figures being produced. Hopefully for 1991 the problems will be ironed out and accurate error rates on 'actioned' CAC fields will be obtainable.

In future it is suggested that some checks be run on only selected CAC fields that produce a high number of errors. In order to know which fields are of the high error variety, all fields will need to be analysed.

6.2.5 'Not specified' and 'vague' coding

'Not specified' codes are those processed with all '9's' in the field. Vague coding has been defined for the purpose of this check to be those occupation and industry codes involving 'n.e.c.' or 'n.o.d.' etc., and locations coded to area unit, local authority or local government region when they were expected to be coded to meshblock level.

These rates were monitored on a cumulative basis, so that no account was taken as to whether 'not specified' or 'vague' codes were actioned at CAC or not.

6.2.5.1 'Not Specified' Coding

Tables were produced showing: -

(i) 'Not Specified' coding - for all operators, an example is shown in Table V.

TABLE V

NOT SPECIFIED CODING - For All Operators. (Mean %)

VARIABLE	MEAN
USRES	0.13
AU5YR	1.29
BTHPL	0.65
ETHOR1	1.09
ETHOR2	95.65
ETHOR3	99.71
RELIG	1.83
QUAL1	6.99
QUAL2	33.43
QUAL3	86.28
SWBEN1	3.63
SWBEN2	73.53
SWBEN3	86.23
OCC	0.38
IND	0.75
SECT	0.62
WKADD	1.36
NSRATE	37.49

The figures were very much as expected with ETHOR2 and 3, QUAL2 and 3, and SWBEN2 and 3 having high non-response rates, and all other figures were low. The 'not specified' rate of 37.49% takes into account all fields whether actioned at CAC or not.

(ii) 'Not Specified' fields for each operator and for all CAC fields. An example is shown in Table VI.

TABLE VI

Not specified fields- for all CAC fields 1:14 THURSDAY, NOVEMBER 27, 19[illegible]

OPERATOR	NSRATE	MESHS	USRES	AUSYR	BTHPL	ETHOR1	ETHOR2	ETHOR3	RELIG	SWBEN1	SWBEN2	SWBEN3	QUAL1	QUAL2	QUAL3	OCC	IND	SECT	UKADD
2	37.60	8	0.00	1.82	0.75	1.18	95.26	100.00	1.72	2.33	91.74	99.72	3.40	96.28	99.55	1.53	1.53	1.31	4.82
3	37.16	4	0.00	1.65	0.00	0.33	95.04	99.33	0.66	3.62	92.74	99.59	2.82	97.53	99.19	0.61	1.23	0.00	0.61
4	37.81	4	0.00	0.33	0.00	0.33	97.53	100.00	1.32	2.97	91.06	99.14	12.76	94.89	99.57	1.39	0.69	0.69	0.69
5	37.97	3	0.41	0.82	0.00	0.82	93.76	100.00	0.82	5.29	92.59	98.41	5.82	95.76	100.00	0.00	0.00	0.00	0.00
6	38.30	2	4.13	5.51	0.00	0.68	96.55	100.00	5.51	7.07	93.93	100.00	8.08	92.92	98.98	0.00	0.00	0.00	0.00
7	38.65	4	1.27	0.95	0.95	1.59	97.44	99.68	1.91	4.93	95.16	99.62	7.43	97.02	100.00	0.59	1.18	1.77	0.59
8	37.84	3	0.00	0.00	0.00	0.72	97.81	100.00	0.36	5.46	95.37	100.00	8.82	94.11	98.73	0.00	0.00	0.00	4.34
12	38.27	4	0.00	0.29	0.00	2.34	99.70	100.00	0.29	3.44	91.95	100.00	9.57	96.93	100.00	0.00	1.32	0.00	1.32
15	37.67	2	0.00	0.00	0.00	0.00	100.00	100.00	2.89	11.32	89.24	100.00	12.90	93.54	98.92	0.00	0.00	0.00	3.50
16	36.53	3	0.00	1.93	0.00	0.48	90.82	98.06	0.96	2.65	85.23	97.31	7.38	97.31	99.32	0.00	0.59	4.39	1.07
17	36.35	3	0.00	1.11	1.48	2.22	84.81	100.00	1.48	2.13	80.87	96.17	7.65	96.72	100.00	1.03	0.00	0.00	1.08
19	36.16	5	0.00	0.00	0.00	1.27	94.05	100.00	1.29	5.22	87.10	99.65	9.75	98.60	100.00	0.00	0.46	0.00	0.46
20	35.21	2	0.00	1.33	0.00	1.33	96.66	100.00	0.00	7.29	85.41	98.95	5.20	93.95	100.00	0.00	1.29	1.29	0.00
22	36.72	4	0.66	1.32	0.66	0.66	83.74	100.00	1.98	7.55	80.10	96.93	10.71	97.95	100.00	0.96	0.00	0.00	2.88
23	36.99	3	0.00	0.49	0.00	0.00	96.03	100.00	0.49	0.09	89.39	100.00	2.51	98.11	100.00	0.00	2.00	1.00	3.00
24	37.15	1	0.00	0.00	0.00	0.00	95.77	100.00	0.00	1.78	96.21	100.00	7.14	94.64	98.21	0.00	0.00	0.00	0.00
25	36.72	2	0.00	0.00	0.00	0.00	95.20	100.00	1.36	3.50	92.33	100.00	8.57	96.19	100.00	0.00	0.00	0.00	0.00
26	37.91	1	0.00	2.46	0.00	0.00	100.00	100.00	1.23	4.76	98.41	100.00	6.34	93.65	100.00	0.00	0.00	0.00	0.00
27	36.27	3	0.00	2.02	0.33	0.67	95.60	99.66	1.68	2.33	90.65	99.53	7.00	92.52	100.00	0.00	0.00	0.00	0.67
29	36.23	6	0.00	1.31	0.29	1.31	93.29	99.70	2.18	3.62	89.91	99.79	6.85	97.58	99.79	0.27	0.27	0.27	0.83
30	36.79	5	0.00	0.18	0.18	0.00	93.03	99.81	0.74	3.40	89.52	99.73	8.90	97.38	99.73	0.42	0.42	0.42	0.85
31	39.73	5	0.00	0.72	0.48	1.15	96.06	99.76	3.70	7.91	94.23	99.13	23.05	96.54	99.71	0.00	1.63	1.63	1.09
33	33.93	5	0.00	0.71	0.00	0.00	95.70	99.76	2.62	6.27	91.56	99.70	8.72	94.47	99.12	0.00	0.58	0.00	0.00
34	40.16	4	0.83	2.22	2.50	3.05	97.22	100.00	3.33	3.69	91.45	99.64	12.45	96.44	99.28	0.00	1.50	0.00	7.51
35	36.96	5	0.00	0.21	0.43	0.36	97.20	100.00	1.07	2.29	90.83	99.71	5.15	93.40	99.42	0.00	0.00	0.00	0.93
36	37.27	4	0.00	2.93	2.60	2.60	94.46	100.00	2.93	4.18	90.37	99.58	4.60	96.23	98.74	0.00	0.61	0.61	1.85
38	37.40	5	0.00	0.63	1.05	1.69	94.27	98.30	3.38	6.74	85.56	99.41	10.55	97.06	100.00	1.38	1.38	0.92	2.30
40	37.78	6	0.00	0.81	0.49	0.98	95.90	99.83	1.47	3.79	93.45	99.78	13.08	95.78	99.36	0.00	0.33	0.00	0.33
41	37.63	4	0.00	1.22	0.40	1.43	96.31	99.77	2.66	3.53	92.56	98.20	7.43	95.64	99.48	0.00	1.97	0.00	3.55
42	37.23	4	0.00	0.00	0.00	0.00	98.32	100.00	0.58	2.75	93.30	100.00	6.69	96.85	100.00	0.00	0.00	0.00	0.00
43	38.31	4	0.00	2.00	1.80	1.60	95.39	99.59	2.20	4.37	90.51	99.48	4.35	96.15	99.48	0.00	1.42	0.95	0.47
44	37.68	4	0.26	1.88	0.80	1.88	95.14	100.00	1.34	4.90	89.05	99.62	7.54	96.60	99.24	0.00	1.94	1.29	3.89
45	37.00	3	0.00	0.32	0.32	0.32	97.41	100.00	0.96	1.65	88.79	100.00	5.39	95.43	99.58	0.66	1.32	0.66	0.66
46	35.54	3	0.00	0.86	0.00	0.00	96.26	100.00	0.28	1.22	88.57	100.00	0.31	95.51	99.59	0.00	0.00	0.00	0.58
48	35.65	3	0.00	0.49	0.00	0.49	92.53	92.50	1.49	7.09	90.20	99.30	5.59	99.30	100.00	0.00	0.00	0.00	0.00
49	37.41	4	0.21	1.07	0.86	1.50	92.62	100.00	1.93	5.75	88.62	98.50	8.38	97.90	100.00	0.00	1.01	1.01	2.02
50	37.77	2	0.00	1.58	0.79	0.00	97.61	100.00	0.00	4.39	90.10	100.00	12.08	95.60	98.90	1.92	0.00	0.00	0.00
51	37.51	5	0.00	1.36	2.56	2.79	89.27	98.60	4.42	6.64	84.26	99.65	6.29	98.60	100.00	1.30	1.96	1.96	3.26
52	37.92	2	0.00	1.30	0.32	1.30	95.40	100.00	2.61	4.04	72.05	78.45	5.05	75.42	77.44	0.61	0.61	0.61	1.84
53	40.80	4	0.57	2.59	1.15	3.45	97.69	99.71	3.17	4.74	77.09	81.84	15.08	80.44	82.12	0.69	0.00	0.00	0.00
54	37.79	3	0.00	0.51	0.00	0.51	97.66	99.43	1.55	3.02	77.47	81.86	3.57	76.09	81.86	0.00	0.00	0.00	3.48
55	36.56	2	0.00	0.00	0.00	0.00	96.37	100.00	1.25	0.56	61.79	63.48	0.56	58.42	62.92	0.00	0.00	0.00	1.47
56	38.39	5	0.00	2.22	2.22	3.61	95.00	99.72	3.33	6.45	72.99	80.41	15.13	77.44	80.71	0.00	0.57	1.15	0.57
57	38.35	3	0.00	0.00	0.00	3.42	97.33	100.00	0.76	4.10	63.28	76.11	10.32	72.76	74.25	1.70	0.55	0.85	0.00
58	34.06	1	0.00	0.00	0.00	0.00	91.73	100.00	3.22	0.73	23.42	37.25	0.00	37.25	37.25	0.00	0.00	0.00	0.00
61	36.56	2	0.00	1.85	1.23	1.23	89.50	98.76	1.23	5.17	57.30	62.92	3.93	61.23	62.92	2.87	1.44	1.44	1.44
63	37.08	4	0.21	1.47	0.00	0.21	96.90	99.36	0.42	2.72	81.17	85.45	5.39	80.04	84.35	0.39	1.19	0.79	1.19
64	37.53	3	0.00	0.41	0.00	0.41	95.85	100.00	0.00	1.14	70.58	75.47	7.66	70.58	74.71	0.00	0.39	0.90	1.61
65	36.10	2	0.00	0.00	0.53	0.00	93.52	100.00	0.58	0.55	53.59	62.98	4.97	59.11	63.53	0.00	0.00	0.00	0.00
67	38.48	3	0.00	7.65	5.10	7.23	76.17	93.29	7.23	6.76	71.42	75.18	9.77	73.68	75.56	0.00	0.00	0.00	0.00
69	35.93	4	0.00	0.37	0.00	0.56	92.33	99.25	2.24	3.54	69.97	82.97	3.78	82.97	84.63	0.00	0.46	0.46	0.46
70	36.29	5	0.54	0.82	0.54	0.82	95.43	100.00	3.28	2.58	72.31	78.50	2.93	77.19	79.15	0.00	0.00	0.00	0.00
71	37.13	5	0.00	0.75	0.00	0.51	95.79	99.53	1.40	1.39	80.32	87.83	5.72	85.50	86.17	0.62	0.31	0.00	5.43
72	39.73	5	0.00	1.69	0.00	1.20	94.44	100.00	0.96	5.31	73.31	83.67	7.65	81.12	82.90	1.15	1.73	1.15	2.31

6.2.5.2 'Vague' Coding

The variables checked for 'vague' coding were: -

USRESV1 - coding of usual residence at area unit level
USRESV2 - coding of usual residence at local authority level
USRESV3 - coding of usual residence at local government region level
AU5YRV2 - coding of 5 years ago address at local authority level
AU5YRV3 - coding of 5 years ago address at local government region level
OCCV - vague occupation coding
INDV - vague industry coding
WKADDV1 - coding of work address at area unit level
WKADDV2 - coding of work address at local authority level
WKADDV3 - coding of work address at local government region level
VRate - overall mean vague coding rate as a percentage

Tables were produced showing: -

(i) 'vague' coding - for all operators as shown in Table VII

TABLE VII

VAGUE CODING - For All Operators. (Mean %)

VARIABLE	MEAN
USRESV1	0.29
USRESV2	0.08
USRESV3	0.20
AU5YRV2	0.75
AU5YRV3	0.26
OCCV	3.31
INDV	2.01
WKADDV1	25.92
WKADDV2	3.45
WKADDV3	2.73
VRATE	6.74

These figures were low, except for the coding of work address at area unit level, and as many work addresses, especially in rural areas, were automatically coded to that level, rather than meshblock, that would be expected. The overall rate of 6.74% was due more to vague responses on the PQ, rather than to lazy coding.

(ii) 'vague' coding rates - for each operator and for various fields as shown in Table VIII.

TABLE VIII

Vague coding - for various fields

OPERATOR	VRATE	MESHS	USRESV1	USRESV2	USRESV3	AUSYRV2	AUSYRV3	OCCV	INDV	WKADDV1	WKADDV2	WKADDV3
2	8.57	6	0.75	0.21	2.56	0.75	0.53	4.33	2.19	23.94	3.72	1.09
3	7.52	4	0.35	0.00	0.00	0.99	0.00	2.46	3.05	27.27	3.70	0.61
4	5.00	4	0.00	0.00	0.00	0.99	1.32	1.39	3.49	16.78	1.39	2.79
5	7.02	3	0.41	0.00	0.00	0.41	0.82	0.91	1.33	25.44	8.25	3.66
6	2.32	2	1.37	0.00	0.00	0.00	0.00	0.00	5.76	7.69	0.00	1.92
7	6.37	4	0.00	0.00	0.00	1.59	0.00	2.36	5.32	15.97	3.55	4.73
8	7.06	3	0.00	0.00	0.72	0.00	0.00	3.72	1.24	22.36	1.86	3.72
12	3.35	4	0.00	0.00	0.00	0.58	0.00	6.62	3.31	3.97	3.31	3.97
15	3.38	2	0.00	0.00	0.72	0.00	0.00	1.75	0.00	8.77	10.52	0.00
16	5.95	3	0.00	0.00	0.00	0.00	0.00	5.49	5.39	8.79	12.08	7.69
17	6.27	3	0.00	0.00	0.00	0.74	0.37	4.34	6.52	30.43	7.60	3.26
19	10.77	5	0.00	0.00	0.00	0.00	1.03	2.80	2.30	40.18	0.00	2.33
20	22.40	2	0.00	0.00	0.00	0.66	0.66	1.29	1.29	96.10	2.59	0.00
22	6.59	4	0.00	0.33	0.33	1.65	0.00	7.69	3.96	30.76	5.76	0.96
23	9.98	3	0.00	0.00	0.00	2.47	1.48	5.00	1.00	32.00	4.00	2.00
24	4.45	1	0.00	0.00	0.00	0.00	0.00	5.55	0.00	9.00	2.77	16.66
25	2.25	2	0.00	0.00	0.00	1.36	0.00	5.79	1.44	30.43	2.89	4.34
26	3.46	1	0.00	0.00	0.00	0.00	0.00	2.50	5.00	2.50	0.00	10.00
27	3.54	3	0.00	0.00	0.00	0.00	0.00	3.37	2.02	4.05	1.35	8.10
29	6.38	6	0.00	0.00	1.02	0.00	0.43	2.51	2.23	15.92	2.23	6.14
30	6.27	5	0.56	0.00	0.18	0.93	0.37	5.55	1.23	26.92	1.70	0.42
31	4.57	5	0.69	0.23	0.23	0.92	0.23	4.37	0.54	15.30	7.10	1.09
33	6.92	5	0.23	0.23	0.00	0.95	0.71	1.75	3.58	39.76	2.33	2.33
34	6.78	4	1.11	0.00	0.00	0.27	0.00	1.50	1.50	45.11	3.75	1.50
35	4.95	5	0.43	0.00	0.00	0.43	0.00	2.32	0.46	29.93	5.11	0.00
36	6.93	4	0.00	0.00	0.65	2.93	0.00	3.03	4.32	14.31	2.46	4.93
38	6.23	5	0.21	0.00	0.42	0.21	0.42	5.99	3.22	17.97	3.22	4.60
40	5.95	6	0.00	0.00	0.32	0.49	0.00	1.67	1.67	19.06	4.68	6.02
41	2.66	4	0.00	0.00	0.00	0.20	0.20	2.76	2.76	3.55	0.39	4.34
42	2.99	4	0.00	0.00	0.00	1.47	0.29	4.34	1.36	3.10	2.48	1.36
43	4.16	4	0.00	0.00	0.00	1.30	0.60	4.28	4.28	11.42	1.42	3.33
44	7.62	4	0.26	0.00	0.26	2.42	0.00	2.59	4.34	35.71	3.24	0.00
45	4.39	3	0.00	0.00	0.32	0.00	0.32	3.57	0.00	16.55	1.98	1.98
46	11.53	3	0.28	0.00	0.00	1.43	0.00	0.00	2.90	52.32	2.90	0.00
48	13.48	3	0.49	0.00	0.00	0.00	0.00	0.56	1.72	53.84	7.69	1.92
49	6.12	4	0.21	0.21	0.43	0.21	0.00	1.61	2.32	25.75	6.56	3.53
50	5.42	2	0.00	0.00	0.79	0.00	0.00	3.34	1.92	25.00	5.76	0.00
51	4.77	5	0.46	0.23	0.00	0.93	0.23	1.96	1.30	26.14	4.57	0.00
52	10.34	2	1.96	0.00	0.00	0.65	0.00	3.06	0.00	39.26	4.29	0.61
53	5.50	4	0.28	0.00	0.28	1.44	0.86	2.77	2.77	28.47	2.77	0.00
54	2.85	3	0.25	0.00	0.77	0.00	0.00	4.65	2.79	3.48	1.16	4.65
55	7.64	2	0.00	0.00	0.00	0.00	0.00	1.47	2.94	41.17	0.00	5.88
56	10.98	5	0.35	0.00	0.00	1.11	1.11	1.15	0.46	50.86	1.73	4.62
57	3.43	3	0.38	0.00	0.00	2.28	0.76	5.12	2.28	3.41	4.27	0.00
58	19.86	1	0.00	0.00	0.00	1.61	0.00	0.00	0.00	120.00	0.00	0.00
61	4.13	2	0.00	0.61	0.00	0.61	0.00	7.24	1.44	5.69	4.34	2.39
63	4.00	4	0.00	0.00	0.42	0.42	0.42	4.36	3.13	1.93	1.19	7.93
64	2.23	3	0.00	0.00	0.00	0.41	0.00	5.64	0.00	3.22	2.41	0.80
65	2.53	2	0.00	0.00	0.00	1.76	0.00	6.34	0.00	4.76	3.17	1.58
67	25.17	3	2.12	0.00	0.42	1.27	0.42	2.43	0.43	30.43	0.00	0.00
69	2.87	4	0.00	0.00	0.00	0.00	0.00	4.14	3.29	3.29	1.84	2.30
70	11.76	5	0.54	0.27	0.00	0.27	0.27	2.95	1.11	19.11	3.67	1.18
71	4.69	5	1.71	0.31	0.31	0.62	0.31	2.50	1.87	11.87	1.87	1.87
72	3.55	5	0.00	0.24	0.48	0.72	0.00	2.89	2.41	13.29	4.04	0.57

6.2.5.3 Summary

This area of Quality Control was not carried out on a large enough number of meshblocks to provide sufficient feedback. In future a greater number of meshblocks should have 'not specified' and 'vague' coding checks run on them, and a programme developed to monitor 'actioned' CAC fields as well as overall rates.

6.2.6 Performance Rate

A performance rate combining thruput and error rates was produced to provide one figure on a CAC operators performance.

This was produced by dividing thruput rate by error rate. The figure produced did not sum up an operator's performance, as an operator with a low error rate and a low thruput rate showed a significantly higher performance than an operator with a high error rate and a high thruput rate. This was due to the fact that a large divisor significantly reduced the final figure e.g. error rate = 0.39, thruput rate = 27.60 and performance = 70.77 compared with: error rate = 1.37, thruput rate = 90.89 and performance = 66.34. This was not a fair method of assessing an operators 'performance', and for this reason both error and thruput rates needed to be given as 2 sets of figures.

6.2.7 Recommendations for 1991

- that consistency rates are monitored for CAC 'actioned' fields.
- that there are some checks carried out just on specific fields that are known trouble-spots.
- that more meshblocks be checked for 'not specified' and 'vague' coding.
- that range check edits are put on certain fields.
- that a minimum of 10% of CAC records are checked by Quality Control.

6.4 Quality Control Procedures

Quality Control was carried out on all CAC operators. Initially everyone had a meshblock quality controlled, and then those with a high error rate had another check on them. This alternating procedure continued throughout.

A step by step procedure was followed to maintain an efficient flow of meshblocks through the checking process.

1. Quality Control coders obtained the next CAC ID number to check, from the numerical listing of operators.

2. The QC coder (CAQ) referred to the last work record of the operator and chose an appropriate meshblock for duplicate coding. The meshblock chosen had to be back on the shelf in Records, and not too large or too small.

3. Coding, referencing and editing of the complete meshblock was carried out the same as for CAC.

4. When CAQ coding was finished, the meshblock was put in a pile of other finished meshblocks. That evening all the completed meshblocks and operator ID numbers were entered into the computer and a batch job run overnight.

5. This batch job ran a comparison programme and produced printouts of the inconsistencies between the CAC and CAQ coders. These printouts formed worksheets, and were matched with the appropriate meshblock for verification.

6. Verifiers went through the worksheets and determined the correct code for each inconsistency. In some cases the verifier did not agree with either and wrote in the correct code, and in other cases the verifier found both codes acceptable. After verification was completed on a meshblock the errors were tallied for both sides.

7. After verification the meshblock was passed back to the CAQ coder for an opportunity to look at the errors.

8. The meshblock was then 'reset' so that it appeared on the CAC operators screen, and the meshblock and worksheet sent to CAC. A trolley load of meshblocks arrived every 4-5 days and the supervisors distributed them to the appropriate operators.

9. Corrections were made by the CAC operators with supervisors checking discrepancies and approving the final error rate figures.

10. Corrected meshblocks and worksheets were returned to the verifier where a breakdown of errors was done. The reference sheets were filed and the meshblocks re-shelved.

11. Periodically, relevant data from the worksheets was keyed into the computer and programmes run overnight to update various CAC and QC statistics.

12. The processed worksheets were filed by operator ID number.

6.5 Problems with Quality Control Procedures

There was often a time lapse of 3-4 weeks before CAC operators received back meshblocks they had processed, and Quality Control had run checks on. This was too long, as often they were out of the LGR that was currently being processed, and they had to switch back to thinking of another area before making corrections.

There was no set procedure as to how to correct the worksheets; some CAC operators showed clearly changes they had made, whereas others, particularly when they disagreed with the verifier, scribbled comments over the sheet. Far too much time was spent by CAC operators correcting Quality Control errors and trying to prove QC were wrong. Supervisors also spent a lot of time trying to resolve discrepancies. Although this procedure provided feedback and ensured every CAC operator had a fair say in their errors, it had a detrimental effect on the relations between Quality Control and CAC.

CAC operators were responsible for their own meshblock corrections on the terminal, but there was no check as to whether incorrect codes were changed to correct codes. They were also expected to change inferior codes to better ones to ensure that better quality data was being produced.

The inability of Quality Control to 'reset' meshblocks for CAC corrections was a problem in the latter stages of the CAC processing. The reason for this was that LGR's were being cleared so that data could pass to output. If meshblocks that had had Quality Control carried out on them were in the cleared LGR's, CAC operators could not access the meshblocks to change any incorrect codes.

Although figures were available from QC on individual operators error and thruput rates, only twice during the processing were operators given this information. It was disappointing that CAC operators were denied the opportunity of obtaining this valuable feedback from QC.

6.6 Alternative Methods of Undertaking Quality Control

All CAC operators need to have the QC procedure outlined to them so that they have an insight into what checks are being undertaken. They should be made aware that the feedback provided by QC is invaluable in determining problems so that quality can be improved.

There should be regular group talks with the supervisor discussing and ironing out common problems and coding policies. If necessary a retraining session for the group or individuals should be undertaken.

