

CHAPTER 4. Data Collection and Processing

Followup Mailings

First Followup

The final date for responses to the initial census mailing was February 19, 1975. As of that date, nonrespondents were considered delinquent and placed on the followup mailing address list. Computer tapes containing the mailing list of delinquent addresses were furnished to the label contractor who produced and delivered 2.4 million address labels to Jeffersonville several days later. The packages for the mail followup were assembled and mailed by the end of February. The letters used varied according to the type and size of operation involved in each case. The mailout was as follows:

Original mailing to—	Followup letter	Quantity mailed
A1, A2 single unit or multiunit with only one establishment	74-A5(L)	2,293,000
A40 single unit	74-A43(L)	77,000
Multiunit with two or more establishments (Letters were sent to each establishment of a multiunit.)	74-A12(L) revised—plus attachment sheet containing labels for delinquent cases	5,000

Second Followup

The second followup involved a three-phase remailing of report forms to cases still delinquent on March 14. In the first phase, the printing contractor printed, addressed, and mailed A1 and A2 report forms in the same manner as in the initial mailing and first followup. This operation was completed by March 27 and involved the following quantities of forms:

Form	Quantity
Total	1,928,651
A1 "black"	69,948
A1 "green"	1,024,724
A2	833,979

In the second phase of the followup, the clerical staff in Jeffersonville assembled and mailed packages to 91,300 nonrespondents that were believed to require some degree of special handling. The principal cases involved and the actions taken by the Bureau were as follows:

Type of case	Followup letter	Contents of package
Agricultural operations		
Large multiunit (received A1 "black" report form)	74-A23(L)	A1 "black" report form, BC-1578 return envelope, BC-242 outgoing envelope
Large multiunit with two or more establishments	74-A11(L) stamped "Second Request"	A1 "black" report forms, BC-1578 return envelope, BC-242 outgoing envelope
Single unit, Hawaii	74-A6(H)-L	A1(H) report form, A11(H) instruction leaflet, BC-1578 return envelope, BC-242 outgoing envelope
Multiunit, Hawaii, with one establishment	74-A6(H)-L	A1(H) report form, BC-1578 return envelope, BC-242 outgoing envelope
Agricultural services		
Single unit or multiunit with one establishment	74-A44(L)	A40 report form, BC-1866 or 2516 return envelope, BC-1865 or 2515 outgoing envelope
Multiunit with two or more establishments	74-A41(L)	Same as above, with additional copies of A40 report form
"Requests Form" (see below)	74-A105 [flyer]	Appropriate forms and envelopes
"Claims Filed" (see below)	74-A110(L)	Appropriate forms and envelopes

When a respondent requested a replacement form of any type ("requests form" cases), the form was mailed together with a transmittal flyer (form A105); if a respondent claimed the original had been mailed in, but the case was still listed as delinquent ("claims filed" cases), a duplicate was mailed with a cover letter (form A110(L)). The address labels for these cases were color coded to assist in package assembly and labeling, and to monitor the returned report forms.

The third phase covered delinquent abnormal farms, and was completed on March 20. This involved a mailout to 178 grazing associations and 706 institutions.

Quality control. The quality control operation involved the tailored assembly and mailing of the followup packages from Jeffersonville. Strict procedures to insure accuracy were employed. The assembly and labeling of all packages for multiunit operations were verified manually, while those for the "requests form" and "claims filed" mailings were checked on a sample basis. The A1(H) single-unit packages (for Hawaii) were inspected using the shadowgraph weighing device; this permitted mechanical verification of the mailing packages by comparing

the weight of the mailing packages to one that was known to be complete. Packages showing incorrect weights were corrected as necessary. The single-unit agricultural services packages were examined in the same way except that if the first 100 inspected were error-free, the inspection was reduced to a 1-in-50 sample. If a defective package was found during this sampling, the consecutive verification was resumed.

Third Followup

The third followup involved a mailout and a telephone operation for cases still delinquent on April 15, 1975. Most of the mailing was done between April 17 and April 24. (Letters to Alaska and Hawaii were sent by air mail; all others were mailed first class.) The mailout was as follows:

Type of case	Followup letter	Quantity mailed	Remarks
A1 or A2	74-A7(L)	1,400,000	Included Hawaii and 11,767 "adds," ZIP code changes, etc.
A40	74-A45(L)	58,000	Included Hawaii and 2,446 "adds," ZIP code changes, etc.

In addition, 698 form A7 letters were mailed from Bureau Headquarters to abnormal farms in 47 States.

Telephone clerks (see p. 36) were assigned 13,114 multiunits, 56,233 "must" cases (i.e., those with \$100,000 and over in estimated sales) and cases excluded from the original mailing to abnormal farms. Address labels for cases selected for telephone followup were affixed to form A424 control cards. These cards were used to record telephone numbers and the results of as many as three followup attempts.

Fourth Followup

May 13, 1975 was the fourth mail cutoff date. The printing contractor prepared and mailed A1 green and A2 report forms to all single-unit agricultural operations that still were delinquent. The report forms, 625,000 A1's and 475,000 A2's were printed and mailed between May 15 and May 20. These forms differed from those previously used, in that the words "1974 Census of Agriculture," "First Class [Mail]," and "Return Required Within 15 Days" were overprinted on the cover in gold ink. Further, on page 2 of each form, the 15-day response deadline was emphasized by underscored, boldface red letters. There had been some evidence by this time that the third-class handling of earlier mailings (an economy measure) had led some respondents to treat them as junk mail; those modifications were designed to call attention to the official character of the report forms and to expedite delivery and response.

Preparations for this followup were subject to the quality control measures used for the earlier followups. The mailout took place between May 15 and May 20. The forms included

and the quantity mailed for each type of case follows:

Type of case	Followup letter	Contents of package	Quantity mailed
Hawaii, agricultural operations	74-A8(H)	A1 (H) report form, A11(H) instruction leaflet, BC-2537 return envelope, 74-A4 outgoing envelope	1,123
Agricultural services (single-unit establishments)	74-A46(L)	A40 report form, BC-1866 or 2516 return envelope, BC-1865 or 2515 outgoing envelope	33,998
State "must" and large A1 cases	74-A126(L)	BC-2517 outgoing envelope	42,194
"Claims filed" cases			
A1 agricultural operations	74-A27(L)	A1 green report form, BC-1266 or BC-1664 return envelope, and BC