The time lapse between coding a meshblock at CAC and the return to the CAC operator after QC should be within a fortnight. An increase in QC staff and terminals should ensure this. Also, it is important that the best quality CAC operators are selected for QC.

A sample of all CAC operators work should be quality controlled initially, and later more emphasis placed on those with high error rates. There should always be the odd check on competent operators, so no CAC operator is exempt from QC.

A minimum of 10% of CAC work, should be checked at QC, which is possible with additional QC staff.

Consideration needs to be given to coding corrections being undertaken by someone other than the original CAC operator. Meshblocks could be reset to a special user ID, and corrections actioned by QC staff so that the problems with CAC operators are eliminated. This would mean the feedback received by the CAC operator in the form of written remarks on the worksheet were lost. However, the supervisor's could be responsible for discussing errors with operators with high error rates, so that hopefully problems could be rectified. Also, a fortnightly/monthly meeting of each group with the supervisor would enable any coding problems from the Quality Control feedback, to be drawn to the attention of operators.

In future it is important that operators' quality control figures are available through their supervisors, so that they are aware of the quality and thruput of the work they are producing.

7.0 OUTPUT OF WORK

7.1 Analysis of work targets against work performance

7.1.1 Time

7.1.1.1 Time allocated for CAC processing

The estimated time required for the CAC processing of the 1986 Census was derived from figures obtained after processing the 2nd Pilot Test.

The CAC/Edit processing time was calculated as follows:-

Performance rate = 1.31 minutes per questionnaire
Total time = 15 hours per day (900 min)
VDU's = 24
VDU time = 24 x 900 x 5
= 108,000 min per week
Questionnaires to be processed = 4,370,000
Weeks required for processing = No. of Questionnaires x Rate

$$\frac{\text{min per week}}{}$$

$$= \frac{4{,}370{,}000 \times 1.31}{108{,}000}$$

= 53 weeks

After analysing the figures based on the 2nd Pilot Test, it was decided that 1 year be allocated for the CAC processing of the 1986 Census, plus an additional 4 weeks for training the operators.

7.1.1.2 Time required for CAC processing

CAC operators were employed from 3rd March 1986 until 22nd May 1987, which was a total of 64 weeks. The first 8 weeks were taken up with the training which was extended, due to computer system problems. Also, in the initial stages of CAC processing there was a considerable amount of down time on the computer which meant a loss of CAC processing time. Coupled with this and staff

resigning, the processing did not get off to a good start. Up until the end of March 1987 staff vacancies created through resignations were filled, although there were times when numbers dropped considerably before replacements were found and trained as CAC operators.

7.1.1.3 Overtime

When it became apparent that the processing was behind target because of the delayed start and computer down time, it was decided to introduce Saturday morning overtime from 8.00 - 12 noon. This was started on 26th July 1986 and continued fortnightly until mid-December, and then 3 more times in early 1987. The finishing date for CAC was set as 22nd May. In the latter stages, as expected, staff were finding other employment, and losses were up to 6 a week. To ensure completion of the CAC processing by the set date, operators were permitted to work up to 12 hours a day.

7.1.1.4 Time taken to complete CAC processing

The CAC processing took, in fact, 364 days, one day less than the original allocated time of 365 days.

Initially the CAC processing got off to a slow start, as questionnaires were slower than expected moving from the field to the processing area, and then through the pre-capture and data capture phases before arriving at CAC. Also, computer system problems contributed to some lost time in the early stages of the processing.

7.1.2 Targets

The CAC operators and supervisors were unaware of any work targets throughout most of the CAC processing. This was most unfortunate, as staff involved in any processing job should be aware of their output. This could have provided an incentive for operators to make more effort and improve their outlook and attitude to the job.

7.1.3 Response Time

The response time, was considerably shorter for the pm shift than for the am shift, as fewer people were using the computers over that time. This accounted for the significantly higher thruput on the pm shift.

7.2 Monitoring Thruput Rates and Output

Thruput rates were monitored by Quality Control to check that operators were producing a satisfactory quantity of work.

Thruput rates were calculated monthly for each operator as follows:-

$$\frac{\text{Total Records Processed}}{\text{Total Logon Time}}$$

and this gave the number of questionnaires processed per logon hour for each operator.

Table IX below shows the thruput rate monthly and overall for each operator.

Table IX

Month By Month Thruput Rates Of CAC Operators 12:25 WEDNESDAY, APRIL 15, 1987

OPERATOR	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	THRUPUTT
0	.	.	.	.	.	.	.	.	.	.	140.37	140.37
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.18	32.20	45.41	42.13	37.20
2	51.84	67.74	68.92	63.97	68.95	71.16	67.42	79.81	66.93	90.57	84.19	71.32
3	41.18	57.78	27.42	33.22	48.75	64.92	50.73	57.19	56.88	53.64	80.38	50.49
4	27.91	43.33	52.09	49.93	53.51	75.83	57.84	70.27	71.10	80.32	39.20	54.90
5	30.09	56.53	53.70	62.97	52.38	56.72	66.76	70.18	80.99	71.08	51.12	57.79
6	34.78	50.72	0.00	25.13	90.18	19.14	31.61	32.79	25.68	32.22	51.82	37.50
7	21.76	30.32	32.63	28.84	22.83	31.34	28.37	30.55	33.71	36.11	41.52	30.11
8	26.48	28.71	30.37	45.60	32.10	36.37	37.36	41.05	43.58	53.74	40.82	37.55
12	47.11	49.32	38.70	35.07	30.58	37.45	41.36	39.94	29.53	0.00	0.00	38.97
15	49.19	70.33	83.12	125.94	68.22	107.53	75.33	100.06	105.05	154.08	141.56	91.49
16	22.57	31.70	32.16	49.67	41.56	61.08	75.46	64.34	66.37	110.70	51.79	52.17
19	17.74	42.08	37.27	34.13	33.64	45.60	37.15	47.74	40.49	43.01	28.60	36.87
20	9.44	37.27	26.70	32.53	40.93	55.20	46.94	52.79	52.63	72.33	56.32	41.18
22	31.83	49.20	54.31	57.57	69.02	72.39	58.03	64.09	74.90	89.00	0.00	61.73
23	24.11	32.69	33.80	35.67	39.65	45.35	40.57	51.08	48.84	57.39	65.97	41.00
25	30.17	36.14	44.90	49.99	45.37	48.87	60.24	54.39	56.68	87.82	70.66	49.72
26	16.05	26.99	30.05	34.99	27.80	44.11	41.39	45.01	50.88	55.83	51.84	37.57
27	31.64	41.30	44.41	68.54	71.74	85.52	80.15	81.84	75.10	104.77	43.73	66.90
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.76	31.55	47.54	63.99	35.94
29	53.03	57.56	63.85	78.51	73.16	91.78	69.14	92.25	83.76	97.76	93.23	77.58
33	30.97	38.17	42.63	42.93	46.85	58.39	48.14	53.12	57.41	0.00	0.00	45.17
34	21.32	31.21	27.92	39.56	38.33	41.76	41.04	38.65	40.05	43.69	64.69	38.45
36	31.19	55.80	33.25	46.37	40.05	52.64	50.21	50.30	42.35	52.39	70.12	46.42
40	19.51	27.54	37.03	43.91	31.24	39.16	34.13	36.65	39.91	62.33	32.47	36.34
41	15.79	37.54	29.13	33.93	34.70	42.47	35.62	52.48	42.91	46.17	37.29	36.27
42	15.12	25.00	31.78	37.83	37.44	41.82	30.41	32.76	33.14	38.34	36.46	32.49
43	37.97	48.63	48.59	48.12	50.09	66.10	54.55	48.16	66.20	65.90	69.88	54.20
44	38.86	72.10	55.18	118.04	25.69	76.86	67.72	83.99	88.06	98.49	90.27	70.22
45	0.00	0.00	17.75	61.25	70.38	55.35	54.53	57.42	54.07	96.50	0.00	56.56
48	0.00	0.00	29.45	23.68	39.61	56.93	50.77	68.78	50.70	0.00	0.00	44.09
49	0.00	0.00	19.07	37.17	44.61	61.50	56.50	73.02	90.97	84.80	111.16	61.85
50	0.00	0.00	23.87	33.24	37.78	44.75	44.70	50.86	47.79	66.41	81.68	46.87
51	26.04	31.97	22.13	42.12	38.80	55.95	63.68	67.56	75.98	89.51	0.00	47.30
52	57.99	72.07	66.63	81.08	45.80	73.88	68.04	89.69	75.00	126.41	69.98	74.14
53	22.92	25.00	23.36	23.45	35.69	36.70	34.07	39.11	44.51	43.53	46.22	33.81
55	0.00	0.00	17.92	53.41	44.32	23.83	58.14	41.54	0.00	49.20	52.32	41.17
56	43.21	64.49	61.62	81.59	74.85	85.95	70.43	73.95	84.54	119.06	139.02	78.77
57	33.55	42.50	43.90	59.44	31.37	51.35	91.45	46.59	10.96	93.15	85.21	55.17
58	0.00	0.00	15.59	23.50	22.62	45.56	64.73	53.96	0.00	61.86	95.32	51.43
60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.07	22.66	38.80	25.68	28.87
61	0.00	0.00	20.72	54.39	98.23	42.25	28.87	0.00	0.00	17.92	47.21	49.18
62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.59	0.00	22.76	29.55	25.69
63	46.50	60.51	48.71	61.37	52.37	67.50	53.39	58.85	106.93	101.14	158.11	68.46
64	30.84	32.85	52.99	68.50	55.32	47.38	42.88	55.09	42.44	0.00	0.00	47.26
66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	78.23	77.83	109.29	95.13	89.40
67	41.07	52.95	46.61	70.87	29.84	43.02	26.40	70.82	43.04	0.00	0.00	47.10
69	85.15	106.70	130.54	147.03	139.92	205.38	178.68	206.09	231.09	253.73	290.70	176.61
70	0.00	0.00	15.28	28.86	31.18	43.31	35.35	42.04	49.38	53.83	36.18	37.40
71	25.69	48.83	43.11	50.07	42.71	46.21	44.80	64.20	56.97	80.77	57.76	50.27
72	67.11	76.84	71.14	104.80	67.91	107.20	73.93	93.98	66.18	79.10	104.72	82.10
74	20.71	60.35	60.30	63.55	29.05	59.42	60.56	86.31	82.54	100.24	76.63	55.91
78	42.45	65.47	75.71	86.72	78.15	93.62	99.28	88.93	87.71	107.65	78.87	81.25
79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.74	32.03	47.74	28.68	33.65
80	27.58	43.80	41.39	44.26	47.22	57.77	59.49	65.91	41.15	81.61	0.00	48.98
81	41.08	53.54	44.66	52.76	48.18	38.83	70.54	39.64	43.89	56.58	85.79	52.51
82	29.57	35.15	38.52	42.10	41.42	45.93	43.10	46.68	49.78	61.79	0.00	43.00
83	0.00	0.00	36.43	53.14	61.91	72.72	66.80	59.58	64.68	84.15	63.24	60.27
84	60.50	85.21	92.57	91.82	47.03	77.92	78.73	91.66	89.69	115.30	105.40	84.41
85	31.06	39.76	36.44	46.81	48.02	69.76	56.64	59.84	48.68	69.17	80.64	51.34
86	30.32	43.72	44.81	42.05	67.67	62.94	52.52	53.98	33.25	0.00	0.00	48.16
87	24.77	30.71	0.00	0.00	52.76	40.85	33.66	48.06	37.16	46.39	65.16	42.47
88	55.75	86.59	106.39	139.31	104.67	139.17	131.11	129.23	142.00	107.83	175.45	118.13
89	28.76	38.85	43.09	53.80	40.83	84.76	76.48	76.44	50.28	61.87	58.61	53.25
90	34.37	72.72	78.53	106.31	92.14	105.02	102.90	117.96	108.72	0.00	0.00	92.10
91	42.25	73.78	88.69	117.12	48.44	132.32	104.23	130.37	121.15	120.52	0.00	94.23
93	60.41	74.64	80.46	97.23	114.64	141.97	135.82	142.31	176.80	197.65	150.33	118.50
94	40.13	71.87	75.00	65.96	65.12	77.53	69.92	94.97	77.81	105.24	0.00	70.74
95	0.00	0.00	0.00	0.00	53.37	73.38	70.85	92.86	102.44	119.77	91.16	86.26
96	0.00	0.00	28.71	62.86	65.60	83.45	84.07	98.62	112.68	135.76	137.90	87.72
97	0.00	0.00	0.00	43.48	61.41	70.35	74.05	79.48	81.43	94.66	12.49	68.22
98	0.00	0.00	19.13	28.02	25.49	48.80	37.58	42.57	47.43	48.90	83.33	40.81
100	.	.	.	.	.	.	.	.	.	.	.	.
100	35.05	49.33	47.34	58.39	53.09	66.59	60.78	64.78	65.98	80.42	79.17	58.81

TABLE X Monthly Output Statistics (Records per hour)

	Current Monthly Thruput	Cumulated Monthly Thruput
May	35.06	35.06
June	49.83	42.22
July	47.34	44.13
August	58.89	47.71
September	53.09	48.82
October	66.59	51.79
November	60.78	52.87
December	64.78	54.27
January	65.98	55.36
February	80.42	57.21
March	79.17	58.81
April	70.40	60.91

7.3 Estimated throughput for 1991

Assumptions made:
(i) a single shift operation
(ii) one vdu per person
(iii) same number of fields processed as in 1986

Staff and number of vdu's required would be as follows.

	operators	supervisors	total
non-labour force coding	21	3	24
labour force coding	35	5	40
reference/edit	7	1	8
total	63	9	72

Assuming five hours per day productive vdu logon time, the 1991 Census processing would be completed in 44 weeks.

- vdu time = 5 hours per day
- throughput rate = 70 records per hour
- effective number of operators = 67 (i.e. each supervisor represents 2.5 hours productive vdu logon time per day)
- total records = 4,700,000
- total hours per week = 5 x 5 x 67 = 1,675
- total records per week = 1,675 x 70 = 117,250
- processing weeks = 4,700,000/117,250 = 40.08
- paid leave weeks = 3.00
- training weeks = 1.00
- total processing weeks = 40.08 + 3.00 + 1.00 = 44

The CAC/edit quality control section would require a minimum of eight staff and an equivalent number of vdu's in order to perform their task and achieve the desired 10% level of coverage.

8.0 INSTRUCTIONS PROVIDED

8.1 Training Session

Two shifts operated during the training sessions, the same as for the CAC processing. Initially 4 weeks were set aside for training CAC operators; 2 weeks for the training course followed by a 2 week practical session, processing 'dummy' questionnaires. During the training it was decided to reduce the first fortnight to 6 or 7 days and use the extra time in practical sessions, which proved to be excellent 'on the job' training. Computer system set up problems extended the practical training session an extra 4 weeks, making the total training 8 weeks duration.

A detailed account of the CAC Training is included in the 'Evaluation of CAC Training'.

8.2 Handouts

CAC operators were issued with the following handouts: -

1. CAC/Edit operating instructions
2. Inter-field edit instructions
3. Correcting inter-field edit instructions
4. Inter-record edit correction instructions
5. Coding decisions
6. Pre-capture coding instructions
7. Sector classification

Lever Arch Files were given to all operators to keep their handouts in. These were usually kept on the workstations during the shift so that they were on hand when required.

8.2.1 CAC/Edit Operating Instructions

This was a 37 page handout printed on gold paper. It was issued to all staff during the CAC training, and was a valuable reference source in the early stages of CAC.

It was important that such handouts were available, as new staff took advantage of the opportunity to study the material, so that it would help them gain confidence in the new job ahead of them. The handout had a well outlined index, so users had little difficulty finding what they required. The layout was very clear with headings on the left hand side of the page and the descriptive content on the right hand side.

Although this handout was only used in the initial stages of CAC, it is recommended that a similar set of instructions be provided in 1991.

8.2.2 Inter-field Edit Instructions

A 56 page handout was issued to all CAC operators during the training course. This handout listed all of the dwelling and personal inter-field edits, both definite and warning. Each edit was accompanied by a brief justification for its inclusion, and code lists were available to enable readers unfamiliar with the various codes used, to understand the edits.

This handout would have been rarely used, in fact, some CAC operators admitted to never opening it after the initial skim through.

8.2.3 Inter-field Edit Correction Instructions

This was a 49 page handout printed on green paper. It included all of the dwelling and personal inter-field edits, both definite and warning. For each edit there was an explanation as to what the edit checked, followed by the problem and its solution. The purpose of this was to ensure consistent coding was being carried out when edits occurred.

The handout was used by operators in the early stages of the CAC processing, but operators were never told they had to adhere to the corrections laid down. Some operators corrected edits how they thought they should be corrected. This defeated the purpose of having the instructions to ensure coding consistency.

8.2.4 Inter-record Edit Correction Instructions

This was an 8 page handout listing all of the definite and warning inter-record edits. Each edit was described and the method of correction outlined.

8.2.5 Coding Decisions

There were 10 Coding decisions put out in writing during the CAC processing, and all of these were between May and September 1987. The purpose of the coding decisions was to ensure consistency in coding when problems arose and there was uncertainty as to how to code.

A number of problems arose after September, but there were no additional coding decisions put in writing. In some cases verbal decisions were made, but in most cases the problems were never resolved, resulting in inconsistent coding.

As a coding decision became available, each operator was given a copy to file for reference when required.

8.2.6 Pre-Capture Coding Instructions

There was a 33 page handout for pre-capture staff involved in the Coding phase. The reason for CAC staff acquiring these handouts, was that in the early stages of the CAC processing when computers were down, pre-capture coding was carried out by CAC operators.

CAC staff did not require the complete handout, only the sections explaining Relationship, Family coding and Absentee coding. Fields involving these questions often came up at edit, and occasionally at CAC when pre-capture coders had omitted to code the fields.

8.2.7 Sector

As sector was a difficult field to code, it was decided to compile a handout to help. This was a section from the New Zealand Standard Institutional Sector Classification (NZSISC), and included an alphabetical listing of selected organisations and their sector code, and also selected examples in each sector. This handout was worthwhile and used frequently by operators.

8.3 'Help' Facility

A 'help' facility displays on the screen simple, clear instructions, when a CAC operator has a problem. It is accessed by pressing a PF key.

This facility was available for the 2nd Pilot Test, but as it was rarely used it was removed from the CAC system. Instead, hard copy instructions in the form of a handout on 'CAC/Edit Operating Instructions' were given to all operators.

There was no apparent need for a 'help' facility during the CAC processing of the Census, and it is not considered necessary for the 1991 Census.

8.4 Administering Amendments to Instructions

During the CAC processing most amendments to instructions concerned the edits. Apart from edits few other changes were made.

The procedure by which amendments were made was not very satisfactory, as generally they were not in writing, and only operators who observed the changes were aware of them.

8.4.1 Edit Instruction Amendments

There was only one handout with amendments to inter-field edits given out to operators, and this was during the training session before CAC processing started. After that any amendments to edits were not brought to the attention of CAC staff.

8.4.2 Coding Decision Amendments

During the CAC processing there was only one amendment made in writing to a coding decision. This involved Coding decisions No. 3 and 10. Coding decision 3 stated that "self-employed tradesmen who state no fixed workplace or area, should be coded to the local authority, LGR or NZ not specified, as applicable; even though their office may be at their home address".

Then, coding decision 10 stated "self-employed tradesmen who state they work at home should be coded to their home address". As the 2 decisions contradicted each other, the latter cancelled out the former, and there was a note stating this.

8.5 Proposals and Recommendations for Amendments to Instruction

8.5.1 Reducing Instructions

8.5.1.1 Edit Instructions

Inter-field edit instructions and correction instructions in the form of hard copy handouts could be entirely dispensed with. Instead, the edit description and suggested method of correction could be displayed on the screen by pushing a PF key. Similarly, this could happen for inter-record editing.

The edit handouts accounted for 68% of all hard copy handouts. Dispensing with these, would significantly reduce the number of handouts necessary for CAC operators.

8.5.1.2 Coding Instructions

It was not necessary for CAC operators to have the same set of instructions as given to the Pre-Capture coders. Instead, a summarised version containing the main points relating to Relationship and Family and Absentee coding, should be issued, and a full copy held by supervisors for reference if necessary.

8.5.2 Coding Decisions

These were a problem in the 1986 Census as coding decisions that were verbal or not properly resolved, caused inconsistencies in coding. In future, these must be resolved as soon as they arise, with all decisions being put in writing and dated. Each operator must be given a copy to keep on file.

8.5.3 Filing Handouts

All staff must be given copies of handouts, and any amendments to the handouts. These must be filed in a spring binder provided by the department, and kept at the terminal for reference when required.

8.5.4 Recommended Handouts

If edit handouts are dispensed with and put on the terminal instead, the following handouts would be all that were necessary: -

(i) CAC/Edit instructions
(ii) Coding decisions
(iii) Pre-capture coding - revised version.

9.0 RECOMMENDATIONS FOR 1991

This is a summary of recommendations discussed in the report.

(i) System Operation

- that the BD, industry, sector and work address fields precede occupation
- that the work address field is automatically coded to the appropriate meshblock or area unit if, travel = work at home
- that CAC supervisors update reference files
- that the street listing is displayed on screen in admin. numbers only
- that the inclusion of direct file matching, automatic editing and inter-active editing be reconsidered once feasibility projects have been completed
- that there are 2 expansions to help code occupation and industry fields.
- that a recall facility is available for labour force fields
- that there are 2 PF keys for the record details screen, 1 for fields on the LHS and another for fields on the RHS.
- for lengthly searches the operator could be asked if they wish to continue

(ii) Files

- that the BD, agriculture register, and street listing be reviewed and updated
- that the NZSCO and NZSIC be reviewed and the files updated
- that all CAC operators involved in labour force coding are able to interpret responses using other information on the questionnaire, and can then reword the response to try to find a match on the file
- that occupation and industry fields each have 2 expansions to help code these fields
  (i) NZSCO and NZSIC descriptions
  (ii) a list of all descriptions held on file for a selected code
- that major/minor groups are shown as part of NZSCO and NZSIC matches
- that enumerators give street numbers or at least numbers at intersections in inner city streets, also name large buildings and businesses
- that no changes be made to the country file unless a country is officially renamed
- that respondents who state 'European' and 'New Zealander' are only coded to 'European'
- that 'pakeha' be included on the ethnic origin file under code '01'
- that updating of the religion file be carried out if necessary, and that it be an ongoing project

- that a clear definition of what constitutes a 'valid' qualification be given
- that the qualification file be reviewed to ensure all descriptions are in fact 'valid' and to add or delete description as required
- that information on overseas 'school quals' and 'other quals' is available and their equivalence to NZ quals determined
- that additional codes be added to the relationship file, to include: -
  (i) relative not specified
  (ii) child boarding away from home during the week
- that thorough training on sector classification be given, preferably by someone knowledgeable in this area
- that the sector classification on the agriculture register is consistent with the NZSISC
- that a sector expansion be investigated.

(iii) The Roster

- that only one shift operates for the CAC processing
- that the roster is flexible and 1 VDU is available for each operator
- that CAC processing is split into 3 phases
  1. CAC - up to labour force questions - data entry only
  2. CAC - only labour force questions - data entry only
  3. Referencing/Editing

  By doing this, staff would become specialists in their areas which should result in higher quality data being produced.

(iv) Work Organisation

- that all meshblocks are bar coded and optical bar readers are installed on all sections so that meshblocks can be located at all times
- that trolley-persons are employed for moving and checking meshblocks to and from the CAC area
- that the CAC section issue their own work
- that more shelving be available for operators to store meshblocks being worked on and personal belongings.

(v) Supervisors

- that CAC supervisors have thorough training with the CAC system themselves, before training and supervising staff
- that supervisors duties are clearly defined in writing
- that CAC supervisors are employed as supervisors and that menial chores are not included in their duties

- that weekly/fortnightly meetings be held with all CAC and Reference supervisors and the Senior Supervisor
- that meetings with all processing supervisors and Census controller be held from time to time
- that targets are set, and all supervisors and operators are aware of them
- that team talks are regular and provide stimulation for a team effort
- that an individual operators error rate and thruput figures are available through the supervisor
- that coding decisions are immediate and in writing
- that there is more communication between CAC and Quality Control
- that coding decisions made at CAC are passed immediately to Quality Control
- that 'new operators' have adequate training by a supervisor

(vi) Working Environment

- that workstations are arranged in groups of 4 around a centre point
- that screens are removed from around individual terminals
- that supervisors sit near the group they are responsible for
- that screens are used to divide groups
- that more space is allowed for shelving and it is not constructed in the doorway area
- that the equipment (workstation, chair, lamp, VDU, and keyboard) used remain the same or similar
- that ventilation must be reviewed and consideration given to installing an air conditioning system

(vii) Quality of Work

- that a minimum of 10% of CAC records are checked by Quality Control
- that consistency rates are monitored for CAC 'actioned' fields
- that there are some checks carried out just on specific fields that are known trouble-spots
- that more meshblocks be checked for 'not specified' and 'vague' coding
- that range checks are put on certain fields

(viii) Output of Work

- that approximately 56 VDU operators would be required to carry out the data entry phases, plus 7 Reference/editors.

(ix) Instructions Provided

- that edit handouts are dispensed with and put on the computer
- that the following handouts are provided: -
  (i) CAC/Edit instructions
  (ii) Coding Decisions
  (iii) Pre-capture coding - revised edition

10.0 SUMMARY OF PROBLEMS ENCOUNTERED

10.1 Serious Problems

10.1.1 Shift Changes

Allowing CAC operators to change shifts was undoubtedly one of the most serious problems. This problem could have been solved quite easily by disallowing shift changes, or by only allowing them on exceptional occasions. What made it more annoying, was that this was a priviledge, and it was abused by the same few people.

One of the conditions of employment was that each CAC operator was employed specifically for one of the two shifts, either 7.00-2.30 or 2.30-10.00. Initially they were told that shift changes would occur only on odd occasions, but this rule was allowed to bend too often, until it was out of control.

The am shift were generally content with their hours, but the pm shift were continually changing to the am shift. This would have been acceptable if there had been vacancies on the am shift, and if supervisors had had complete control of their groups. Instead, the Senior Supervisor chose to take control and often forgot to inform supervisors of shift changes. Not only did staff change shifts, but it was acceptable for them to work across both shifts to suit themselves i.e. 11am - 6.30pm. This may have been satisfactory if 1 or 2 people were involved, but on occasions 6-8 would arrive and expect to be able to work. Unless there were absentees in the am shift, it became quite chaotic as there were no free terminals available, so these staff sat around in the Reference room, often disturbing am staff and generally making nuisances of themselves.

When staff numbers dropped, after the end of March and were not replaced, it wasn't so much of a problem. However, in the latter 3-4 weeks when operators (especially pm staff) took advantage of the overtime work and were able to work up to 12 hours a day, the same problem occurred.

This was a serious problem that could have been eliminated if shift changes were disallowed by staff who abused the privilege.

10.1.2 Roster

When CAC processing started, all operators had to adhere to a roster that involved 1 hour on the VDU and ½ hour referencing. This was a rigid roster, not allowing for flexibility. Problems were created when staff did not require the allocated ½ hour to reference, and consequently sat and talked.

This problem improved when staff left and were not replaced, as it allowed an operator to have the option of remaining on a terminal if they had little or no referencing. At one stage, the ideal situation of 1 VDU per operator arose, allowing maximum flexibility of the roster.

10.1.3 Environment

The screens surrounding each terminal created a claustrophobic feeling in the CAC area. They also constricted air movement, which contributed to the poor ventilation. Another problem created by the screens was that supervisors were unable to see most of the CAC operators unless they moved into the centre aisle.

10.1.4 Files

The following files created serious problems: -

1. BD
2. Occupation
3. Task
4. Other Qualifications

10.1.4.1 BD

The BD posed a problem in that it was found to be unreliable in too many cases, particularly as regards work address. This created a feeling of distrust and CAC operators would often check the work address via the street listing, to double check the BD. This was time consuming, and defeated the purpose of the BD facility.

10.1.4.2 Occupation

It was often very difficult allocating a suitable code to some occupations, especially in areas of high technology. Some of these occupations were not included on the file and were coded to general areas rather than specific. The NZSCO on which the occupation file is based, is outdated, but in the process of review, which in turn will enable the file to be updated.

10.1.4.3 Task

This file which was created to help the operator code the occupation field, was accessed through the PF expansion key. It was based on the NZSCO descriptions but was poorly constructed and often misleading, as either important facts were missing or emphasis was placed on the wrong area. CAC operators became very wary of this file and found in many cases, it was worth a check in the NZSCO for a complete description.

10.1.4.4 Other Qualifications

The coding of this question was a real problem, as there was uncertainty as to what was required from the question. When a qualification was stated, that was not on the file, there were inconsistencies in the coding, especially between 'no quals', 'other quals', and 'not specified' codes. It would be impossible to include all possible qualifications on the file, and for this reason there must be a decision made as to what constitutes a valid qualification.

10.1.5 Sector

Few operators and supervisors had a really good understanding on the Sector classification. The choice of codes was relatively small, 20 in all, which fortunately helped reduce the chance of errors or inconsistencies.

10.1.6 Meshblock Conversion

Working with both standard and admin. numbers posed a problem. Even at the end of the CAC processing a few opeators had difficulty converting from one set of numbers to the other. In future, to avoid the conversion problem and to reduce time, consideration should be given to organising the CAC system so that operators only work in one set of numbers.

10.1.7 Coding Decisions

Coding decisions were not always immediate, there was sometimes a time lapse from when the problem was discovered until a decision on coding was made. Not all coding decisions were put out in writing. Some decisions were verbal, and in other cases no decisions were ever made, resulting in unnecessary inconsistencies in the coding.

10.1.8 Quality Control

There was a lack of communication between CAC and Quality Control. Often decisions made at CAC were not passed immediately to QC and were only brought to the attention of QC staff when operators complained about coding decisions being marked incorrectly as errors. This made for strained relationships between the 2 sections.

Far too much time was spent by CAC operators correcting errors detected by QC and trying to prove them wrong.

10.1.9 System Bugs

During the CAC processing 'bugs' were found in the system. Some of these bugs occurred when the cursor was positioned either above or below the indicated codes, and the 'enter' button was depressed. This resulted in values that were out of range, being inserted into some fields.

Following, is a description of these 'bugs'.

10.1.9.1 Bug 1 - Invalid address Codes

If USRES was coded directly to AU, LA or LGR, the appropriate code was entered into the USRES field. A flag had now been set which was not reset until the operator entered to the Batch Selection screen and/or logged off.

If the USRES of a subsequent PQ (not necessarily in the same dwelling) was coded to meshblock level, that code was entered, as expected. However, if a subsequent PQ in that same dwelling was coded, an invalid area unit would be entered into the USRES field, and all other subsequent PQ's in that dwelling would be coded the same way.

This problem was found at Output to have caused 1,755 invalid usual resident address codes. Corrections were made by copying the usual residence fields (USRES plus USIND) from the previous personal record processed.

This problem will need to be remedied for the 1991 Census. Hopefully EDP can incorporate a 'fail safe' device into the system to prevent the problem. Alternatively the editing system could include invalid range checks for the field.

10.1.9.2 Bug 2 - 100 x PQ number entered into certain fields

This bug caused a value of 100 x PQ number to be entered into certain fields when the cursor was placed in the line above the first entry position. Some fields had only 1 or 2 digits displayed on the Record details, but at editing the full invalid code is displayed.

10.1.9.3 Bug 3

This bug was related to bug 2. If the cursor was placed one line above the first entry position when entering a BD employer, a USER ABEND occurred.

10.1.9.4 Bug 4

If the cursor was placed on a blank line below the entry for a BD employer, sector and work address fields were filled with zeros. These fields came to the attention of the CAC operator at the edit stage.

10.1.9.5 Bug 5

If USIND = 1 and AUSIND = 1, the USRES area unit code, although not usually entered in this field, would be the same as the AU5YR area unit code.

This was fine when USIND = 1, however if USIND = 2 and AU5IND remained at 1, then the AU5YR field did not change to reflect the different usual address, but remained at the area unit of the Census night address.

This problem was found early in the processing, but it was decided that it should be left, and corrections carried out at post-CAC processing.

10.1.9.6 Bug 6

If the cursor was placed on a blank line below the description, the code but not the description was saved as the subsequent select default.

10.1.10 Problems detected by Output

10.1.10.1 Anomalies in description files

There were anomalies in the description files which resulted in incorrect codes being allocated to some fields; particularly occupation. An example of this was 'kitchenhand' and 'dishwasher'. If a respondent entered 'kitchenhand' it brought up code '5402 - dishwasher kitchenhand', and if 'dishwasher' was entered code '9916 - dishwasher' would appear on the screen. However, if the respondent had stated 'kitchenhand' and the main duty being dishwashing, code '9916' would be the more appropriate, as code '5402' involves a combination of duties in the kitchen which may include dishwashing.

10.1.10.2 Clustering of Codes

A clustering of codes was evident in occupation and industry coding, where a number of operators opted for a general code rather than a specific. An example of this was '2111 - general manager' and '2119 - general manager n.e.c.'. Many operators coded to '2111' and '2119' rather than coding to a specific type of manager, even if it was stated in the tasks.

10.1.10.3 Use of code on 1st screen

After analysing why certain codes were used more frequently than was expected, it was found that when a description displayed a multi-screen response, operators were more likely to select a code from the 1st screen rather than scroll through the screens.

10.1.10.4 Industry comparison

When the 1981 and 1986 industry codes were compared, there was a bigger difference in the number of industries allocated to some codes than expected. The main reason for this was that in 1986 the majority of industry codes were entered through the BD, as compared with manual coding in 1981. The manual coder had to rely on the respondent's industry description and in many cases check referencing material to determine the most appropriate code to allocate. However, the BD allocated the industry code that appeared on the screen for that business, even though it didn't always tie up with the respondent's description.

10.1.10.5 Synonyms

If the CAC operator keyed in a synonym for a stated response it sometimes brought up a different code e.g. 'maid' and 'servant'. If a respondent stated their occupation as 'maid' and this description was entered, code '5409' would appear. However if 'servant' was entered code '5401' would appear, which in this case is the better code, as the description for this code includes such tasks as cleaning and servicing guest rooms which was what the respondent indicated in the tasks.

10.2 How Problems were Resolved

BD problems were filed with suggested corrections, and when a number had accumulated they were sent to the BD development section in Auckland where they were subsequently updated on the file and later loaded by EDP. This occurred twice during the processing, however any changes were of little use as operators were well through or out of the LGR when this was done.

The occupation file was updated twice during the processing, and once again this was after a number of amendments had accumulated. To have been entirely effective immediate updating should have been carried out.

Most of the serious problems that occurred were not resolved during the Census processing, and those that were, were not entirely satisfactory.

10.3 Proposals Recommended to avoid Problems in 1991

10.3.1 Shift

Hopefully there will be no necessity to operate 2 shifts in 1991, and the problems of shift changes will be eliminated.

10.3.2 Roster

A roster allowing maximum flexibility should operate, so that the problems created by operators with no referencing are avoided. A ratio of 1 VDU to 1 operator, or close to this, would be ideal.

10.3.3 Environment

Screens should be removed from around VDU's so that air can circulate more freely, and so that supervisors can see the staff they are responsible for. Consideration needs to be given to installing an air conditioning system.

10.3.4 Files

The BD, occupation, other quals and task files need reviewing and updating. A facility for CAC supervisors to update the files would ensure immediate action, which is required.

10.3.5 Sector

A specialist person on Sector Classification should talk to all CAC staff and supervisors to help them understand the coding of this field. Additional examples on the file would also help.

10.3.6 Meshblock conversion

Meshblock numbers on the terminal should be in admin. numbers. Enumerator books and maps are in admin. numbers, so the problem of converting from one set of numbers to the other would be eliminated. Admin. numbers could be later converted to standard numbers, so that the format is acceptable for output.

10.3.7 Coding Decisions

A committee made up of CAC supervisors should be set up to make all coding decisions. When a problem arises a meeting should be organised immediately so that a decision can be made. All decisions should be drawn to the attention of the CAC staff, as well as being put in writing, and a copy given to each operator to file.

10.3.8 Quality Control

There should be regular meetings between CAC and QC supervisors so that feedback is more active. Coding corrections should be undertaken by someone other than the original CAC operator, possibly QC staff.

10.3.9 System Bugs

Hopefully EDP will be able to eliminate the 'bugs' from the CAC system, or failing this, the editing system would include invalid range checks for some fields.

10.3.10 Output Problems

Many of the problems detected at Output could be resolved if the CAC occupation and industry files were completely reviewed.

The BD will undoubtedly be used again in 1991, however the comparison between 1986 and 1991 industry figures should not be as significant as between 1981 and 1986. The reason being, that for both 1986 and 1991, there will have been coding consistency for the industry field, as the BD will have been used for both of these years.

10.4 Summary Less Serious Problems

10.4.1 Training New Staff

New staff should have had a more thorough background training on CAC and the system. It was very much on the job training and the responsibility of operators rather than supervisors.

10.4.2 Enumerator Books

Enumerator books would have been more useful if they had included street numbers in city areas, the names of commercial premises and large buildings, and R.D. numbers, where applicable.

10.4.3 Reference Material

There were insufficient copies of phone books and Wises in the 4 main centres. More were ordered but by the time they arrived it was too late, as the LGR was completed or close to it.

10.4.4 TVL's

In the last month of the CAC processing, TVL's required 2-3 VDU's in the CAC area. This was unfortunate as it coincided with the time when CAC staff were allowed to work up to 12 hours a day, and it was really necessary to have all the VDU's available for CAC.

6. 1991 Census of Population and Dwellings : Processing and Production Plan Outline

1991 CENSUS OF POPULATION AND DWELLINGS

PROCESSING AND PRODUCTION PLAN OUTLINE

5 May 1988
Population Development Section
Department of Statistics

ds105588/IDC

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Check Balance

Objectives

1. Ensuring a dwelling questionnaire exists for each occupied dwelling in the enumerator fieldbook and that the correct number of personal questionnaires are present for each dwelling (this includes dummy questionnaires where necessary).

2. To action insertion or removal of non-residents (P.Q's whose Census night address is different from that of the D.Q. they are contained in), missing persons, late questionnaires, blank, duplicate, partially completed, defaced or facetious P.Q's so that objective (1) is maintained.

3. The production of summary counts for meshblocks and sub-districts and subsequent production of a national 'Counts file' for dwellings and persons which exactly tallies with the actual number of questionnaires.

Methodology/Proposals

Check Balance will be split into two phases.

A. Clerical Phase whose duties cover objectives (1) and (2).
B. Computer Phase which will cover objective (3).

A. Clerical Phase
In this phase clerks would:

1) Check the identification information of questionnaires (district, sub-district, meshblock and dwelling numbers)

2) Check questionnaires
- remove blank, duplicate, defaced, facetious, partially completed and non-resident questionnaires
- make dummy replacements where required

3) Check 'Summary of Outstanding Questionnaires' (SOQ) list
- make dummies if required.

4) Check dwelling type
- make dummy questionnaires if required

5) Count personal questionnaires in the dwelling
- check that this total equates with the entry in the fieldbook and the response to 'number of occupants' on the DQ

6) Check the entries in the 'unoccupied' and 'under construction' columns in the enumerator fieldbook

7) Add up and check page totals for each completed page in the fieldbook

8) Count the questionnaires in each meshblock

9) Record these meshblock dwelling and population count totals on the wallet labels

B. Computer Phase

The tasks for this phase involve entering page totals into the computer via VDU. The proposed method requires that this phase be performed by clerks working in pairs, one handling the wallets and fieldbooks, the other operating the VDU.

1) Call up appropriate meshblock on screen. Check this is correct.

2) For each meshblock enter page totals directly from the fieldbook.
- clerk with fieldbook calls the totals
- these are entered then verified

3) Computer forms meshblock totals from the entered data.

4) These totals are then verified against those on the wallet label.

5) If the totals match, operator accepts the data and the entry in the Counts file is updated.

6) If the totals don't match operator has option of changing data, (i.e. to rectify a typing error) or to the place meshblock on hold. (In this case a separate file containing the data entered is created and this can be reaccessed at a later date). The meshblock is then sent back to Check Balance for re-counting.

Anticipated Benefits (compared to 1986 Census Check Balance processing)

1) The Counts file would be formed directly, at Check Balance. Furthermore, it should be a substantially more accurate record of the actual number of questionnaires.

2) The direct entry of page totals reduces the number of tasks and importantly the number of error prone transfer steps which make up Check Balance.

3) Discrepancies between the actual number of questionnaires in a meshblock and the recorded number of questionnaires in a meshblock will be substantially reduced.

4) Printouts of Counts file updates would provide accurate records of daily output for the Check Balance phase. Further, the use of I.D. numbers allows for the identification of each individual clerk within each group. This would eliminate the need for keeping time-consuming work records and improve throughput monitoring for Quality Control.

Phase Requirements

Assuming a planned start date to the phase of 19 March 1991 and a conclusion of 31 July 1991, this will permit 19 weeks for phase completion.

Four sections, comprising one supervisor and eleven clerks will be required for this phase.

Each section would require one VDU.

Insertions

Objectives

An Insertions group will be responsible for inserting 'non resident' and late questionnaires into their rightful Census night address dwelling questionnaires, and also try to locate questionnaires for persons on missing person enquiry and refusal forms, re-referencing any found back also to their correct dwelling.

Then they will reprocess the questionnaire and its meshblock back up to the point from which it was removed from the processing sequence.

Methodology/Proposals

The main tasks of this group are:

1. Obtain loose questionnaires (e.g. late, non-resident, etc.), missing person enquiry and refusal forms and any other miscellaneous enumeration material for a sub-district. Obtain also the fieldbook, and the meshblocks required. Note: Insertion staff will have access to the Control system to determine the whereabouts of a sub-district or meshblock and also, to place a 'hold' status on it so that it can be returned for insertions. Although it is intended to run insertions concurrently with Check Balance, this group is not so much a phase in the processing sequence, but rather, covers all phases in the processing sequence since a questionnaire may need to be inserted into a meshblock which could be at any stage of processing. However, at this stage, due to the restraints of having a timely finalisation of the Counts file, it is not proposed to insert records for meshblocks cleared for CAC.

2. Insert loose questionnaires, taking the appropriate action
   - replace dummy questionnaires
   - remove and cancel duplicates
   - if addresses need re-referencing then pass on to Insertions referencing staff.

3. Reprocess questionnaire and meshblock and/or sub-district up to its previous status in the processing sequence e.g.
   i) Check Balance - amending dwelling population (if necessary) fieldbook and meshblock totals and updating the Counts file on computer.
   ii) Check Edit - carried out, where required by Insertions staff.
   iii) Data Capture - questionnaire and meshblock sent to data capture for 'computer' insertion where no dummy was present earlier.
   iv) Preliminary Processing - (done automatically)
   v) CAC - sent to CAC staff for appropriate coding and editing, where a dummy is present.

Anticipated Benefits (compared to 1986 Insertion procedures)

In 1986 the unexpected flood of 'non resident' and late questionnaires and material from the field caused some significant problems on largely undeveloped Insertions procedures. Some of the problems and resulting delays resulted in many questionnaires unable to be inserted into their rightful dwelling.

Increased access to an enhanced Control system will enable faster location of work, not stored on record shelves. This will speed up processing and ensure that more (if not all) questionnaires are located to their correct dwelling and therefore that the Counts file is more accurate. (In 1986, Due to the required closure of the Counts file in July 1986, questionnaires could not be inserted for meshblocks which had been through Preliminary Processing, so if there was no corresponding dummy, the questionnaire had to be re-located elsewhere).

Fully developed procedures for reprocessing these meshblocks for any phase will decrease the number of errors associated with 'inserted' questionnaires, in particular, family code errors, counts errors and some inter-field and inter-record edits.

The Control system has been enhanced to include an 'insertions status indicator' as part of the status of a meshblock to simplify location of wallets, and better control the Insertions process.

Phase Requirements

If the Insertions phase operates concurrently with Check Balance as proposed, this will provide 19 weeks for 12 staff to finalise all meshblock counts. (Compared to an average 30 staff for 13 weeks in 1986). Four VDU's will be required for access to the Control/Counts file.

Check Edit

Objectives

1. To determine record type for all dwellings (i.e. private or non-private).
2. To determine record type for all persons (i.e. adult or child).
3. To ensure all dwellings have a 'dwelling type' code.
4. That all persons within a dwelling are sorted into 'family groups' and a 'relationship to occupier' code is allocated to each person. This will enable later automatic family code derivation and exclusions for electoral population calculation.
5. That any absentees listed have relationship to occupier, sex, age, living arrangements and parent number coded.
6. To ensure the questionnaire is in a suitable, legible and unambiguous format for data capture.
7. To eliminate obvious errors and data inconsistencies from the questionnaires.

In general terms this phase, codes dwellings, absentees and people's relationship to occupier, preparing questionnaires for later automatic derivation of family codes and provides a final tidy up and correction of questionnaires for fast, accurate and effective data capture.

Methodology/Proposals

In 1991 it is proposed to combine the Coding and Grooming phases used in 1986 into a single streamlined Check Edit phase.

The duties then will comprise those used for these two phases in 1986 apart from the following significant changes.

i) Family code derivation will now be done automatically, at the Rationalisation phase, i.e. after CAC.

ii) A wider range of clerical editing will be permitted on questionnaires. (In 1986 staff weren't required to correct (obvious) inconsistencies in the data, but merely 'tidy up' the questionnaire).

Basic tasks for this phase would then involve:

- sorting, numbering and allocating codes to personal and dwelling questionnaires as described in the above objectives
- 'grooming' the questionnaire involves checking each question for legibility, inserting ticks where necessary, that the correct number of responses are present for each field, and that each response is in acceptable format, e.g. written responses corrected to numeric, where appropriate, fractions deleted etc.

This is the second and final clerical processing phase before Data Capture.

(Anticipated) Benefits (compared to 1986 Coding and Grooming processing)

Combining these phases should result in a more streamlined process, which should improve efficiency, if not throughput. Automation of family code derivation will significantly improve data quality and consistency for family statistics. Permitting staff to perform limited clerical editing of 'obvious' inconsistencies, should help alleviate the boredom factor experienced for this phase in 1986 (which affected the quality). It will also prevent many needless failures of edits and decrease the amount of information lost, in some cases, by too rigid Grooming rules.

Phase Requirements

An estimated 70 staff will be required for 27 weeks for this phase, with an anticipated start date of 2 April 1991 and finish date of 30 September 1991. There are no computer requirements for the phase.

A SAS program is currently being developed for the automatic family code derivation.

Data Capture/Preliminary Processing

Objectives

1. The fast and accurate capture of Census data from questionnaires to computer.
2. To produce from the captured data, output records suitable for
   i) CAC and
   ii) Provisional Output.

Methodology/Proposals

In 1991 it is proposed to use Personal Computers to capture the data. All self-coded (i.e. ticked and numeric) responses will be captured directly from key to disk. The PC data capture software can be programmed to perform range checks on each field as well as inter-field and indeed inter-record checks. The software features will be utilised to perform the following tasks:

- each field will be checked for a valid value
- questionnaires are in ascending order
- duplication of entries
- dwelling questionnaires with no associated personal questionnaires
- presence of essential fields
- and other similar data validation tests

Once a record has been captured an output record will be produced by the PC software.

The software will be programmed to perform the following functions:

- create and allocate a value to a field called 'Record Type'
- create fields required for CAC.
- determine whether a holding code or not specified code should be allocated to CAC fields

Once this is done the records are transferred via floppy disk to the mainframe, for Preliminary Processing. The tasks of this phase involve the following:

i) comparison of the number of questionnaires punched for each dwelling with the corresponding total from the Counts file (i.e. the one determined at Check Balance)

ii) Automatic computer imputation of any unspecified age, sex and hours worked fields

iii) Provisional Output Preliminary Processing.
A second set of output records is made for Provisional Output purposes. In addition to i) and ii) above a limited range of inter-field editing is carried out on essential fields. Also the automated family coding program is run on the records to produce provisional family statistics.

Apart from correction inconsistencies picked up by edits and amendment of counts errors all other procedures are automatic.

Anticipated Benefits

In 1986 the capture of data was done on Inforex equipment, which although reasonably fast, was limited to only three or four range checks per record.

Data was transferred to tape and passed on to a separate Preliminary Processing phase, where reformat, imputation and preliminary edit programs were done. Any edits were actioned by independant Processing Control staff.

With the proposed method, all intermediate tape handling is cut out (i.e. all operations are carried out on disk). Most importantly most preliminary errors can now be resolved directly at punch time. This should result in a more streamlined and efficient system, improving processing time and saving on resources.

Phase Requirements

For the capture of data, a single shift operation is once again proposed with 50 personal computers. Software requirements are one developer and 50 workstation packages. A further VDU will be required for the preliminary processing tasks. The duration of the combined phase should run from 19 March 1991 until 30 November 1991.

Computed Assisted Coding (CAC)

Objectives

- To provide, quickly and accurately, codes for all responses not able to be directly entered at Data Capture. E.g. written responses, including occupation, industry, addresses.

- To correct records of all errors and inconsistencies, as comprehensively as possible, so that Census statistics are accurate and reliable.

Methodology/Proposals

1. 1986 Census

The above objectives are a broad description only, of what CAC was designed to do. In general terms, CAC was designed to eliminate the slow, often error prone, manual coding and editing of questionnaires done in previous Censuses, and let the computer do the searching and testing of codes.

In 1986 all fields for records that were not captured directly at the Data Capture stage were given a holding value by the computer. These included written responses to questions such as occupation, business employer, industry, addresses etc. as well as written responses to 'other' categories in certain questions. These fields were displayed on the screen at CAC, prompting the operator to enter a description. Depending on the field, these were coded in one of three ways

i) specifying a numeric value (e.g. age, years lived at usual residence)
ii) selecting a code from a fixed list (e.g. social welfare benefits, total income)
iii) or entering a description, for which the computer then searched the relevant description file, displaying any matches on screen. If several matches were displayed, the operator selected and entered the most appropriate code.

Note: Although initially, only those fields with a holding value required action by the operator, operators were able to access any field in the record as necessary (e.g. in the situation where edits required changes to directly captured fields).

If an operator was unable to code a response, the field could be by-passed for subsequent manual referencing to determine the most appropriate code. When the operator returned to the VDU, previously by-passed fields could then be allocated with the referenced codes. Once all data for a record had been input, the computer tested it with pre-specified edits, for inter-field inconsistencies. Both definite and warning edits were displayed on the screen for operator action.

When all records in a meshblock had been processed they were subjected to the inter-record edit routine which checked for non-compatability between records within the same household. These edits were displayed on a printout and were available to the operator shortly after the completion of the meshblock.

2. 1991 Census

In 1991 it is proposed to have a single shift operation and a 1:1 ratio of operators to VDU's.

The operation of coding/editing/referencing of a meshblock performed by one person in 1986 will be split into three distinct operations.

i) coding only, of all fields not including labour-force fields (i.e. all fields except occupation, industry, sector and workplace address)
ii) coding only, of labour-force fields
iii) combined referencing (of fields by-passed by above two operators) and subsequent editing of meshblock records.

Inter-Record edits will be inter-active.

Several previously inter-active edits will now be done automatically after CAC. All edits involving family code will now be included as part of the automatic family code derivation program done later.

Further, a system of Direct File Matching (DFM) will be incorporated into the system. This means that when the computer finds a single exact match to a respondent's description, this code will automatically be written to the record without further manual intervention. Research is currently being done to determine firstly, which fields are suitable for DFM, and secondly, how the computer matches on a given description.

At present the method proposed for direct file matching for selected fields works as follows: Firstly the computer tries to match on exactly what has been entered. If a single match is found, the code relating to this description will be written directly to the record. If a single match is not found, the computer begins truncating the description, letter by letter, and searching on this truncated description until one or more matches are found. Any code or codes matched in this way will be displayed on the screen for the operator to select and enter as required.

Current research indicates that the following fields will be suitable for DFM. Relationship to Occupier, Country of Birth, Ethnic Origin and Religion. The 'Qualifications' field may also be included, but will require extensive revision of its description file. For the other fields, the description files that the computer uses to search for suitable matching codes are also being extensively reviewed and updated. This is clearly essential if direct matching is to work efficiently.

Direct matching techniques appear, at this stage, not to be suitable for labour force coding. However labour force coding techniques will be quite different to those employed in 1986. It is planned to use the hierarchal structure of the standard occupation and industry classifications (NZSCO and NZSIC) as opposed to code by code search methods used in 1986. Hence, the proposed method will work by selection first of the appropriate major group (for occupation, this is the first two digits of a four digit code), followed by selection of the appropriate sub-major group and finally selection of the appropriate occupation code (unit group) to match the respondents description. Coding in this way, is designed to increase consistency of occupation and industry at all levels. At the last level of coding function keys will permit the operator to view all unit group occupation codes and descriptions. Codes at this level are often very similar, and displaying all of them will enable the operator to best select the most appropriate code to fit the respondents occupation. Once selected it can be entered from this screen. In 1986 the codes displayed relied on the actual wording of the written response, so, in some cases, non-matched descriptions, which were more accurate were not displayed and therefore not allocated.

In addition to this, another function key will enable a task description to be viewed for a selected code.

Other enhancements involve inclusion of a recall facility (as currently implemented for usual residence, address 5 years ago, religion, ethnic origin, country of birth) to operate for occupation, industry, sector and workplace address. A function key will enable the operator to recall these codes from the previous record and allocate to the current record, for cases where persons within a dwelling list similar employment. This will be useful, for example, in the case of families working on farms.

The Business Directory (BD) is a directory of businesses in New Zealand. It contains the business names and addresses, and their associated industry(s) and employment sector(s). In 1986 the BD was an integral and invaluable part of the Computer Assisted Coding of labour force fields.

Once the operator had coded occupation, the computer prompted them to enter a description of 'Business Employer'. The BD was then accessed and searched and any resulting matches were displayed on the screen. The matching businesses displayed on screen showed in addition to workplace address, the industry and sector. Hence by selecting and entering on the appropriate business all three fields, industry, sector and work address would be written to that record. Any businesses not on the BD required separate CAC on these three fields.

In 1991 it is proposed to change the order of fields coded so that occupation is coded after business employer. This will enable, information learned about respondents business, to be used in coding the occupation.

Inter-active inter-record editing will make the editing procedures more logically organised. At present, however all inter-record edits (but one) involve the variable family code. It is proposed that the automatic family code derivation routine be run at Rationalisation i.e. after CAC. Given this, all inter-field and inter-record edits involving family code can now only be catered for in this routine. If inter-record edit specification development produces no new edits, not involving family code, then inter-record editing will be eliminated from the CAC phase, while the number of inter-field edits will be reduced by around 8 to 9%.

The layout of displayed edits on the screen will be altered so that they are easier to read and understand. In addition, operators will be able to view correction instructions on screen rather than looking for them in printed instructions. A function key will enable operators to display the meaning of an edit and how to go about correcting in plain English, the data. This online facility provides more immediate help to operators, it can be more readily updated than hardcopy instructions, and will be in a more descriptive and easier understand form than in 1986.

There are a number of other minor proposed changes to the system, all of which are fully summarised in the 'Report on the Computer Assisted Coding processing phase of the 1986 Census of Population and Dwellings'.

In 1986 decisions on and changes made to coding policy were typed and distributed to operators by hand. Many other decisions were made on a verbal basis only. Some policies made several months earlier were, by some operators, lost or forgotten. In 1991 it is proposed to have an online news facility which is updated everytime new coding policy decisions are made, and always displayed every time an operator logs on to the computer.

In 1991, it will also be alot easier to make updates to the reference files, when errors or deficiencies are discovered.

In 1986, there were often long delays before errors in files (especially the BD), were corrected.

For CAC, in 1991, a standard meshblock numbering will be replaced by Administrative numbers, since these are easier to use and eliminate the need to do manual code conversion.

Anticipated Benefits

The logistical and organisational problems experienced with the two shift operation used in 1986 will be considerably reduced by a single shift environment.

A 1:1 ratio of vdu to operator permits more coding to be done when operators have no more referencing to do. Due to the required rostering of time between coding and referencing, in 1986, many found themselves with little to do, once all their referencing was done. This was unavoidable due to the limited vdu resources available. The splitting up of CAC into three operations will enable task specialisation. This is of primary importance in labour-force coding, a traditionally hard to code area, which persistently had the lowest levels of coding consistency of all fields in 1986, and for which specialist coders with a more thorough understanding of the standard classification of codes is desirable. It is anticipated that this policy will have invaluable benefits on the quality and consistency on Census statistics produced from the 1991 Census.

Direct File Matching should significantly decrease processing time, as will the planned automation of some of the edits.

The benefits of an online news facility should be more consistent and informed coding in areas where problems arise.

Phase Requirements

Given a single shift operation with one vdu per person and a similar number of fields processed as in 1986, it is anticipated that this phase will require the following staff and vdus.

	Operators	Supervisors	Total
CAC 1 non labour-force coding	21	3	24
CAC 2 labour-force coding	35	5	40
CAC 3 reference/edit	7	1	8
Total	63	9	72

Total processing time (including training and paid leave) for this phase is estimated at 44 weeks.

Rationalisation

Objective

. The production of final Census data files suitable for both Provisional and Final Output.

This involves:

- Derivation of family codes to all persons.
- Automatic editing of data to clear any inconsistencies.
- Conversion of non-standard to standard codes.
- Creation of additional fields and expansion of code ranges and code combinations.

Methodology/Proposals and anticipated Benefits (compared to 1986)

Rationalisation is the final stage in processing before Output can begin.

Coded and edited data from CAC is input to the rationalisation program, which generates corresponding output files specifically designed for output use, i.e. Rationalisation produces the final unit record file.

An Areas file containing geographic information for each meshblock is also used.

The rationalisation routine then performs the following functions:

It combines Input data from the CAC process with the Areas data to form a hierarchically structured Output File.

For each meshblock in this file there exists

- A geographic record (record type = 0: This contains various geographic data for the meshblock, including its corresponding area unit, local authority, local government region etc. This is the first line of all meshblock files)
- A dwelling record (record type = 1-2: This contains all the household data for a dwelling.
- Personal records (record type = 3-6: One line of data per person containing personal data).

The number of variables for each of these records depends on the type of record. The variables and their values for each line are either,

i) copied directly from input fields
ii) derived to form a new variable from the values of one or more input fields.

In 1986 Rationalisation was run when all meshblocks for a local government region were processed through CAC. These regional files (23 of them) were stored on tape. Once each Region was rationalised a national Master file was created. This exists as a multi-tape file. No editing was done at Rationalisation.

For 1991 several changes have been proposed.

1. Meshblock Rationalisation

Firstly Rationalisation will be done on a meshblock by meshblock basis rather than by region.

Regionally based Rationalisation used massive chunks of computer resource and placed severe restraints on an already heavily committed computer, (Rationalising the Auckland local government region lasted over 20 hours). Eventually the IBM 4381 computer at Wellington was utilised to relieve this situation.
Furthermore the unexpected errors detected in the data meant that most LGR's had to be re-rationalised at some cost and delay. Many LGR's required additional work to finally eliminate all data anomalies. The reason for these errors is discussed later.

Rationalisation will be run on meshblocks as they complete CAC processing. This will mean that the rationalisation overhead will be spread over a much longer period without causing any delay to the proposed publication dates and considerably less machine capacity will be required.

2. Editing

Some editing will form part of the Rationalisation program in 1991.

It is proposed to automate a number of inter-field edits, which were part of the interactive edits system used at CAC in 1986.

The program will check each record for these pre-determined edit conditions. Any records containing such an inconsistency will have one or more fields altered automatically, according to pre-determined rules. The edits and their corrections that will be suitable for automation, are currently being researched. In general, they involve format type inconsistencies, or inconsistencies where only one possible correction can be made most of the time. Such an example might be the following edit, where Country of Birth is New Zealand and years lived in New Zealand has been specified, since the 'years lived in New Zealand' question should only be answered for persons born overseas. In this case, an automatic correction would change the values for 'years in New Zealand' to the 'not specified' code.

Automating this edit relies upon the assumption response to 'Country of Birth' is correct most of the time. Including editing as part of the Rationalisation procedures has two benefits:

i) significant time and resource will be saved at the Edit/Reference phase of CAC. In 1986 certain edits failed often and required only simple changes. It is some of these edits that will be automated.
ii) it will help eliminate from the Output Files the unexpected anomalies and errors not covered at CAC.

There are two reasons why errors were found in the rationalised data. Firstly, deficiencies in the program specifications and a lack of testing time. This is discussed further in 5. below.

Secondly, the edits used at CAC in 1986 did not cover all inconsistencies.

Examples of this found after Rationalisation included young people receiving Superannuation, too many absentees aged 99, and same sex parents.

These anomalies necessitated the re-rationalisation, at some cost, of a number of meshblocks.

3. Family Code Derivation

Just prior to the rationalisation program proper, the data will be run through a program which will automatically determine the family code for each person and absentee in the dwelling.

This program, (a prototype has been written in SAS), is designed to entirely replace the clerical family coding procedures employed in 1986. The quality and consistency of family coding in 1986 was not satisfactory and many errors had to be resolved later by CAC staff. The programme will determine the (single digit) family code, based on relationship to occupier, living arrangements, marital status, age and sex of all persons in the dwelling as well as any absentees listed. The method of derivation will ensure no inconsistencies exist between family codes and other data. That is, it will preclude any edit failure on the family code variable.

4. Output Files

After the family codes have been derived, the rationalisation is then run and Output Files are generated as described earlier.

The specific format for Output files will undoubtedly be different for 1991. It will depend on both Processing and Output requirements, but, for example, it has been proposed to include a much wider range of household statistics in the Output Files for 1991.

5. Planning, Development and Testing

Due to limited resources and delays to finalised output requirements, the Rationalisation program used in 1986 was not able to be thoroughly tested and corrected of bugs. As mentioned before, this caused delays in tabulation production as well as Provisional Output since errors found in data necessitated costly re-rationalisation of meshblocks as well as corrections to the rationalisation program itself.

In 1991 it is proposed to have a thoroughly tested rationalisation program that is performing exactly as required before Processing begins.

This is essential if a timetable is to be kept, resources are not wasted, and the frustrating problems experienced in 1986 are to be avoided.

The file formats will be finalised early so that ample time is given to write and test programs. Early finalisation of Output requirements and questionnaire design are factors which govern file formats.

The program will be tested in a "live data" environment. E.g. using a sample of 1986 Census Data and verifying the data against known results from 1986 rationalisation.

6. Disk Storage

All Output files produced by the rationalisation program will be stored on disk in 1991. Disk storage provides more immediate and efficient access to Census data and is not frought with tape handling problems which plagued the 1986 Output processing.

In particular storing the Master file required the use of a multi-tape file. Many software problems had to be resolved, resulting in delays. In 1991 an IBM 4381 machine (already installed) will provide increased machine capacity to process the Census. This will include providing enough disk space so that all Output files can be stored on disk rather than tape for the duration of the production cycle.

Provisional Rationalisation

In addition to final Rationalisation, a duplicate set of Census Data is rationalised for Provisional Output purposes.

This, of course, is done earlier during Processing, immediately after Preliminary Processing. Since this data has not been through CAC, it does not contain all the fields that the final data has. It will work as described above, on a meshblock by meshblock basis, deriving family codes, performing modified editing, providing Output files on disk, free of any inconsistencies, for timely output of Provisional key statistics.

Output

Objectives

. The production of a range of Provisional Census statistics at the earliest possible date.

. The production of final census statistics, which take in the following considerations:

- timely release
- statistics that are of best value to users
- statistics that are reliable
- the various forms of statistical releases
- available resources
- user requirements
- revenue generation potential

In general the Census output should be a high quality product at reasonable cost providing the best community value data and readily available to all users.

Methodology/Proposals

At this stage the working model for 1991 Output Processing should not differ significantly from that used for the 1986 Census.

However, the Review of the 1986 Output Processing is currently underway, and any recommendations made from this report may result in more major enhancements to those procedures which are discussed below.

The methodology follows two natural stages

a) Planning
b) Production

It is intended that all Output production procedures are fully tested and running by the time processing of data has started.

Table Specification and Programming

In 1986 Table Specification involved examination of the Table contents to determine the nature of each proposed table. Then specifications for the table were written on a special form. Specifications included, title, table number, the subject population for the table, the row and column variables and the way these variables are determined. The layout, column width and cell size etc., is also determined and a drawing of the proposed table is made.

Once the specifications are approved and amended if necessary, programming of the tables is done. In 1986 table programming was done using Table Producing Language (TPL) software. Although TPL does have some limitations, it is still considered to be best tabulation software available at present. The main problem is that the type of output required is often more complex than TPL was designed for. Format problems are most common, all of which require screen editing to bring the output up to publication quality. Despite these shortcomings, there is no proposal at present to deviate from TPL software for the 1991 Census.

It is hoped that some of the programs used in 1986 can be reused in 1991. New tables, however, will be determined, finalised, written and tested by the time processing starts.

Table Testing

Each table produced by a program must, of course, be tested. Both the format and correctness of the table are checked to ensure it is performing as required.

In 1986, test data files were created to test these tables. They were designed to test every code range and every field possible. These 'testdecks' were cyclic in nature. That is, the possible code ranges for each field repeated in cycles. In this way checking table totals was facilitated, since totals can be readily calculated from such cyclic data. Although the test deck procedure work reasonably well, it did not pick up all errors in the program. This resulted in costly re-running with delays later in processing.

In 1991, it is proposed to use "live data" (generated from the first few meshblocks processed in each geographic area of the country) in addition to cyclic data for testing the tables. In this way it is hoped to give a more comprehensive and realistic test of programs, so that actual table production with 1991 Census Data is not delayed. It will also alert the processing management of any system anomalies which were not detected.

Data Validation

Once the tables are produced using Census data, its format and data must be validated. This is necessary, since you can never guarantee that table testing will ensure all tables are correct.

A number of data validation techniques were used on 1986 Census Tabulations. The exact methodology employed was dependent on the report being produced i.e. provisional, final or topic. The following checks were undertaken:

- table formats correct
- table descriptions, columns and stubs for spelling
- presentation up to publication standard
- totals for subject population correct
- comparability with same subject population (totals within ±3)
- percentages correctly calculated
- comparability with 1981
- comparability with cross-tabulations

In 1986 a number of errors were found in the data. These resulted from deficiencies in the editing system, errors in the rationalisation program or errors in the table producing programs that were not detected at the table testing stage.

There is a definite need to monitor and validate data. However, with the developments made in 1986 and proposed improvement and refinement of the edits system, rationalisation program and table testing this aspect of output should require significantly less resources than those used in 1986.

Provisional Output

Provisional Output is designed to provide the earliest possible results from the Census. In 1986 both Provisional Counts and Provisional Key Statistics were produced within 9 months of Census day with a number of additional information new releases also.

The Provisional Counts, released within 3 months of Census day, were produced by a Summary Returns System from a form listing provisional meshblock counts, completed by field supervisors. These forms were then processed to produce the earliest figures for population. A number of news releases, and provisional local authority population and dwelling statistics are also produced from this system. Provisional Statistics are available as soon as the data has been captured.

Once input files are reformatted, run through the imputation routine, for missing ages and sexes, it is edited, in a limited sense, and run through the provisional rationalisation routine.

The data produced, is by necessity, a much limited version of the final data. It contains key statistics on ages, families, sex, religion and ethnic origin etc., excluding information that is only coded at CAC.

As with the final data, provisional data exists in regional files and as a national file and also as a summary file.

In 1991 Provisional Output will operate in a similar way. The actual content of output, however, will be different and will be determined as part of the Output Strategy later this year. Provisional Rationalisation requirements will also be different, as described earlier, as will the number of data files.

Output files

There are a number of computer files containing Census data, which were designed to serve specific purposes and bypass the need to use the large master-file or regional files.

As mentioned earlier Rationalisation produced region by region tapes of Census data. These were combined to form the national Master file, a multi-tape file.

From these files a number of others were 'split' from them. These included:

- a dwellings file
- an adults file
- total population file
- electoral file
- 10% sample files
- a family file

The family file was used to produce family statistics, while other split files were used in the production of subject matter volumes. These were also used, in addition to the 10% sample files, for ad hoc table production and customised productions of clients.

Using split files in this way saves machine resources since a complete search of the master file is avoided.

Additional summary files were made and stored in computer readable form these contain summary cross tabulation statistics of various important social and demographic variables.

For 1991 the number and type of additional output files will be reassessed to make best use of user requirements. For example in 1986 the 10% sample files were rarely used, since users preferred to use the appropriate subject matter file, because of their need for regionally based data.

Publication Procedures

Once Tables were generated and edited they were stored on computer file, while a hard copy was passed to management for approval. A copy of this file was subsequently sent to Information Services Division (ISD) who edited the file using VAX equipment and produced bromides for publication purposes. Unfortunately duplication of effort between Population Census Division and ISD occurred with respect to the final preparation of copy for publications and must be eliminated. One option proposed is that Population staff be totally responsible for all copy preparation and ISD for the bromiding of the final report, and adopt a Quality Control monitoring role. Desktop Publishing Software such as Ventura on a personal computer would enable Population staff to edit publications to the required standard and send the resulting files either to a laser printer or the VAX equipment.

Flow Control/Data Management

Objectives

- To provide effective and efficient control on the progress of questionnaires throughout processing.
  - by providing for issue and receipt of work to and from phases.
  - by controlling the status of any meshblock at all times. The status covers, what phase of processing a meshblock is at, its location, its processing status within the phase, and an insertions/rationalisation status indicator.
    'controlling', means both monitoring and updating, whether clerically or automatically
  - by monitoring the history of processing on all meshblocks
  - by maintaining exact counts of population and dwellings for each meshblock
- To provide timely and accurate reports to management on processing progress.

Methodology/Proposals

The flow of questionnaires through the processing phases will be controlled almost entirely automatically by a computerised Control system. A manual interface will be necessary, of course, for updating the Control file for certain phases.

At each stage of processing the status of a meshblock is updated on the Control file. This is done manually or automatically, depending on whether the phase concerned is a clerical operation or an automated one. This enables issue and receipt of work to and from each phase.

At present the Control system is designed to give users three types of access:

1. Enquiry: To determine current information on a meshblock.
2. Update: To update information on the stage of processing of a meshblock.
3. Reports: To provide reports (at a number of geographic levels) of processing progress.

When changing the status of processed work, users access the update screen, select the relevant status code and enter the meshblock i.d. numbers. Once validated, the control file is updated online.

In 1986, meshblock i.d. numbers were keyed in by hand. To provide a more immediate and error free interface for 1991, it is proposed to use bar code labels on all meshblock wallets and a reader which can be used to scan the bar codes, thereby automatically entering the meshblock numbers into the control system. The option of manually keying in meshblock numbers will still be available.

The enquiry screen can be used to monitor the progress of or determine the whereabouts of any meshblock. The Control file contains the following information for a queried meshblock.

1. Status
2. Date
3. Time
4. Operator ID
5. Total population
6. Total dwellings
7. OTA, EHD, BWC, HUC, and FLATS counts

1. Status

A four digit hierarchically structured code indicating the processing status of a meshblock. It provides users with information on

i) current phase of processing
ii) location of meshblock
iii) status of processing within the phase
iv) insertions and rationalisation indicator

Around 80 combinations of the above digits form valid status codes which represent all stages in the processing sequence and enable pinpoint monitoring of questionnaires. In particular, an insertions indicator will now enable much greater access and control over meshblocks that need questionnaires inserted. By placing a 'hold' status (last digit = 1) on a required meshblock, ensures that this meshblock cannot be processed further without going to Insertions. This will eliminate many of the frustrating delays experienced in 1986, in searching for, and accessing meshblocks needing insertions and ensure that many more questionnaires are included in their correct dwelling.

2 and 3 Date and Time

The date and time of the last control update provides useful information on when work was completed, and compliments the status code.

4 Operator ID

This is the ID number of the clerk who has processed the work. Recording this provides an accurate monitoring of individual throughput and eliminates the need to clerically record work done.

5,6,7 Population and Dwelling Counts (The Counts file)

The Counts file has been incorporated into the Control file.

This is a significant enhancement over the method used in 1986, in which two independent and separately updated files were kept. It used substantial computer resource to have two sets of records, and also used substantial clerical resources since Counts file updates (e.g. due to Insertions relocating questionnaires), had to be manually co-ordinated with the Control file. This often resulted in duplication of manually keyed-in input. The Counts are formed at Check Balance, but can be updated, if necessary, at a later stage, simultaneously updating the Control file. In addition to population and dwelling counts for a meshblock, counts of occupants temporarily away (OTA), Empty Habitable dwellings (EHD), Baches and Weekend Cottages (BWC), Houses under construction (HUC) and Flats are kept.

It is also proposed to compare the provisional counts data produced by the Summary Returns, with the final Counts data, to highlight any anomalies.

In addition to the Control file, the Control system contains two additional files:

1. A History file:
   Each time the Control file is updated for one or more meshblocks, the previous data for those meshblocks is sent to a history file.

2. A Geography file:
   This file contains for each meshblock number, the corresponding standard area unit, local authority and local government region numbers. Management progress reports (by linking to this file) can thus be produced at all levels from meshblock to local government region.

The proposed Control system is currently being developed. It uses SQL tables to store files. These tables are accessed using ISPF screens and tables and is designed using REXX and SQL procedures to run on the IBM 4381 mainframe.

Proposed Benefits

The integration of the Control and Counts file will make essential improvements in the control over the relocation of questionnaires, a significant problem in 1986.

Such a unified control will also prevent needless duplication of work, sometimes caused by the need to manually interface two systems. Clerical resources will be substantially saved, as will computer resources in having to maintain two systems. Clerical cost will therefore be reduced, in this area.

Further, the manual aspects that are involved will be greatly reduced through the planned use of bar code readers for more immediate entering of meshblock numbers for update into the control system. In addition to this, any data transcription or transposition errors will be eliminated.

The Control file will provide users with much greater information than before. The new status code will enable 'pinpoint' monitoring, access and control over any meshblock at any stage during processing. The other features, inclusion of a history file, and geographic file, recording date and time of each update will mean the 'Reports' option of this system can provide timely and accurate progress reports at any geographic level, and which truly reflect the current state of Census Processing.

The proposed system with the online updating, provides more immediate information, than was possible with the 1986 system and provides more control for more users over the questionnaire flow.

References

The following sources of information were used in preparing this report and can be referred to for further information. These are all available from Population Census Division, Christchurch.

. 1986 Census of Population and Dwellings Processing Reports:

- Check Balance
- Coding
- Grooming
- Computed Assisted Coding (CAC)
- Referencing
- Editing
- Processing Control
- Preliminary Processing Errors
- Quality Control
  i) Pre-Capture
  ii) CAC

1991 Census of Population and Dwellings Computerised Processing Proposals

. Output Processing, Tabulation and Dissemination: Chapter 9 of the 1991 Census Plan

7. 1991 Census of Population and Dwellings : Data Capture Options

1991 CENSUS OF POPULATION AND DWELLINGS

DATA CAPTURE OPTIONS

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9 September 1987

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Appendix

1991 N.Z. CENSUS OF POPULATION AND DWELLINGS - DATA CAPTURE OPTIONS

Objective

The objective of this paper is to investigate and evaluate the methods of data capture which have been employed, or are currently available, both in New Zealand and overseas and to recommend the course of action considered most suitable for use in the New Zealand environment.

Introduction

A definition of data capture which may usefully be employed for the purposes of this discussion is, the transfer or conversion of data in handwritten form from respondent or interviewer administered questionnaires, into a machine readable form which may be processed (i.e. edited, analysed, tabulated etc.) by computer.

The need for a data capture phase in any survey or census operation of any reasonable size is universally accepted. In pre-computerised society, Census data was manually i.e. clerically edited and tabulated by "armies" of clerks. In today's rapidly advancing technological age, a quick and accurate data capture method has become an essential component of any data processing system.

The cost of undertaking a Census of population and dwellings is considerable. Therefore, it is essential that, in order to recover some if not all of the financial outlay, data must be made available to users at the earliest opportunity. The marketing of topical information from a 100% sample of the population of a country, is the principal means of generating funds from Census data and thereby, in part, justifies the taking of future Censuses.

There are a number of elements which contribute to the timely release of data. The principal means is an efficient, accurate data capture system. The need for speed is obvious as should be the need for accuracy by the use of sophisticated error detection techniques to monitor such a repetitive function.

Most countries in the developed and developing world undertake a Census every ten years. In some cases a Census is taken every five years. The taking of a Census every ten years means that, with the current rapid progress in computer technology, in some situations, the method of data capture employed ten years ago, may become obsolete and cannot be used again due to the non-availability of parts, servicing and/or ancillary equipment. A Census taken every five years, can often take advantage of the rate of progress in computer technology by simply upgrading the facilities employed last time, provided the equipment used is capable of such an upgrade.

Data Capture Methods Employed in N.Z.

Two completely different methods of data capture have been employed by N.Z. over recent years. The first method, Optical Character Recognition (OCR), was used to capture data for both the 1976 and 1981 Censuses. This method was available for 1986 but was not utilised due principally to the fact that the equipment was no longer serviced. A number of other equally important factors also influenced the decision not to use OCR as a data capture option for a third Census and these are discussed below. The second method of data capture, employed by New Zealand in 1986, was the use of key entry equipment, thereby capturing handwritten responses directly from respondent completed questionnaires. This procedure was not without its problems either and these are also discussed below.

Optical Character Recognition is a process whereby a beam of light is concentrated on a pre-determined segment(s) of paper and the outline of the pencil figure is read, interpreted by the machine and subsequently written to a record on magnetic tape. The OCR machine required the reading documents to be paper of a high quality and constant specific density. The characters were required to be in pencil of a particular lead quality and also very clear and definite in their outline. Such exacting requirements lead to numerous problems occurring which affected the speed and quality of reading and also the ability of the machine to read the documents at all.

Problems were experienced with inconsistent paper density. This meant that the documents could not be read, but as this was not recognised until the documents were fed into the machine, (to the naked eye the paper appeared to be no different) the documents had to be coded a second time, thus adding considerably to the cost of an already expensive labour intensive exercise.

The OCR machine required special reading documents which implied that the data had to be clerically transcribed from the questionnaires onto the coding documents. Transcription and transposition errors would have been common. However, the major concern was rejection and mis-reading by the machine of characters, some of which appeared to be quite clear, acceptable and easily recognisable by the naked eye. This method of capturing data by clerically transcribing information from questionnaires which already contained this data, although not in a form suitable for an OCR machine, was considered very inefficient and wasteful of scarce resources. The intensive labour content of this phase of the data capture process was a significant reason for the department to conduct an investigation into alternative methods of data capture.

Prior to 1986, the department recognised the need to replace its existing outdated Inforex data capture equipment with a more modern and technically superior system. It was decided that the Inforex equipment would be used to capture the information contained on the 1986 Census questionnaires and the new Nixdorf equipment would be used to cater for the on-going operational data capture requirements of the balance of the department. Some modifications were necessary to questionnaire design but these were easily accommodated.

This method had many advantages over the previously used OCR system. Direct key entry straight from the questionnaires eliminated the vast majority of the extremely resource demanding clerical transcription process and hence eliminated this source of transcription and transposition errors. This method was also found to be relatively quick, with all data being captured onto magnetic tape within seven months of Census date. Problems relating to the capture of written responses such as occupation, address etc. were overcome with a sophisticated computerised coding system.

Problems with this method fell into three distinct categories; clerical error, operator error and machine limitations. The questionnaires, prior to despatch for data capture, were subjected to a clerical "grooming" process. The objective of this phase of the processing operation was to clarify responses, remove superfluous marks, indicate short and long records and to generally "clean up" the questionnaire prior to its despatch to data capture. In practise, a number of problems arose through inadequate grooming of the questionnaires and although the problems were addressed on several occasions and steps taken to reduce the problems, the situation was never completely resolved.

With any repetitive clerical operation, boredom and carelessness are bound to arise. Data capture was no exception to this rule. Numerous data capture errors were detected at later processing phases and communicated to the data capture supervisors. Like the grooming problems already mentioned above, these problems were never resolved and appeared to a greater or lesser extent throughout the entire data capture operation, especially when partial and subsequently no data verification was introduced.

The Inforex equipment employed was not sophisticated enough to handle field editing of any more than three to four fields per record. Inter-field editing was not possible at all. The equipment could not be programmed to verify specific records and so entire meshblocks had to be verified. In order to verify a meshblock, a special character had to be inserted by the data capture operator when initially keying the data, so the operator knew in advance whether or not the work would be verified.

Key entry did have its problems, a number of which are outlined above, but in terms of timeliness of data release and cost in terms of labour resources, (and hence finance) it was a considerably superior method of data capture when compared to OCR.

Data Capture Methods Employed Overseas

For the purposes of this investigation, the data capture methods recently employed by three overseas countries will be reviewed. Consideration will also be given to the data capture options selected by these same countries for the 1990-91 round of Censuses.

(a) Australia

Like New Zealand, Australia has recently employed two vastly different methods of data capture. One method highly labour intensive, the other not so, but both requiring manual coding onto the questionnaires.

In both 1976 and 1981, Australia employed OMR technology as a means of data capture. However, this did not mean that questionnaires were fed into and read by the OMR equipment. A large number of temporary clerks were employed to transcribe the data which appeared on the questionnaires onto OMR documents. The coded documents were then fed into ICL document readers and transferred to computer, where the data was edited. This method was very resource hungry with respect to labour and, as with most clerical operations, was subject to human errors of transcription, transposition etc.

In 1986, a totally new approach was taken in an attempt to reduce labour costs and hasten the data capture process.

The new approach still demanded clerical coding of questions with the codes written in coding boxes provided on the questionnaire. A form of computer assisted coding was available for occupation (introduced mainly because of the difficulty clerical staff had experienced in the 1985 dress rehearsal when using ASCO). The data capture was effected by using Nixdorf key entry equipment and was initially to be undertaken in two stages, principally in order to provide users with some early data. The initial data capture concerned the census night geographic identification fields plus age and sex. However, a decision was made to abandon the initial data capture stage due to excessive cost. The second data capture stage involved the key to disk of all fields, including those already keyed at stage one of data capture. (Note: This subsequently became the only data capture stage.) The data entry was undertaken by the same clerks who coded the questionnaires, not specialist key entry operators, and this resulted in an extremely slow hourly key depression rate (approximately 2,000-3,000 key depressions per hour).

Australia is currently investigating the use of OMR and OCR as viable data capture options for 1991. OCR has the advantage of being able to read both alphabetic and numeric characters but performance in reading alphabetic characters is not as high as for reading numeric characters. Considering the problems which New Zealand experienced with the exactitude of the requirements of the OCR equipment, it is not surprising that at this stage, Australia have rejected OCR for 1991 given the uncontrolled environment with respect to questionnaire completion by members of the public. Additional factors which influenced this decision included the cost of OCR equipment, (considerably more expensive than OMR) reading throughput rates, (slower than OMR) and the extensive testing and development programme which would be necessary prior to OCR implementation.

At this early stage in the 1991 development cycle, OMR appears to be the data capture option most likely to be used by Australia. OMR does have some disadvantages in that most equipment is designed to read pencil marks although technological advances have recently been made which permit the reading of various coloured inks. A more serious disadvantage from New Zealand's stance is the size of document able to be read by the OMR equipment, basically A4. OMR equipment can be purchased either as a complete data capture product including reading equipment, processors, tape drives etc. while other manufacturers market reading equipment only which can be connected to peripheral devices which may already exist within the department's organisation.

Australia conducted three OMR pilot tests during the 1970's, none of which proved conclusively that OMR would be a satisfactory data capture method or that respondents could successfully complete an OMR questionnaire. However, OMR has been demonstrated in other countries as being a successful method. In order to further test OMR, Australia has recently embarked upon an extensive six stage test programme in order to fully verify that OMR would be a viable and cost effective data capture option for 1991. In March and June 1986, Australia undertook two further OMR tests with varying questionnaire content and layout. To date, no results are available, but the principal factors being assessed were:

(i) writing implements used by respondents
(ii) response to various questionnaire layout
(iii) effect of questionnaire content on response
(iv) OMR equipment response.

(b) United States of America

Unlike New Zealand or Australia, USA conducts decennial Censuses. The main advantage of a ten year development cycle is that an extensive test programme can be undertaken and thoroughly evaluated prior to implementation in the ensuing Census.

The USA has investigated OMR as a data capture technique for its 1990 bicentennial Census but has, for the time being, rejected this method. However, further investigation into OMR will occur during the 1990's. Tests conducted in 1985 by the US Bureau of the Census indicated that some problems still required further research before OMR could be considered as a viable data capture option. A major concern with respect to OMR was the uncontrolled respondent environment. Cost effectiveness and reading time were other considerations affecting the decision to defer the possible implementation of OMR in 1990.

The USA has also investigated key entry equipment as a data capture method. The only significant reason for rejecting key entry from being considered for use in any Census, was the very large number of key stations and operators which would be required. (Approximately 4,000 based on N.Z. experience.) A possible solution would have been to create a proliferation of data capture centres, but de-centralisation problems such as quality control, transportation, recruitment, training and communication were foreseen as unnecessary and undesirable complications.

The USA employed FOSDIC (film optical sensing device for input to computer) and FACT (FOSDIC and automated camera technology) in order to capture the data collected from the 1980 Census. This process involved microfilming the questionnaires with high speed cameras. The raw film was then developed and processed into microfilm which was subsequently read by the FOSDIC machine and written to magnetic tape. All written responses were clerically converted to coded form and transcribed onto the questionnaires prior to filming.

The data capture method which will be employed for the bicentennial Census to be held in 1990, is basically the same as that used in 1980 with a few modifications which reflect both technological advances and also the result of previous experience in 1980. FACT and FOSDIC will be utilised as the principal means of data capture. Instead of the three processing

centres which operated in 1980, eleven centres will be established in an attempt to accelerate the production and release of data. Written responses, which in 1980 were clerically coded onto the questionnaires, will be input by using a form of computer assisted coding.

The International Statistics Programs Centre of the US Bureau of the Census has recently developed a complete data capture, editing and tabulation software package which is suitable for use on a personal computer. Although the intention, when the development of this integrated package was initially commenced, was for use in developing nations which were unable to obtain either the computing hardware or skilled personnel, its use should be further investigated.

The package, known by the acronym, IMPS (Integrated Microcomputer Processing System) is composed of three integrated functions. The data capture function is known as ENTRYPOINT 90, the editing function is known as CONCOR, while the tabulation function is known as CENTS 4. The ENTRYPOINT 90 package, run in a personal computer environment and linked to a mainframe computer, could prove to be a possible alternative solution to New Zealand's key entry equipment requirements.

(c) Japan

Japan has relied on OMR as a data capture method since 1970 and to date, has captured the data from four successive Censuses with this method. Japan has found this method to be highly satisfactory and intends to continue using OMR in the forseeable future.

Prior to 1975, data was transcribed from the questionnaires onto specially designed and printed OMR coding sheets by clerks. These documents were then fed into the OMR reader and subsequently written to magnetic tape. However, since 1975, respondents have completed questionnaires specifically designed to be read by OMR equipment. In 1975 the questionnaires were printed on one side only as OMR technology, at that stage, could only read a single side at a time. In 1980 and 1985 the documents were printed on both sides which were read by the OMR equipment simultaneously.

The OMR equipment used by Japan is very sophisticated and quite flexible. The OMR reader can be connected either on-line directly to a computer, so that data can be read to disk, or off-line with the data being recorded onto magnetic tapes. The machine is equipped with its own error diagnostic capabilities (similar to modern photocopiers) which enable the operator to perform operational maintenance tasks.

The equipment, as a general rule, has a maximum reading capacity of between 200 and 250 documents per minute. The size of each document and the number of marks the machine is programmed to read, are the prime determinants of reading speed. The size of document for reading purposes may vary from 182mm - 257mm high and 257mm - 364mm wide, with the constraint that one side of the page must be twice the length of the other side (i.e. basically A4 is the maximum size of document which can be read). The machine has a capacity to be programmed to read marks in up to 34 rows and 96 columns, which permits a considerable degree of flexibility with respect to questionnaire design.

The OMR equipment requires regular monitoring to ensure that the reading density level is functioning correctly. In Japan, such tests are conducted three times daily and adjustments to the equipment are performed by engineers employed by the manufacturer of the equipment.

The Japanese experience with OMR may shed some light on New Zealand's data capture dilemma. In practise, the reading rates were not as high as anticipated, due to time incurred by operators loading/unloading the machine, reading performance tests and handling time necessary when questionnaires had been rejected by the equipment. The average number of double sided questionnaires read per hour over a 14 month period was 165. The rejection rate was very low at 0.05% and was mainly due to the documents not being completely flat (creases, folds, tears etc. all affected the machines ability to read the questionnaires). In fact, 71% of all documents rejected were creased in some manner. A further 18% of rejected documents had stains such as coffee or ink. A further 9% were rejected because of attached paper clips, staples and rubber remnants (from erasures). Approximately 2% were rejected owing to operator error i.e. the questionnaires were not fed into the machine top-end first. It is significant to note, that only 0.1% of all rejections were due to inferior printing of the questionnaires.

Looking ahead to 1990, Japan is faced with some significant technological developments as the equipment used in 1985 is no longer being supported by manufacturers. The 1990 Japanese Census questionnaires will be considerably larger than those used in 1985 (mid-decade Censuses in Japan have traditionally been on a smaller scale subject-matter-wise). At present no OMR equipment is available to read the increased size of document, 420mm x 297mm (approximately A3). However, four Japanese companies are at present developing OMR machines which will be capable of reading the type of document proposed by the Statistics Centre in Japan.

Data Capture Options for New Zealand in 1991

(a) Optical Mark Recognition (OMR)(1)

At present there is no OMR machine available which could be used to capture responses from the New Zealand questionnaire in its current size. Several Japanese electronics companies are currently attempting to develop equipment capable of reading a document of A3 size. This technology will be necessary for use in the 1990 Japanese Census. However, for the purposes of assessing OMR technology as a viable data capture option for New Zealand in 1991, the assumption is made that no equipment will be available capable of reading a document larger than A4.

The OMR equipment could be operated 24 hours per day if required (subject to reading level tests i.e. one hour in every eight). The ideal location for such equipment would be in the computer operations area where the equipment could be directly connected to such peripheral devices as tape drives etc. so that the data could be readily transferred to magnetic tape and subsequently loaded to computer. During the Census processing operation, the computer operations area conduct a minimum of two shifts and sometimes three shifts daily. Operations staff plus an additional person could be employed to operate the OMR equipment.

(1) Discussion based on NEC model N 7815

However the transportability of the Census questionnaires themselves and the rapid speed at which the equipment reads the documents may necessitate the location of the OMR machine in the Records area. This would require the linkage of the OMR machine to the computer operations area by ducted electric cabling. In this instance, two persons would be required to operate the equipment, one to operate the reader and service any minor faults and the other to collect and return questionnaires to/from a central store.

Temperature and humidity control should not be a problem in either area as the equipment is tolerant of a wide spectrum of levels. It requires a working temperature range of between 15^{0}C and 32^{0}C with humidity in the 30% - 70% range. The reader is approximately 2m wide by 1.8m high by 0.8m long and weighs about 700 kg. (Dependent on machine used.)

In an OMR environment, the questionnaires would need to be cut into A4 (or smaller) sized documents prior to being read by the machine. This implies considerably increased handling time and may introduce some problems later when the questionnaires are subsequently processed at CAC (where both portions of the personal questionnaire must be kept together) unless reference numbers appear on both pages which comprise a single personal questionnaire. The documents would not require separation into dwellings and personals for ease of OMR reading because an index mark should appear in the first column of each page. This mark would determine the reading pattern required for the page.

The degree of training necessary in order to operate the OMR equipment is difficult to assess, but it is clear that regular maintenance by the manufacturer is essential if a high quality performance is demanded. The nature of this maintenance takes the form of; reading level tests (3 times per shift, approximately one hour in every eight hours of machine operation), reading checks and equipment cleaning, both of which should occur every two weeks.

Time is a vital consideration in the determination of any prospective data capture system. In an OMR environment, the reading document is A4 size therefore, the existing A3 personal questionnaire would need to be divided into two documents, each of A4 size (except for children under 15 years of age who would be represented by only one A4 document). The total number of documents to be read, based on the 1986 Census would be 6,921,192 made up as follows:

Estimated Number of A4 Documents

Type	Questionnaire	A4 Documents
Dwelling	1,095,748	1,095,748
Adult	2,518,360	5,036,720
Child	788,724	788,724
Total	4,402,832	6,921,192

Based on overseas experience, reading levels in the early months of data capture tend to be lower due to initial teething problems with the equipment and operator inexperience. With the passing of time, reading rates improve dramatically to average at about 165-175 documents per minute. The following table provides an estimate of the time required to read the 1986 Census questionnaires with an OMR machine. The assumption is made that the reading performance rate will improve over the first four months of the operation, by which time all problems should have been eliminated and a constant performance rate of 170 documents per minute is assumed thereafter. Estimates are provided for a one, two and three shift operation.

Projected OMR Reading Rates

Week No.	Documents per minute	One Shift(1)		Two Shifts(1)		Three Shifts(1)	
		This Week	Cumulative	This Week	Cumulative	This Week	Cumulative
1	100	210,000	210,000	420,000	420,000	630,000	630,000
2	100	210,000	420,000	420,000	840,000	630,000	1,260,000
3	100	210,000	630,000	420,000	1,260,000	630,000	1,890,000
4	100	210,000	840,000	420,000	1,680,000	630,000	2,520,000
5	140	294,000	1,134,000	588,000	2,268,000	882,000	3,402,000
6	140	294,000	1,428,000	588,000	2,856,000	882,000	4,284,000
7	140	294,000	1,722,000	588,000	3,444,000	882,000	5,166,000
8	140	294,000	2,016,000	588,000	4,032,000	882,000	6,048,000
9	160	336,000	2,352,000	672,000	4,704,000	1,008,000	7,056,000
10	160	336,000	2,688,000	672,000	5,376,000		
11	160	336,000	3,024,000	672,000	6,048,000		
12	160	336,000	3,360,000	672,000	6,720,000		
13	170	357,000	3,717,000	714,000	7,434,000		
14	170	357,000	4,074,000				
15	170	357,000	4,431,000				
16	170	357,000	4,788,000				
17	170	357,000	5,145,000				
18	170	357,000	5,502,000				
19	170	357,000	5,859,000				
20	170	357,000	6,216,000				
21	170	357,000	6,573,000				
22	170	357,000	6,930,000				

(1) Each shift is of eight hours duration less one hour for reading level tests i.e. a net seven hours reading time per shift.

The above figures represent a conservative estimate of the number of documents which could be read. However, this table does have an impact on the timetable for the release of provisional data. Extensive information could be made available to the public within three months of Census date compared with seven months for 1986.

The maximum number of columns which can be read is 34 and the maximum number of rows is 96. From a data capture perspective, this number is reduced slightly as the timing marks (discussed below) use two column positions, therefore a matrix of 32 x 96 cells is readable.

The equipment can be set to read one mark in a column or more than one mark. If a one mark read mode is set, any more than one mark read is regarded as an error and the equipment then compares the reading density of each mark read. The mark with the greatest density (or print contrast signal) is accepted. (Note: In practise, one mark must have a print

contrast signal of 30% greater than any other mark to be accepted, if this is not the case, the form is rejected.) If a multi-mark mode is set, the machine will read all marks (up to a maximum of 32) in the column. Multi-mark mode is used when more than one response is permitted or when responses for several people are read at once (as occurs in a household schedule).

OMR questionnaires require a significantly higher standard of paper and print quality than that used for the 1986 Census. The quality of paper used in 1986 would be too light for OMR use as it creased very easily. The majority of OMR documents which have been respondent completed overseas, are composed of a relatively heavy duty paper. Print colour is equally important, with light colours being better than dark colours, although respondents may experience some degree of difficulty reading light coloured print.

The OMR equipment not only affects the paper and print quality able to be used, but also has a significant impact on questionnaire design. Three types of marks are essential on each page of an OMR readable questionnaire. The positioning of these marks is of paramount importance and the success or failure of the data capture process depends on strict adherence to OMR requirements.

The first mark in the first column is known as an index mark and if the questionnaire is composed of several pages, then an additional mark will appear further down the same column. The second mark in the first column will be in a different position for each page. It is the position of these marks which determines the reading pattern for each page.

Timing marks indicate to the OMR machine, which columns should be read and whether multi-marks are to be read and distinguished. The timing marks must be a certain size (approximately 1mm x 4mm) and a minimum of 2.5mm apart if a single mark is to be read but, approximately 2mm x 4mm in size and a minimum of 3.5mm apart if the multi-read facility is required. (Note: This requirement varies with the machine used.)

Data marks are required for the entry of the respondent's answer. Each column of data marks must be aligned exactly 1mm below the top of the timing marks to which they relate. The dimension of the data marks is not very flexible. The depth must be within the range of 1-2mm. They must be 4mm long and a minimum of 3mm apart within each column and each column must be a minimum of 2.5mm apart.

A further questionnaire development problem which may arise concerns the difficulty of designing a question which will provide date of birth data. This information could be captured with the accepted OMR method of marked boxes, but this is very confusing for respondents. Two alternatives could be employed by asking the respondents to record their date of birth in numerics and capture this data, either at a later processing phase e.g. CAC, or clerically mark the date of birth in a, "for office use only" area of the questionnaire.

The quality of data capture when using OMR is second to none. This is clearly the most accurate means of capturing data from a questionnaire currently available. Human error is completely absent from the reading process whereas all other data capture methods rely on human intervention, either transcribing or keying data from questionnaires.

The level of clerical grooming of the questionnaires would not change significantly. The emphasis would shift from ensuring that figures and ticks were legible to ensuring that all marks which should be read, will be read by the machine.

A dilemma with respect to OMR equipment which has not yet been addressed is whether to purchase or hire. If the department was to purchase, the problem would be two-fold. To what use would an expensive item of machinery be put between Censuses, and secondly, in five years time, given the rapid technological changes currently occurring, will the machine be obsolete and no longer serviced. If the department was to hire the equipment, a backup data entry method would be required just in case a few questionnaires required re-capture. The favoured method would be to hire, as a backup data capture method should be available if an emergency arose which prevented the use of the OMR equipment.

(b) Personal Computers and Related Software

The use of personal computers (P.C's) to capture Census data is a relatively recent phenomenon. To date, P.C's have been used for this purpose only in small Pacific Island states. Ponope, an island state within the Federated States of Micronesia, with a population of 22,000 has recently processed its entire Census on three IBM PC/ATs. This year, this department processed the Tokelau Islands Census on a PC, although initial data capture was with Nixdorf equipment. The U.S.A. is considering processing data obtained from outlying areas (e.g. Guam, Marianas, Virgin Is. and American Samoa) with respect to the 1990 U.S. bicentennial Census with P.C's.

A number of software agencies are offering P.C. software capable of handling Census data entry. However, after an extensive evaluation of several data entry packages, the International Statistics Programs Centre (ISPC) of the U.S. Bureau of the Census has selected two for use in a Census environment. The first, known as RODE/PC is a data entry package developed by Rasab of Sweden for the IBM PC. The second, known as ENTRYPOINT 90 was developed by Datalex of USA and is used by the International Statistics Programs Centre (ISPC) of the U.S. Bureau of the Census, also for use on the IBM PC. Both software packages require IBM PC, PC/XT or PC/AT or compatible equipment with a minimum of 256K RAM and a 10 megabyte hard disk.

In a data capture environment, the daily operation time depends to a large extent on the conditions of employment as determined by the department in consultation with the State Services Commission. A one or two shift operation is definitely possible, but a third shift is extremely doubtful. Normal operating hours for the existing data capture pool are 8am - 4pm including a 30 minute lunch break i.e. 7 hours 30 minutes per day. In addition, no operator is permitted to work more than 50 minutes continuously at the keyboard, although in practise, an in-house agreement has been reached with the staff, whereby two 30 minute tea breaks are taken in lieu of a break each hour. With other breaks e.g. for obtaining additional work/returning completed work, query resolution etc. a net $5\frac{1}{2}$ hour, productive day is achieved.

Days Required to Complete Data Capture

Shift Type/No. of PC's	Verification Level		
	10%	15%	25%
One Shift Operation			
25 PC's	165	171	183
50 PC's	98	102	108
Two Shift Operation			
25 PC's	98	102	108
50 PC's	55	57	61

Both software packages currently available have been designed for use on an IBM PC/AT. The PC/AT is supplied with 512K RAM, Qwerty keyboard, monochrome monitor and up to 20 megabyte hard disk as standard equipment. Optional extras include a colour monitor, printing facilities and a "numerics" keyboard to enable faster data entry than the normal Qwerty keyboard.

For the purposes of this discussion, RODE/PC will be evaluated. ENTRYPOINT 90 is a key entry software package which is very similar. Both require a program to be written which is then available for use by the data entry operator.

Features of RODE/PC can be divided into three categories. The facilities within each category are discussed below.

(a) Field Definition

Fields may be specified as numeric or alpha only, or alphanumeric. Fields may be set up as optional (i.e. may be by-passed e.g. income, voluntary work) or mandatory (e.g. sex, date of birth). Fields may also be padded with either zero or blanks to the specified length.

(b) Field Editing

Field titles and characteristics may be displayed. Fields may be checked for values which are "out of range" and inter-field edits are also possible. Automatic duplication of field values is permitted and operators may access previously keyed fields or records. Data files, both internal and external to the PC may also be accessed during the data capture phase.

(c) Other Features

The software can cope with multiple record types. The operator may correct records, delete records and insert records in the appropriate place. The operator may also search for a specific field or value. Verification and field release facilities are also available.

A further consideration is the determination of the PC system configuration. Several alternatives are available, three of which will be briefly outlined here.

(a) Stand Alone Configuration

With this type of installation, each PC would be separately connected to the mainframe. When the operator enters the data at the PC, using the software program, the keystrokes are transmitted directly to the mainframe and stored in a file held on disk. This method requires an extensive amount of cabling and the number of ports which the mainframe can support may limit the number of PC's which can be used.

(b) Batched Configuration

This type of installation is a variation of the above with data being stored temporarily on the hard disk within the PC. At periodic intervals e.g. tea or meal breaks, data is transferred from the PC to a hard disk on the mainframe. With this method, a bank of 5 or 10 PC's at a time could be connected to the mainframe and data transferred thus saving on cabling and the number of mainframe ports required. This method would require a PC with a much larger hard disk (40 megabytes minimum) than a standard PC/AT.

(c) Network Configuration

With this type of installation the PC's are linked together and the data from each PC can be held in a central store. Data may then be transferred to the mainframe either at periodic intervals or at the end of the day. With this method only one port to the mainframe would be required.

If the PC and related software data capture approach was used in order to capture Census data, the degree of impact on the questionnaire design used for the 1986 Census would be minimal, if at all. However, the impact on the existing processing system would be significant. The most obvious change to the existing processing system would involve reading data directly onto hard disk rather than from tape to disk. The existing processing system reads data from tape and at this stage, also generates record type, creates CAC fields, imputes values for various fields (if required) and also undertakes some preliminary editing. The need to retain the portion of the existing system which checks for out of range errors in the initial data may prove to be no longer necessary.

Data quality with this method of data capture is dependent on three principal factors. The first relates to the operator. A well trained, skilled operator will probably be both fast and accurate. Unfortunately, there is no guarantee that this type of person will be available for such a short period of employment. The nature of this work is such that the level of dedication to the job and loyalty to the employer is not always as high as for a permanent position due to lower career prospects. The second factor relates to the level of data verification undertaken. Clearly the higher the level of verification the more likely the data will be error free. The final factor relates to the sophistication of the data entry software itself. The greater the number of checks which can be placed on the data entry operators, the less is the likelihood of introducing errors (either deliberate or otherwise) into the data from this source.

At the conclusion of the data capture phase, there should be no difficulty in re-using the equipment in other areas of the department. The PC's could either be "sold" to other divisions of the department or placed on extended loan for a four year period and recalled when required. The software would be retained and could be re-used in subsequent Censuses.

Two further options within the personal computer arena are worthy of consideration. Personal computer rental is a possibility, although 50 units is a large number. Rental rates are approximately $300 per month for a PC/XT. The department would still need to purchase workstations and ergonomic chairs to accommodate the PC's and have the problem of the disposal of 50 workstations at the end of the data capture phase. The workstations could be stored and retrieved as and when required.

By 1991 the department will have added to it's current tally of 65 personal computers. Considering that the data capture process will be of a relatively short duration i.e. approximately 9 months (including training), it is not inconceivable that 50 personal computers, complete with workstation and ergonomic chair, could be seconded for Population Census Division use at no additional cost to the department.

Appendix 1 provides details of an analysis of data transfer rates from the PC to the mainframe computer. File size is the primary determinant of transfer-time.

(c) Nixdorf Data Capture Equipment

The Nixdorf data capture system is very sophisticated and is in fact a computer in its own right. The department already has two data capture installations which currently utilise Nixdorf equipment. This equipment was selected from a range of possible alternative hardware because of its flexibility and sophistication.

The operating environment required for the Nixdorf equipment would be very similar to that envisaged for data capture using PC's. The key entry stations would be networked to a central disk where data would be held until transferred to magnetic tape. In order to capture the 1986 Census questionnaires onto magnetic tape, 48 Inforex key entry stations were used on a one shift basis. The number of key stations could have been reduced by half if a two shift operation had been employed. For details relating to a two shift operation refer to the personal computers and related software section of this report.

Training in the use of both Nixdorf software and hardware would present few problems for the Population Census Division. With two Nixdorf installations within the department, the expertise from the existing Data Capture Section could be employed in order to write the necessary programs. With respect to maintenance of the hardware, Nixdorf has an office in Christchurch, so hardware problems should be speedily resolved.

It is anticipated that the data capture time frame would be the same for either Nixdorf or PC data entry. Slight variations between the two methods might occur, but these are not expected to be significant.

The Nixdorf equipment presently used in the Christchurch office of the department has the following configuration. A Nixdorf 8850/55 system has been installed containing a 10 megabyte hard disk, 800 bpi tape drive, 128K memory and the capacity to handle up to 32 key stations. The Christchurch operation has a 25 key station load on the machine. The system also has a one hour battery backup system should the power supply be lost which enables management to continue the operation until power is restored and/or to save the work to magnetic tape that has been done since the last save was undertaken. At present, the Nixdorf equipment is a stand alone system, i.e. it is not linked to the department's IBM 4361. With the present system, a backup tape(s) is created for each job and four system saves (each taking approximately 5-10 minutes) are performed daily.

The software used by the Nixdorf system is very powerful and reasonably simple to programme once training has been given. A summary of the software characteristics follows.

(a) Data capture facilities

Facilities are available to determine screen layout and record format i.e. field descriptions, length, sequence etc. Record length can be from 1 to 4096 bytes and record and blocksize can also be regulated. Fields can be alphabetic, numeric or alphanumeric, left or right justified, field skip, space and zero fill options are also available. Field edit, file edit and range checks are possible as are searches of value tables, accumulators and automatic insertion of values. Comparisons can be made between the number of records and counts data and a verification facility is available whereby any level and degree of verification is possible.

(b) Verification facilities

Separate verification programmes may be written depending on the degree and level of verification required. The whole or part of a batch may be verified. Full or partial verification of records is possible although this is performed using separate programmes. The original operator does not know which batch will be subject to a verification check as this is an entirely separate procedure.

(c) Output facilities

The output may be in any format desired by the user of the data. Fields may be moved to a different position within a record or increased or decreased in size. Values may be converted to standard codes, country codes for example, from files specially created for that purpose. Data from accumulators can be inserted with the output as can data from external files.

The use of Nixdorf equipment would enable the department to employ an identical questionnaire design to that used in 1986. The Nixdorf equipment is very flexible as the data entry screen layout can be so designed that it reflects the questionnaire layout thereby making data entry considerably easier. The computerised processing system used in 1986 could be used again in 1991 if desired as the Nixdorf equipment was employed in order to capture a small proportion of the 1986 Census data and proved to be 100% compatible.

The quality of this method of data capture is subject to a degree of human error. Although range checks can be imposed upon virtually every field, there is no guarantee that every field will contain correct values, only that every field will contain a valid value. Transposition, transcription and slide errors could all occur without necessarily being detected unless a 100% verification policy was introduced.

A major problem which would arise if Nixdorf equipment was purchased to capture the 1991 Census data, is what to do with the equipment during the inter-censal period. The department has recently introduced a policy of reduced levels of verification on all survey data. (Departmental standard policy is 25% verification.) This has resulted in reduced staffing levels in the data capture area of the department, therefore additional key entry equipment would not be required.

An investigation has been conducted into the possibility of hiring Nixdorf equipment for the duration of the data capture period. A precedent for equipment hire has already been established by Nixdorf, who hired equipment to the Australian Bureau of the Statistics during their data capture phase. Nixdorf have provided costing details which appear in the summary below.

Summary of Data Capture Options

The point must be made that the most sophisticated and technically advanced data capture method available may not necessarily be suitable for use in the New Zealand situation because of cost or economics of scale. Similarly, what is the most suitable data capture method for one country need not necessarily be so for another country due to processing, regional or labour supply differences.

A summary of the three methods evaluated by this paper appears below.

A two shift operation would require an earlier daily start and a later daily finish. The 1986 Census CAC phase operated on a two shift basis; 7am - 2.30pm and 2.30pm - 10pm. Each shift had two 15 minute tea breaks and a 30 minute meal break, i.e. an effective 6 hour 30 minute day. The net working day, through lost time would probably be about 6 hours. The second shift therefore, has the effect of doubling the productive capacity of the data capture operation.

With a two shift environment, the only overtime which could be undertaken would be Saturday, whereas a single shift could work overtime during the week as well as Saturday. However, previous experience with overtime would render this practise questionable. During the 1986 Census data capture operation, limited overtime was undertaken when production fell behind schedule. However it was observed that the quality of work fell when additional hours were worked, probably due to operator tiredness and absenteeism increased due to sickness.

Approximately 50 PC's in a single shift environment or 25 PC's in a two shift environment would be required in order to capture the 1986 Census data. The location of this equipment, bearing in mind that each PC may require the ability to be connected to the mainframe computer at some stage during each day, is not critical, although it is preferable for all the PC's to be situated in the same location. If experienced data capture staff are desired as supervisors, then level 3 is the obvious choice, but anyone suitably trained in the use of both PC software and hardware could supervise the PC data entry staff. However, a location within the same building as the mainframe is essential.

Training in the use of the PC software would probably be the responsibility of the Population Census Division, although the distribution agent would presumeably be able to provide some expertise. Most PC software is provided with extensive documentation in the form of instruction manuals and tutorials. Population Census Division staff would need to be able to write the necessary programs which would permit the Census data to be captured but with the expertise available within the division (and within the department) this should pose no problems.

The time required to capture the Census data with PC's in a one or two shift environment, assuming an average key depression rate of 7,500 per hour, with three verification level options, (10%, 15% and 25%) is shown in the table below. The average number of key depressions per record required to capture the 1986 Census data was 37, therefore, the total number of key depressions required was 162,904,784.

Summary of Data Capture Options

Consideration	OMR	Personal Computer	Nixdorf
(a) Capture Time			
. one shift	22 weeks		
. 25 operators	n.a.	39 weeks	39 weeks
. 50 operators	n.a.	24 weeks	24 weeks
. two shifts	13 weeks		
. 25 operators	n.a.	24 weeks	24 weeks
. 50 operators	n.a.	13 weeks	13 weeks
. three shifts	9 weeks		
. 25 operators	n.a.	n.a.	n.a.
. 50 operators	n.a.	n.a.	n.a.
(b) Hardware Cost	$1,000,000(1)		
. 25 operators			
. capture equipment		$125,000	$200,000
. work stations		$25,000	$25,000
. seating		$5,000	$5,000
Total cost		$155,000	$230,000
. 50 operators			
. capture equipment		$250,000	$350,000
. work stations		$50,000	$50,000
. seating		$10,000	$10,000
Total cost		$310,000	$410,000
(c) Software Cost	(2)		(2)
. 25 work stations		$27,570	
. 50 work stations		$49,150	
(d) Labour Cost			
. one shift	$26,511		
. 25 operators		$396,864	$396,864
. 50 operators		$492,075	$492,075
. two shifts	$26,957		
. 25 operators		$536,818	$536,818
. 50 operators		$574,517	$574,517
. three shifts	$26,719		
. 25 operators		n.a.	n.a.
. 50 operators		n.a.	n.a.

Consideration	OMR	Personal Computer	Nixdorf
(e) Data Quality			
. error rate	0.0%	0.03%(3)	0.03%(3)
(f) Maintenance			
. nearest agent	Sydney	Sydney	Christchurch
. cost	(4)	$2,190/$3,500(5)	

(1) Estimate only based on Australian information.
(2) Assumption - included in hardware cost.
(3) Based on Inforex equipment, true rate probably closer to 0.01%.
(4) Unknown.
(5) Cost for 25/50 work stations.

Summary of Data Capture Option Costs

(a) OMR

one shift	$1,026,511
two shift	$1,026,957
three shift	$1,026,719

(b) Personal Computer

one shift 25 operators	$581,624
one shift 50 operators	$854,725
two shifts 25 operators	$721,578
two shifts 50 operators	$937,167

(c) Nixdorf

one shift 25 operators	$626,864
one shift 50 operators	$902,075
two shifts 25 operators	$766,818
two shifts 50 operators	$984,517

Additional Note

Personal Computer (50 operators - one shift)

	Purchase ($)	Hire ($)	In-House(1) ($)
Hardware			
. capture equipment	250,000	135,000	-
. work stations	50,000	50,000	-
. seating	10,000	10,000	-
Software			
. e.g. Entrypoint 90	49,150	49,150	49,150
Total Cost	359,150	244,150	49,150

(1) Use PC's already in use within the department for a 9 month period.

Nixdorf (50 operators - one shift)

	Purchase ($)	Hire ($)
Hardware		
. capture equipment	350,000	200,000
. work stations	50,000	50,000
. seating	10,000	10,000
Total Cost	410,000	260,000

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ANALYSIS OF FILE TRANSFER

BETWEEN IBM PC AND MAINFRAME

Introduction:

It has been proposed to use either stand-alone or networked IBM personal computers for data capture during the 1991 Census. Data capture to disk via the appropriate software will result in the formation of large sequentially formatted data files.

Estimates based on 1986 data capture rates reveal an average operator rate of 7000 key depressions per hour. The proposal for PC data capture is for the implementation of 50 machines. During the 1986 Census data capture records were backed up three times per day at approximately two hourly intervals. With 50 operators working at average efficiency this would require the transfer of about 700,000 bytes of data at each session.

An investigation was undertaken to evaluate transfer times for data files between the PC and the mainframe.

Several causal factors were identified to have a significant affect on these transfer times.

1) File size - a measure of the record length and the overall file length.

2) Mainframe load - a variety of parameters are monitored by the mainframe, of principal interest to this investigation are:

   i) The number of users logged on.
   ii) Computer activity - defined as % CPU in use.
   iii) Computer load - defined as paging rate.
   iv) Computer I/oload - defined as % I/O in use.

Methodology:

The transfer times for a number of sequential files was monitored over a period of several weeks.

The files were uploaded via the IRMA terminal Emulator. This system uses a coaxial cable connection to the IBM mainframe.

To avoid complications the file transfer experiments were conducted on a mainframe user-ID with a relatively simple profile exec (evidence has shown that the inclusion of a 'Blip' in the profile exec interfears drastically with file transfer function).

At the completion of each transaction the CPWATCH menu was accessed and the relevant system parameters recorded. The data from this study was then tabulated on the PC in a spreadsheet and on the mainframe as a SAS dataset.

Data Analysis:

The principal aim of this study was to isolate the main causal factors affecting file transfer between the PC and the mainframe and to construct a reliable predictive model for file transfer times.

Both simple and multiple regression analyses were conducted on the data to this end.

Exploratory analysis of the data was conducted to examine the relationships between the various independent parameters (file size, users, I/D and % CPU) and the dependent parameter (transfer time) to determine the best model for the data. A stepwise regression analysis and a Rsquared analysis was conducted using SAS to identify the most significant combinations of variables in a multiple regression model.

These combinations were then used to form the basis of a predictive model allowing file transfer times to be calculated under a number of conditions.

Results:

As would be expected file size appeared to be the single most significant factor influencing file transfer times. Table I shows the relative significance of independent variables expressed by their R^2 values calculated from simple linear regression models.

Table I Simple Linear Regression Model.

Independent Variable	R^2
File Size	0.862
Users	0.219
I/O	0.013
% Problem	0.016

Appendix one contains the partial regression plots (estimate of transfer time vs transfer time) based on these simple regressions.

Graph I is the plot of the regression line for file transfer time as a function of file size. The R^2 value of 0.862 indicates a fairly 'good fit'. Closer examination at this graph shows several points to deviate significantly from this function, inclusion of other independent variables into a multiple regression model would improve on this and produce a more reliable predictive model.

Table II summarises the results of the exploratory analysis into independent variable relationships and lists in decreasing order of up significance the multiple regression models.

ANALYSIS OF FILE TRANSFER TIME

SIMPLE REGRESSION MODEL : TIME vs SIZE

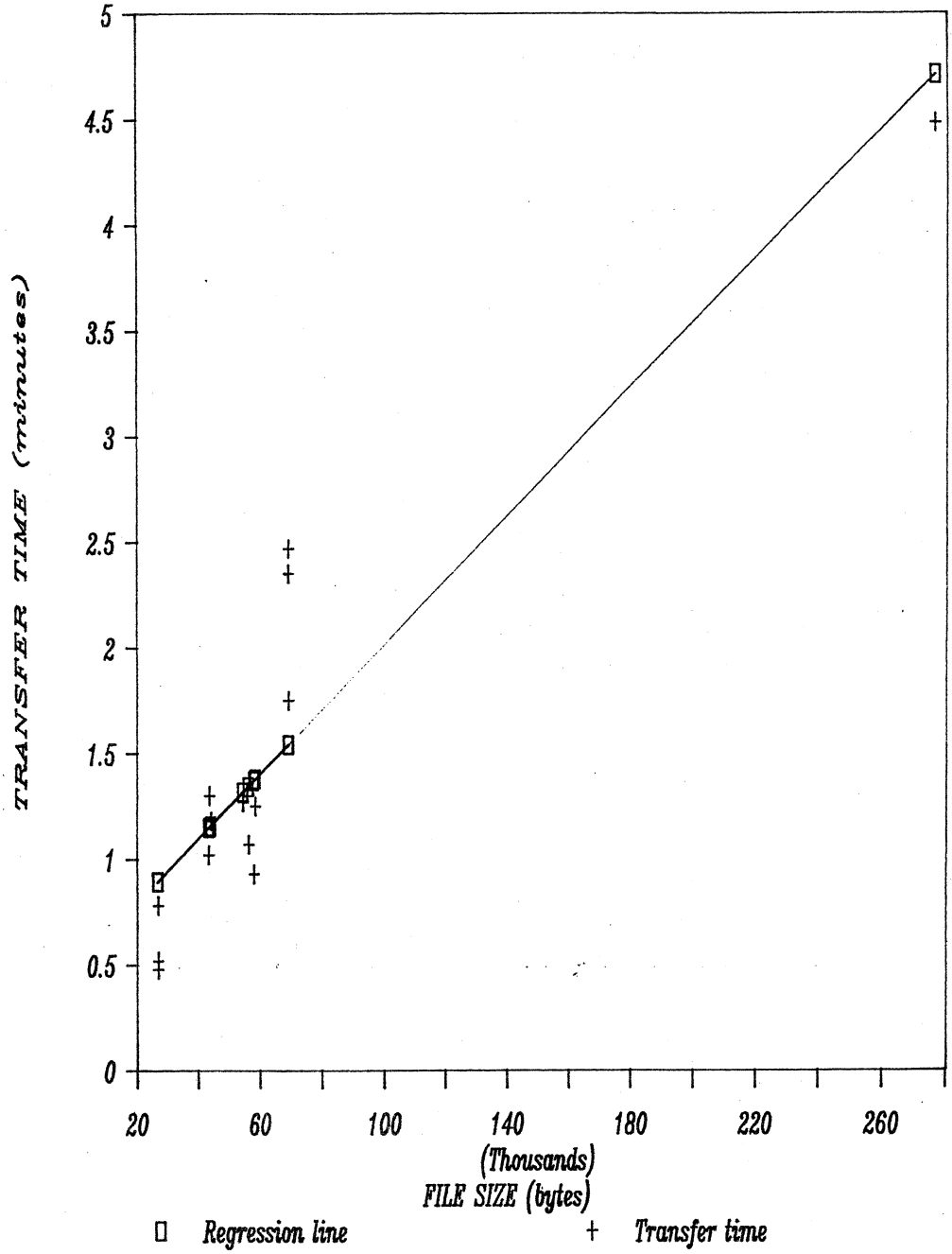


Table II Regression Models for Dependent Variable: Transfer Time

Number in Model	R-Square	Variables in Model
1	0.0127	I/O
1	0.0164	% Problem
1	0.2193	Users
1	0.8623	File Size
2	0.0181	I/O: % Problem
2	0.2741	Users: IO
2	0.4464	Users: Problem
2	0.8625	Size: I/O
2	0.8651	Size: Users
2	0.8907	Size: Problem
3	0.4519	Users: I/O: Problem
3	0.8663	Size: Users: I/O
3	0.9052	Size: I/O: Problem
3	0.9297	Size: Users: Problem
4	0.9500	Size: Users: I/O: Problem

From these results the final model adopted was
File size: Users: I/O: Problem[1]

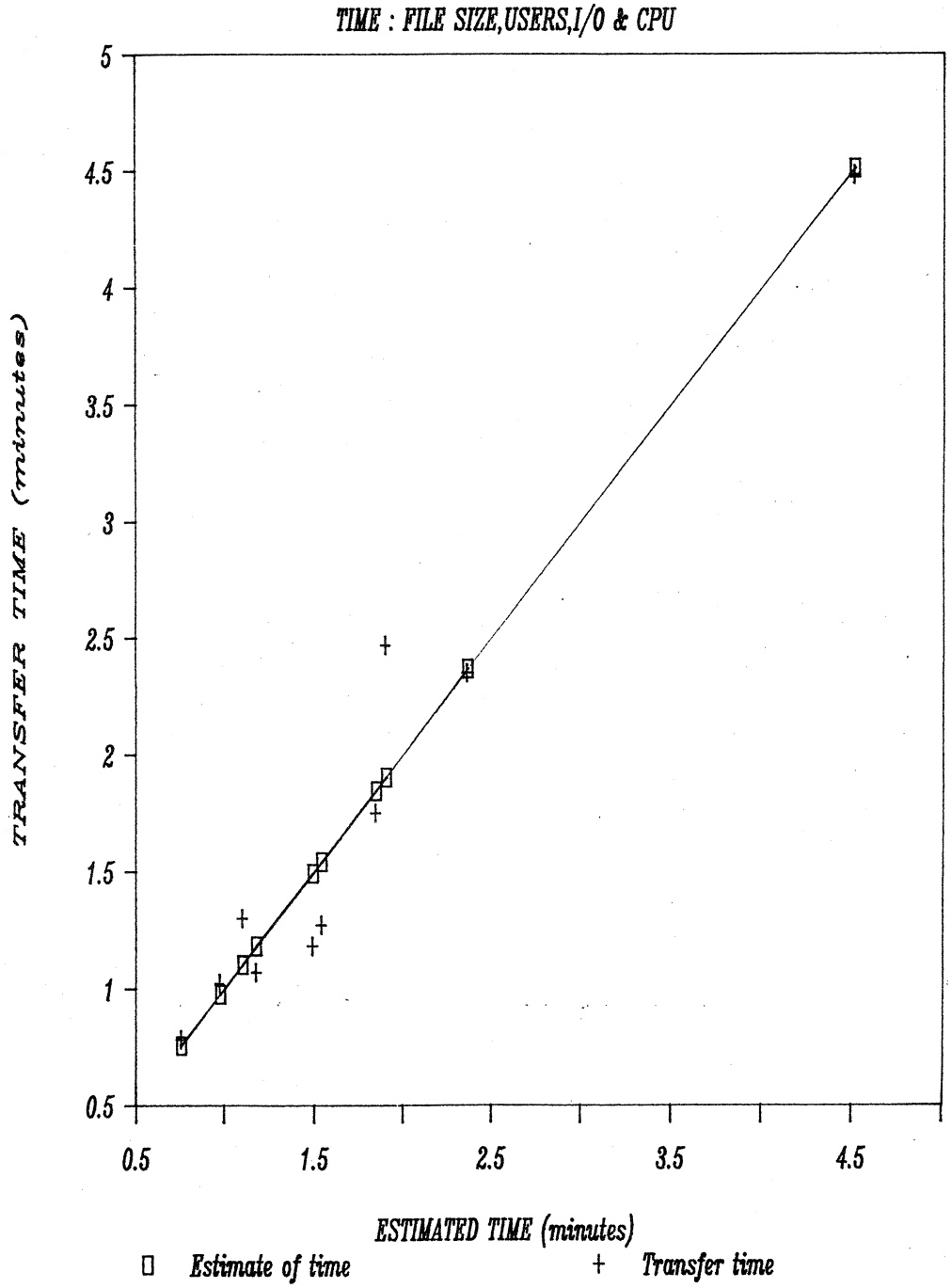
Conclusion:

Using this multiple regression model a formula for the prediction of file transfer time was derived.

$$\text{Transfer Time} = (1.28 \times 10^{-5} \times \text{file size}) - (7.6 \times 10^{-2} \times \text{No. users}) - (1.21 \times 10^{-2} \times \text{I/O}) - (2.94 \times 10^{-2} \times \text{Problem}) + 4.50$$

[1] It must be noted that at the time of these experiments CAC processing had been completed, therefore the levels of system loading during this study were significantly lower than those expected during real-time processing. This may result in a small underestimate of transfer time.

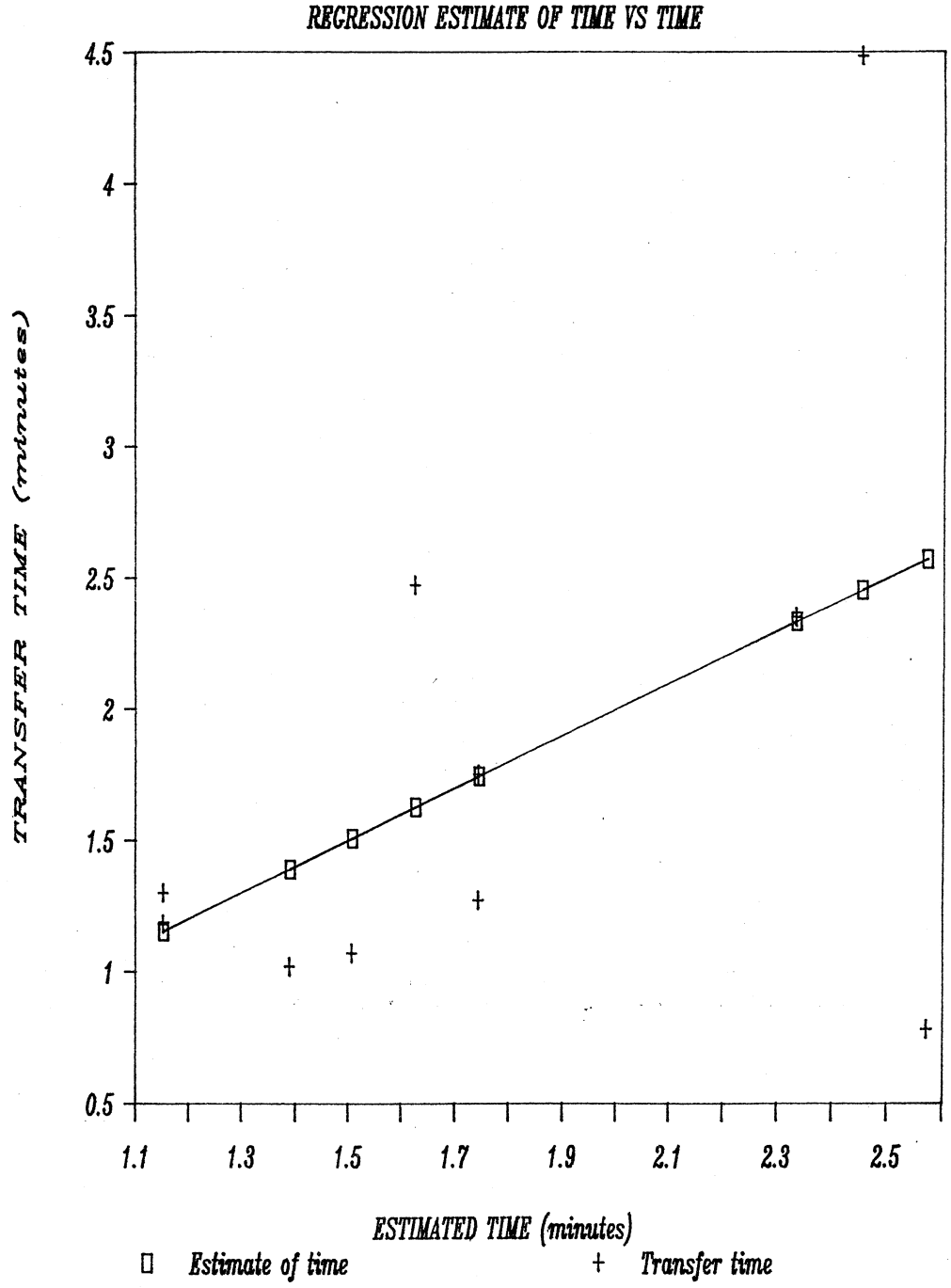
ANALYSIS OF FILE TRANSFER TIME



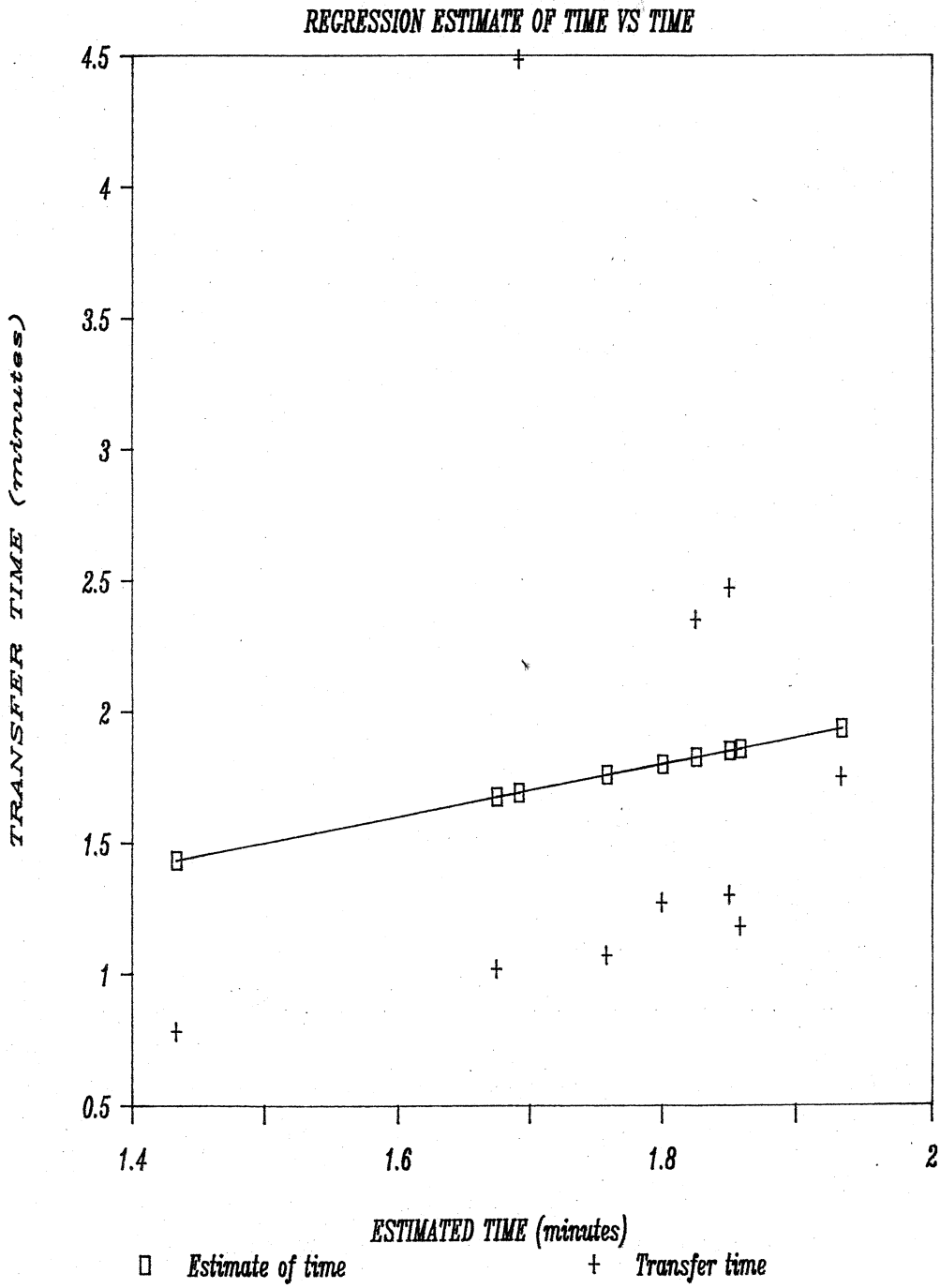
APPENDIX ONE

Partial regression plots of independent variables.

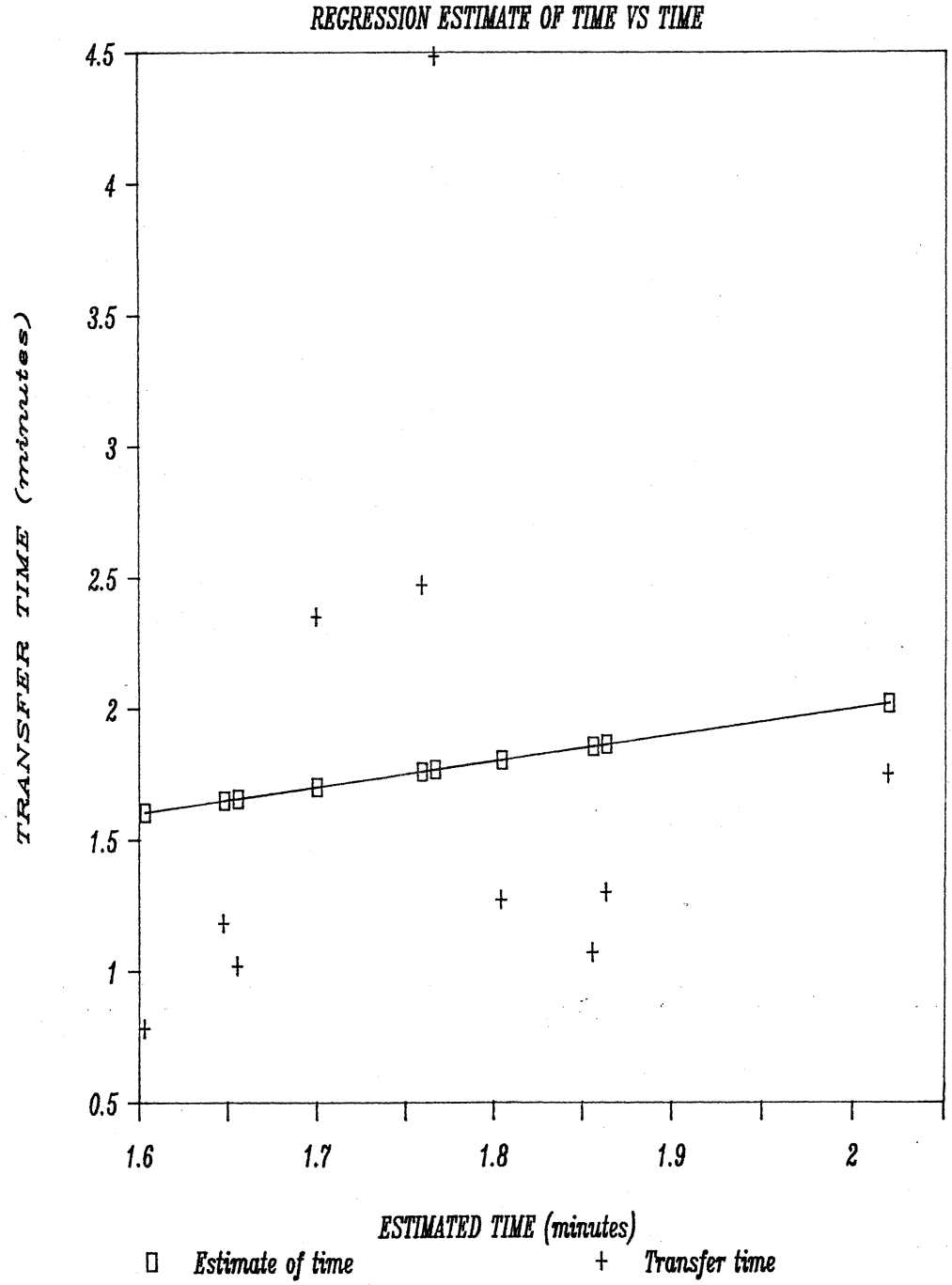
REGRESSION ANALYSIS : USERS



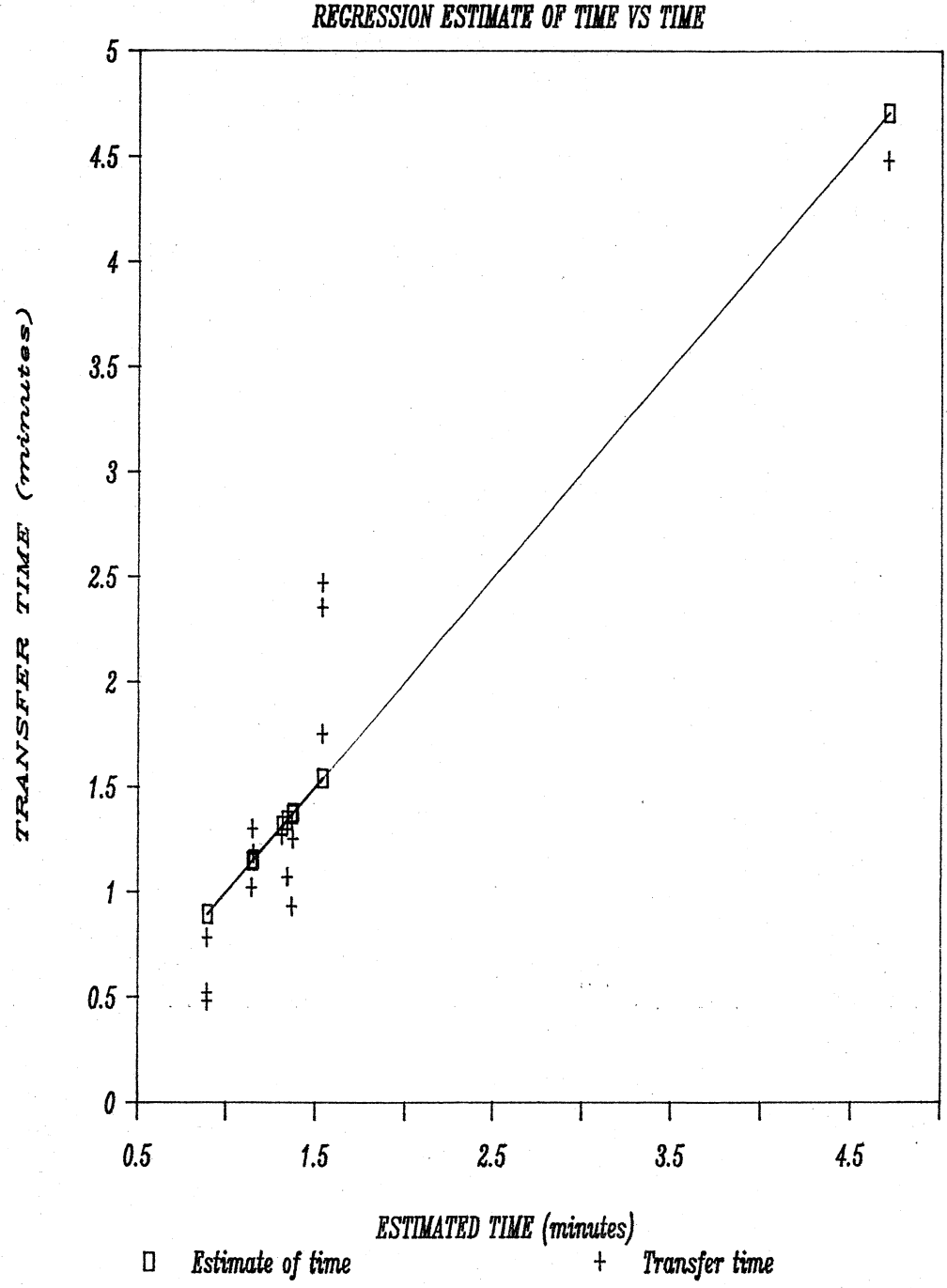
REGRESSION ANALYSIS : CPU ACTIVITY



REGRESSION ANALYSIS : INPUT/OUTPUT



REGRESSION ANALYSIS : FILE SIZE



附 錄 1.

第11次 韓·日 統計協力會議

1. 第11次 韓·日 統計協力會議 參席結果報告

第 11 次 韓.日 統計協力會議 參席 結果 報告

1. 會議 期間 : '88.5.9(日) ~ '88.5.13(金)

2. 會議 場所 : 日本 總務廳 統計局 및 統計센터
   日本 香川縣

3. 韓國 代表團

   o 經濟企劃院 調査統計局長 李 康 雨

   o " " 人口統計課長 金 日 炫

   o " " 事務官 白 鐘 植

   o 大邱直轄市 企劃管理室 統計擔當官 金 光 玄

4. 訪問日程 및 主要業務 遂行 內容

   o '88.5.9 (月) : 서울 出發, 동경 到着

   o '88.5.10 (火)

   - 總務 事務 次官(古橋源 次郎) 視察

   - 總務廳 統計局 및 統計 센터 訪問, 主題別 討議 進行

   o '88.5.11 (水) : 동경 出發, 香川 到着

   - 面談者 : 香川縣 出納長 : 奴 賀 直
     " 企劃部長 : 小林弘明
     " 企劃部 統計調査課長 : 土居正男
     " 國際交流室 副主幹 : 山 口 純

   - 主要面談內容

     . 香川縣 各種 統計調査의 實施 狀況
     . " 地域統計 概要 및 調査員 管理

   o '88.5.12 (木) : 香川 出發, 東京 到着

   o '88.5.13 (金) : 午餐 및 東京 出發

5. 日本側 會議 參席者

o 日時 : '88.5.10 (火) 11:00 - 17:00

o 場所 : 統計局 特別會議室

o 會議 運營時間 및 參席者

- 開會式 ; 11:00 - 11:15

. 統計局長 百 崎 英

. 長官 官房 審議官 鈴本芳雄

. 統計센터 局長 井 出 繩

. 統計基準部長 坂本佶三

. 統計調査部長 津 好明

. 總務課長 小山弘彦

- 統計局 및 統計센터 概要 說明 ; 11:15 - 12:00

. 總務課長 山山弘彦

- 主題別 討議 ; 13:00 - 17:00

. 日本의 國稅調査 分野

統計調査部長	津好明
國稅統計課長	桑原博
" 企劃擔當補佐	松井信夫
" 調査區 擔當補佐	津大夫
" 企劃係長	松村迪雄
" 住宅調査係長	小出秀夫
調査區 係長	羽 達志

. 調査員 管理 標本等

2. 局 長 人 事 말

答　　辭

桃崎統計局長，井出統計センター所長，そして統計局と統計センターの幹部の皆様！

今回私を始め韓國統計協力團を歡迎下さいましたこと韓國側を代表し眞心から感謝する次第であります.又こちらで皆さんを始めてお目になったこと誠にうれしく思っています.

韓國と日本兩國は傳統的に政治,文化,經濟など諸分野において密接な友好關係を維持して參りましたし特に統計分野に於きましては既に1960年代から密接な交流關係を結んできましたが此を基に1982年韓日兩國統計局長の相互交換訪問計劃が始められたと存んじます.

其の間ソウル會議又は東京會議に於きましては統計作成の經驗と情報が交換されたことは兩國の統計發展に大きく寄與したのは勿論のこと,兩國の統計局長を始め統計人相互間の友誼を篤くし相互協力の基盤を固く築き上げて來たと思っています.

我國の統計はその間6回にわたる經濟社會發展5個年計劃を支えて來ながら刮目すべき發展を遂げて來ました．しかしその間の經濟社會發展計劃が專ら經濟發展に片奇る總量的發展政策であったため地域統計や社會分野の統計開發が來だ不十分であることが指摘されています.

私達調査統計局ではこのような國家統計の不均衡を正しより體系的に發展させるがために多角的な努力を注いでいるのであります.

今年中に行うべき重要な統計活動事項を申うし上げますと各地域別に鑛工業事業體の生産,出荷,在庫指數を公表するため去年から標本の規模を大幅に擴大して調査を行っているし又來年からは雇用,物價などの統計までも各地域別に作成する計劃のもとで作業を進ませているところであります.

又去る3月には1985年人口及び住宅センサスの最終報告書の發刊を記念するがためのもよはしを學界及び關連機關の代表者達と一しょに開きました.

今月は韓國の社會發展の程度とより多樣化された國民の欲求を把握するため調査項目等が大きく改善された社會統計調査を實施することになり又6月には國全體の資産狀態を把握するためにその間行なわれなかった第3回國富統計調査が10年目に實施されるのみならず來る10月には我國始めてのサービス業統計調査を實施するこどになりました.

來年には1990年人口及び住宅センサスに對する本格的な準備作業に入るつもりでいます.

我國の場合資料處理面では日本のような自動化方法を利用することができず人力による符號記入及び資料入力方法を使用したため資料利用上の時宜性が落ちてくるばかでなく入力管理のむずかしさもあり此れの解決のためのセンサス自動化方法が切實に要求されている次第であります.

又去年井出統計センター所長が私達調査統計局をご訪問なされた際おっしゃたことがありましたが統計調査に對する國民の協力心が減少してくる傾向はその質の差はありましょうが我國に於いてもむずかしい問題で擡頭されて來ています. 從って應答者に對する各種統計廣報は實際に應答者と直接接觸する調査員達の資質向上問題が重要な課題に登場されて來ました.

從いまして今回の韓日統計協力會議に於いてはセンサス自動化方案と國民の統計協力を導き出すための諸般活動等に關し深度ある意見交換が行なわれるよう望んでいます.

さらに今年中に1990年に實施される人口センサス計劃,來年實施豫定の世帶消費實態調査,今年に實施されるサービス業統計調査,それから各種統計資料の電算處理等に關連する關係擔當者達を貴國に派遣し研修させたい積りですが積極的なご協力下さるようこの場を借りてお願い申うし上げる次第であります.

韓日統計人の交流は兩國の統計を發展させるための當面懸案問題を含め新しい統計技法の開發など幅ひろい意見を交換しながら相互協力のできる場を作る非常に有益な事業であるので將來一層發展するよう衷心からお祈りするところであります.

おわりに來る10月にソウルで開催される豫定の次の協力會議には桃崎統計局長が必ずしもご參席なされ私達が當面する統計問題に對する多くの高見を聞がせて下さるようお願い申うし上げまして以上答辭に代ります.

ありがとうございました.

3. 韓國代表團名簿

訪日・韓国統計視察団の受入れ状況

63.4.19
文書係

回数	期間	構成（＊：団長）		用務	訪問先		表敬訪問	空港出迎え者	地方随行者
1	昭和５７年 6月5日～11日 (7日間)	＊慎　潤　宰 Shin, Yun-Jae 金　栄　権 Kim, Young Kwon 張　新　奎 Chang, Shin Kyu	経済企画院 調査統計局長 〃 調査統計局基準課長 大韓統計協会会長	・統計制度及び統計活動状況の視察	統計局 行政管理庁 農水省 通産省	東京都 神奈川県	6／7(月) 午後 2.00～2.30 総務長官及び 総務副長官	総務課長 電子計算課長 総務課調査官 総務課国際係長	統計局長 国勢統計課長 総務課調査官 総務課国際係長
2	昭和５９年 9月24日～28日 (5日間)	＊慎　潤　宰 Shin, Yun-Jae 厳　準　鎔 Um, Joon-Yong 林　成　坤 Lim, Seung-Kon	経済企画院 調査統計局長 〃 調査統計局産業統計課長 〃 調査統計局社会統計課労働力統計係長	・昭和６０年国勢調査の準備及びデータ処理体制状況の視察	統計局 統計センター 経企庁 通産省	岐阜県 京都府	9／25日(火) 午後 3:00～3:30 総務事務次官	統計局長 総務課長 総務課 統計専門職	統計調査部長 統計ｾﾝﾀｰ 管理部長
3	昭和６１年 3月10日～15日 (6日間)	＊李　康　斗 Lee, Kang-Doo 金　民　卿 Kim, Min-Kyung 李　政　利 Lee, Jung-Ri 柳　千　奎 Yoo, Chun-Gyu 南　重　書 Nam, Joong-Seu	経済企画院 調査統計局統計計画官(副局長格) 〃 調査統計局統計分析課長 ソウル市統計課長 釜山市統計課長 京畿道統計課長	・昭和６０年国勢調査の評価及び地方公共団体における統計活動状況の視察	統計局 統計センター 通産省 経企庁	東京都 奈良県 大阪府	3／11(火) 午前 10:30～11:00 総務事次官	総務課長 総務課 総括課長補佐 〃 統計専門職	国勢統計課長 総務課統計専門職
4	昭和６１年 11月12日～17日 (6日間)	＊金　景　中 Kim, Kyeong-Joong 申　賢　均 Shin, Hyun-Kyoon 韓　弼　峰 Han, Pil-Bong 申　鉉　根 Shin, Hyun-Keun	経済企画院 調査統計局統計計画官（副局長格） 〃 調査統計局基準課長 〃 調査統計局電算分析官 〃 江原道統計担当官室課長補佐	・統計行政の中・長期構想 ・国富調査 ・メッシュ統計 ・OMR	統計局 統計センター	京都府	11／14(金) 午前 10:00～10:30 総務事務次官	統計ｾﾝﾀｰ所長 総務課長 総務課 統計専門職	統計情報課長 総務課文書・審査担当補佐

回数	期　間	構　成　（＊団長）		用　務	訪　問　先	
5	昭和６２年 9月16日～19日 （4日間）	＊孫　明　鉉 Sohn , Myong- Hyun 朴　周　煥 Park , Joo - Hwan 韓　弼　峰 Ham , Pil - Bong 宣　柱　大 Sun , Ju - Dai	経済企画院 調査統計局長 〃 調査統計局調査管理課長 〃 調査統計局電算分析官 〃 調査統計局庶務課経理課長	・地方行政における統計事情の視察 （ＩＳＩ第４６回東京大会に出席）	統計局 統計センター	静岡県 京都府 奈良県
6	昭和６３年 5月9日～14日 （6日間）	＊李　康　雨 Lee , Kang - Woo 金　日　炫 Kim , Il - Hyun 白　鍾　植 Baek , Jong - Sig 金　洸　玄 Kim , Kwang- Hyun	経済企画院 調査統計局長 〃 調査統計局人口統計課長 〃 調査統計局調査管理課長補佐 大邱直轄市企画管理室統計課長	・国勢調査及び住宅統計調査並びにﾃﾞｰﾀ処理体制状況の視察 ・統計調査員制度 ・標本変動への対処等々	統計局 統計センター	香川県 岡山県

表敬訪問	空港出迎え者	地方随行者
なし	統計ｾﾝﾀｰ所長 総務課調整係長	統計ｾﾝﾀｰ所長 国勢統計課総括課長補佐
5/10(火) 午前 9:50～10:00 総務事務次官		

訪日韓国統計視察団への業務説明資料

消費統計課

6　家計調査の調査員運用方法

（1）採用方法，資格基準及び報酬水準

－採用方法

登録調査員制度の利用，前任調査員等からの推薦

－資格基準

調査員は，次の基準により選任する。

(1) 調査の内容を十分理解することのできる者

(2) 実査活動に従事することができ，かつ，調査に熱意のある者

(3) 税務，警察などに直接関係がない者

－報酬水準

１９８８年度　日当　　４８８０円

月額　５２２２０円

（2）業務量割当基準

２単位区担当　１単位区６世帯

(1) 単位区世帯名簿の作成

(2) 家計簿の記入依頼，世帯票等の作成に関する事務

(3) 調査世帯に対する記入指導

(4) 家計簿の取集・内容審査・提出

(5) 年間収入調査票の記入依頼・取集・提出

(6) 調査世帯の臨時交替等に関する事務

(7) 礼状等の配布

（3）有故時の業務処理方法

指導員の代行調査

（4）賞罰制度

統計功労者表彰（表彰要綱　１９８５年２月２２日　長官決定）

感謝状の交付（経常統計調査員に対する感謝状の交付要領

１９８４年７月１日　局長決定）

（5）訓練方法

調査員に対する指導監査は，以下に述べる調査員新任時の指導，調査員指導会及び現地での実地指導により行う。

調査員新任時の指導

新任の調査員に対する指導は，(1)調査全般についての指導，(2)現地における実地訓練に大別して行う。

(1) 調査全般についての指導

「調査の手引」により，その順序に従って説明する。その内容は調査全般にわたり，特に調査世帯の選定及び記入依頼の仕方と家計簿の記入の仕方を十分に説明する。

調査票類の記入の仕方については，「調査の手引」の「第５　世帯票の書き方」，「第6 準調査世帯票の書き方」及び「第７　家計簿の書き方」によって説明する。その際，口頭で説明するだけではなく，調査員にも「家計簿」や「世帯票」を記入させるなどして実地に指導する。

(2) 現地における実地訓練

調査全般についての指導が終わったならば，指導員自ら調査の仕方の模範を示し，あるいは前任調査員の調査の仕方を見学させるなどして，新任の調査員に実地に調査を行わせ，不十分な点や誤りがあれば助言又は注意し，調査が正しく支障なく行われるよう訓練する。

調査員指導会

調査員指導会は少なくとも年２回開催し，次の要領で実施する。

(1) 新たな指導事項の他に，過去の習得事項についても指導する。

(2) 指導事項や指示及び注意事項は，調査員の理解を助け，また知識を整理する意味からも，必ず印刷物にして配布し徹底させる。

(3) 実査の方法など（例えば，単位区世帯名簿の作成，調査予定世帯の抽出，記入依頼，内容審査など）について，調査員の意見，感想，体験の交換を通じ，調査員の調査に関する知識及び調査技術を高めるようにする。

(4) 調査員指導会に出席できなかった調査員に対しては，必ず別途訓練し，指導の徹底を図る。

実　地　指　導

(1) 指導員は，単に書類上で監査するだけでなく，２か月に１回は調査員と共に現地を巡回し，調査員を実地に指導する。

(2) その際，あるいは単独に調査世帯を訪問し，調査に対する協力を求め，また調査員の記入指導状況を監査する。

(3) 調査の仕方に誤りを発見した場合は，すぐその場で是正する。

ただし，指導員の一存で処置ができないような場合は，直ちにその旨を都道府県に報告し，その指示を受ける。

(4) 他の調査員も同様の誤りを犯すおそれがあると思われる場合は，速やかに他の調査員にも注意するとともに，都道府県に連絡する。

上記以外

ブロック会議

調査員合同指導会

8　標本変動の処理方法

調査世帯が定期交替になる前に次に挙げる事情が生じた場合は，指導員の指示を受けて調査員が代わりの世帯を抽出して記入依頼します。

(1)　世帯が単位区外に転居した場合。ただし，転居先が同一市町村であって調査可能な場合は，その転居先で調査します。

(2)　世帯が不適格世帯になった場合

(3)　その他，交替を必要とする場合

このように定期交替になる前の世帯の交替を**臨時交替**といいます。なお，月の途中の交替は，できる限り避けます。

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附 錄 2.

유엔의 人口 및 住宅 센서스에 對한 컴퓨터 關聯 세미나 報告書

NATIONS UNIES
COMMISSION ECONOMIQUE POUR L'EUROPE

ОБЪЕДИНЕННЫЕ НАЦИИ
ЭКОНОМИЧЕСКАЯ КОМИССИЯ ДЛЯ ЕВРОПЫ

UNITED NATIONS
ECONOMIC COMMISSION FOR EUROPE

SEMINAIRE | СЕМИНАР | SEMINAR

STATISTICAL COMMISSION and
ECONOMIC COMMISSION FOR EUROPE

CONFERENCE OF EUROPEAN
STATISTICIANS

CES/SEM.21/2
30 November 1987

Original: ENGLISH

REPORT OF THE SEMINAR ON COMPUTER-RELATED ASPECTS OF POPULATION AND HOUSING CENSUSES

held in Belgrade, Yugoslavia, 5-9 October 1987

I. INTRODUCTION

1. The Seminar on Computer-related Aspects of Population and Housing Censuses was held in Belgrade, Yugoslavia from 5 to 9 October 1987, at the invitation of the Government of Yugoslavia.

2. Opening addresses were delivered by Mr. R. Kontic, Member of the Federal Executive Council of the SFR of Yugoslavia and President of the Committee for International Relations of the Federal Executive Council, by Mr. D. Grupkovic, Director of the Federal Statistical Office of Yugoslavia and by Mr. R. Gentile, Acting Director of the Statistical Division of the Economic Commission for Europe.

3. The Seminar was attended by participants from: Albania; Austria; Belgium; Bulgaria; Canada; Czechoslovakia; Finland; France; German Democratic Republic; Germany, Federal Republic of; Greece; Hungary; Italy; Netherlands; Norway; Poland; Portugal; Romania; Spain; Sweden; Switzerland; Union of Soviet Socialist Republics; United Kingdom; United States; and Yugoslavia. A participant from Israel was also present under the provisions of paragraph XI of the terms of reference of the Economic Commission for Europe.

4. Mr. D. Grupkovic (Yugoslavia) was elected Chairman of the Seminar and Messers. J. Santa (Hungary) and D. Pearce (United Kingdom) were elected Vice-Chairmen.

5. The following items constituted the study program of the Seminar:

(i) National experiences in the use of specialized software for the processing of census data;

(ii) Data capture (including the design of computer-readable questionnaires, the automated coding of write-in responses, and the use of hand-held computers);

(iii) Data editing and imputation techniques and programs;

(iv) Geo-coding;

(v) Data storage;

(vi) Data dissemination procedures (including generalized tabulation and analysis programs and public use sample tapes);

(vii) Decentralization of census data processing; and

(viii) Problems raised by the use of registers to supplement or replace census questionnaires.

II. NATIONAL EXPERIENCES IN THE USE OF SPECIALIZED SOFTWARE FOR THE PROCESSING OF CENSUS DATA

6. The Seminar had before it reports submitted by Canada (CES/SEM.21/R.19), Czechoslovakia (CES/SEM.21/R.1), Spain (CES/SEM.21/R.21), the USSR (CES/SEM.21/R.4), the United Kingdom (CES/SEM.21/R.5) and the United States (CES/SEM.21/R.13), and supplementary papers by Belgium, Bulgaria, Italy and Netherlands which were distributed to participants. The Seminar noted that most of the above documents referred not only to this study topic but also to other ones, and therefore agreed to consider them again under the other relevant agenda items.

7. The presentation of the papers and the ensuing discussion showed that two different approaches have been used by countries as regards the software used for processing census data. While some countries rely almost exclusively on specialized (or tailor-made) software, others make an extensive use of generalized programs, especially for data editing (e.g. AERO; CANEDIT), tabulation (e.g. TPL; TAU) and data analysis (e.g. SAS).

8. There was general agreement among participants that, as commercially available generalized programs usually have not been developed specifically for the processing of census data but for other surveys of smaller dimensions, they often were not always fully adapted to the requirements of census processing. Because of this, they were less efficient in terms of computer resources than tailor-made programs. It was noted, however, that the costs involved in the development, testing and optimization of tailor-made software, both as regards manpower resources and computer time, were such that they could offset the advantages resulting from a higher efficiency. It was also noted that generalized programs, having been extensively tested, should offer a high degree of reliability.

9. The Seminar noted that some countries had adopted an intermediate approach, which consisted in developing tailor-made software products to be used (with minor modifications only) in several consecutive censuses. This approach was particularly efficient when censuses are taken at

relatively short intervals (e.g. five years), but seemed to be more difficult to apply in countries that take decennial censuses, as the changes in the computing environment and the technological progress may be so extensive over the period to require the software to be virtually rewritten.

10. During discussion, another problem linked to the intervals between censuses was mentioned by several participants concerning the difficulty for statistical offices to retain trained staff from one census to the next. Another problem resided in the fact that census processing requires large amounts of labour inputs, and that such inputs are generally not available within the normal staff resources of statistical offices. The use of contract staff and the contracting out of specific operations (e.g. data capture, systems development) to specialized enterprises were mentioned as possible solutions to this problem.

11. The Meeting noted that regardless of whether or not generalized programs were used for processing census data, no country had yet developed an integrated system for census processing. This situation presents several disadvantages. For instance, the fact that different software packages are used at the different phases of census processing requires that the same data be described several times and in different ways. This not only implies a duplication of work, but can also result in inconsistencies whenever the descriptions are made by different persons or at different periods of time. A solution to this problem was suggested by the participant from the Netherlands consisting in the use of a language (BLAISE) for preparing descriptions of questionnaires; these descriptions are used to generate various programmes that are used for processing. This is essentially a feature of the fourth generation integrated language packages where documentation, application generators and possibly data base systems are integrated.

III. PROBLEMS RAISED BY THE USE OF REGISTERS TO SUPPLEMENT OR REPLACE CENSUS QUESTIONNAIRES

12. This topic was considered on the basis of reports submitted by Finland (CES/SEM.21/R.12) and Norway (CES/SEM.21/R.8), and a supplementary paper by Finland which was distributed to participants.

13. The discussion revealed that over the course of the past few decades several countries in the region have increasingly relied on various types of registers and administrative records as a means of collecting census-type data on numerous topics. The advances achieved in the field of EDP during this period were cited as one of the important factors which has contributed to this development.

14. Several participants mentioned the advantages which are associated with the utilization of registers and administrative records for census-type data, such as significant cost savings, a reduced respondent burden and the more rapid availability of the census results.

15. The disadvantages in collecting census-type data from registers and administrative records were also described, such as definitional problems, incomplete coverage and possible biases in the registers and records. The participants noted that post-stratification techniques involving the combined utilization of sampling and register data constituted a possible means of overcoming these types of problems, but that a consequential difficulty was the lack of reliable data on small sub-populations for some kinds of data. They also noted that this method could also be effectively used in

applications other than censuses. Another approach to solve the problems mentioned above could be to develop methods to deduce correct variable values for census units by using data from several sources.

16. The Seminar noted that the matter of data privacy was growing in importance in many countries of the region, and there was general agreement that statistical offices have to be both sensitive to and responsive to such concerns.

17. It was also noted during the discussion that conditions differed within the region concerning the availability of unique identification numbers which could be used to link different registers and sets of administrative records, and that this limited the extent to which exact matching techniques could be employed by other countries in the region. Some participants suggested that countries in this situation might be able to combine data in different sources through other means such as statistical matching techniques, though there were problems involved in achieving a high level of matching.

IV. DATA CAPTURE

18. This item was considered on the basis of papers prepared by Austria (CES/SEM.21/R.11) and France (CES/SEM.21/R.24).

19. It was noted that data collection methods vary greatly from country to country and are often dependent upon external factors. For instance, the decision to employ, e.g. mail-out mail-back techniques, interviewer canvassing or other possibilities is conditioned by factors such as literacy levels, availability of enumerators, and the efficiency and cost of the mail service. In this connection, one participant reported that his country had decided not to use mail-out mail-back techniques as a test had shown a response rate of 55 per cent only.

20. Divergent opinions were expressed about the advantages and disadvantages of mail-out, mail-back techniques. Some participants considered them to be less costly than the traditional enumerator method. However, others considered that the financial advantages of mail-based techniques might be less significant than they appeared, particularly if account is not taken of other related costs such as the costs of obtaining suitable mailing lists. It was also suggested that inter-country comparisons of experiences in this area were difficult to make because of relative differences in the size of countries and in mailing costs, labour costs for enumerators and other factors. As regards the quality of the results, one country mentioned having observed an improvement in the quality of data since using the mail-out, mail-back technique, while other participants feared that these techniques could result in a decrease in both the response rate and the quality of the information collected.

21. During discussion, it was noted that, in principle, a cost-benefit analysis should be conducted before deciding whether to introduce a new methodology or technology. However, this was often difficult to perform. In particular, it was noted that although costs can often be assessed rather easily, it is difficult to estimate the social benefit of a population census, or the negative consequences that can result from inaccurate data.

22. Discussion on this topic also revealed that there are considerable differences in the methods of data capture depending on different conditions in individual countries. While some countries make an extensive use of optical readers for data capture, others prefer to use more

conventional methods such as manual key-punching. In some countries, computer-assisted coding is done at the stage of data entry instead of during data processing. Further, other countries combine data entry and data editing into a single operation.

23. When discussing the use of optical readers for data capture, many participants mentioned difficulties in obtaining appropriate technical devices from manufacturers. Reference was made to the possibility of statistical offices encouraging manufacturers to produce special equipment for census purposes. It was noted that some countries have had good experiences in this direction and that the reliability of such specially produced devices in many cases could be a more important factor than the higher costs involved in such an approach.

24. The participants noted that several countries have also had very favourable experiences in using optical readers for capturing hand-written texts. The possibility of displaying textual information on a terminal for coding purposes was considered as a very important and welcome development. During discussion, it was observed that while optical readers provided a means of capturing data very quickly and at rather low costs, their error rate was somewhat higher than the ones obtained with other methods. In addition, their use put constraints on the design of the questionnaires and on the methods used for collecting basic information (e.g. as they are unable to read folded questionnaires). It was also noted that the use of optical readers often required enumerators to assist respondents in filling in the questionnaires, which was not always feasible.

25. Several participants described their experience and future plans concerning automatic or computer-assisted coding of occupation, industry, etc. During discussion, the question of costs was raised. Some participants declared that there had been cost savings using these methods. However, others pointed out that no clear-cut savings had been realized. It was noted that even if the introduction of such methods did not always result in substantial savings in comparison to traditional methods, it could lead to considerable improvements in working conditions by increasing the interest of staff in this work. It also resulted in a higher quality of data.

V. DATA EDITING AND IMPUTATION

26. The Seminar considered this topic on the basis of papers presented by Austria (CES/SEM.21/R.15), Poland (CES/SEM.21/R.6) and Yugoslavia (CES/SEM.21/R.16).

27. The Seminar noted that there is general agreement among census and survey specialists as well as computer specialists as regards the need for data editing. However, while there is agreement that structural errors and logical inconsistencies need to be checked and corrected, there are different opinions as regards the desirable extent of imputation, particularly for missing data.

28. It was also noted that data editing is a very costly operation both in time and in computer resources, and the view was expressed that these high costs were not always matched by corresponding improvements in data quality. This was seen by some participants as a reason for using generalized data editing programs, and thereby minimizing development costs. It was noted that several data editing packages were currently available and widely used by statistical offices all over the world. Among them, CANEDIT, AERO, DIA and CONCOR were particularly mentioned. The on-going development of a Generalized Data-editing System (DES) as

part of the work undertaken by countries within the framework of the ECE/UNDP Statistical Computing Project was also mentioned.

29. It was however observed by several participants that census operations are very bulky, requiring the treatment of a large volume of data, and therefore that the efficiency of the data editing software used was of primary importance. This was why many statistical offices prefer to use tailor-made editing programs, at least for those parts of data editing for which complex checking criteria have to be applied.

30. Participants agreed that the impact of data editing on the quality of census data needed to be thoroughly analyzed, and it was observed that literature on this subject was relatively scarce. It was also noted that there was a need to test the effect and the relevance of the data editing rules before using them in census operations, and to be able to modify them whenever required. In this respect, some participants mentioned the favourable experience they had had with AERO, particularly because of its flexibility.

VI. GEO-CODING

31. The Seminar had before it, for the consideration of this agenda item, papers submitted by the German Democratic Republic (CES/SEM.21/R.17), Poland (CES/SEM.21/R.7) and Yugoslavia (CES/SEM.21/R.18), and an additional report by Finland which was distributed to participants during the Seminar.

32. There was general agreement among participants that geo-coding was a very important step in census operations, especially for the provision of census information on small areas. The papers and the oral presentations made by some participants showed that a wide variety of approaches to geo-coding has been adopted by countries, such as: giving each building/house a spatial reference (e.g. grid reference, postal code); allocating the building or house to a geographical/administrative area; or giving each building/house a full range of codes to cover all areas.

33. The participants noted that several factors have to be taken into consideration when determining the boundaries of enumeration districts. One factor was the work-load for census enumerations (number of persons in the area; geographical dispersion of houses, etc). Other factors mentioned were the need to take into account existing administrative boundaries and to respond to the requests of various users (health services; educational services; etc).

34. As regards the use of geographical codes, it was observed that they can be used not only for pre-printing census forms, checking the completeness of results, retrieving data, or aggregating census results into administrative subdivisions, but also for analytical purposes. For instance, several countries reported that they used information on the place of residence and on the place of work to derive information on commuting. In other cases, information on actual and former places of residence is used to obtain data on internal migration. Another important use of geographical codes mentioned was the preparation of diverse types of data for small areas, which are increasingly requested by local authorities.

35. It was also note that the inclusion of grid references in census data and storing them in the computer facilitated the presentation of information in the form of maps.

VII. DATA STORAGE

36. The Seminar based its discussion of this problem on a report by Austria (CES/SEM.21/R.2).

37. The Seminar noted with interest the information provided by Austria on its usage of Mass Storage System (MSS) devices for census purposes where MSS is used in conjunction with a sequential data base under ISIS (a hierarchical data base management system).

38. During discussion, the advantages and disadvantages of different types of data structures in data base management systems were considered. Several participants reported on their experiences concerning the utilization of hierarchical and relational DBMS. Different opinions were expressed, especially concerning the suitability of the relational model. Many participants expressed the hope that software tools more appropriate to large data sets (such as those containing census data) would become commercially available in the near future.

VIII. DATA DISSEMINATION PROCEDURES

39. The Seminar considered this topic on the basis of papers presented by Austria (CES/SEM. 21/R.3), Sweden (CES/SEM.21/R.9) and Yugoslavia (CES/SEM.21/R.20), and a supplementary paper by Greece which was distributed to participants.

40. The papers and the discussion showed that the data base technology has been employed in many countries and that it proved to be an efficient tool for the storage, retrieval and dissemination of census data. It reduced the time needed for aggregation and also increased the volume of the data made accessible to end users far beyond the capacity of traditional means of presentation, like printed publications. It was noted that on-line data storage, ease of retrieval and interactive access offer greater possibilities for statistical analysis and for new and more complex statistical applications. In particular, they enable the end users to attain their objectives independently, thus avoiding recourse being made to EDP specialists. The possibility of rapidly obtaining urgently needed results was also stressed.

41. During the discussion the question of the efficiency of DBMS's in census applications was also considered. There was general agreement among participants that this technology has resulted in a decrease in the workload of the programming staff and that it has also increased the level of organization of the work.

42. The possibility of providing census information to the local authorities was considered. The discussion emphasized the importance of preventing the disclosure of confidential information whenever data for small areas are disseminated. It was also stressed that whenever micro data are made available to local authorities, they should be rendered anonymous.

43. The discussion revealed that a large number of countries have made considerable progress in recent years in the development and usage of generalized software tools. In particular more efficient and flexible systems for the tabulation of the large volumes of data are available for census purposes. It was agreed that the possibility for statistical end-users to use such packages for producing tables without requiring special training in EDP was one of their most important advantages.

IX. DECENTRALIZATION OF CENSUS DATA PROCESSING

44. This study topic was considered on the basis of reports by Hungary (CES/SEM.21/R.10) and Yugoslavia (CES/SEM.21/R.14).

45. The discussion revealed that many countries have introduced a decentralized approach in which various types of processing operations (e.g. coding, data entry, editing) were carried out at the local or regional level. In some cases, aggregation of data and the preparation of publications containing regional results were also done on a decentralized basis.

46. Several advantages of decentralizing data processing were referred to during the discussion, such as data editing often being able to be done faster and more easily in the regions, the benefits in having the data prepared and edited in the region where they were collected, and users being able to acquire regional results more quickly. Reference was also made to advantages of regional statisticians and EDP specialists having direct control over the processing of the data in which they have greatest interest.

47. The participants noted that there can also be some disadvantages associated with decentralized data processing such as the lack of compatability of the software and hardware in the different regions and the lack of a sufficient number of trained staff in some regions.

48. The importance of planning and co-ordination in decentralized data processing was stressed during the discussion. The necessity of developing standard processing methodologies, particularly concerning data editing rules, and of involving both EDP specialists and subject-matter statisticians at the national and regional levels, were also underlined.

X. OTHER BUSINESS

49. The Seminar expressed its thanks to the authors of the national reports for stimulating a fruitful discussion of the study topics. Participants agreed that the exchange of experience that had taken place at the Seminar had been very useful and suggested to the Conference that consideration be given to the possibility of organizing this type of meeting again in the future.

50. The participants expressed their warm appreciation to the Government of Yugoslavia and to the Federal Statistical Office for hosting the meeting, for the facilities they had provided and for the warm hospitality which had been extended to them.

XI. ADOPTION OF THE REPORT

51. The Seminar adopted the present report at its closing session.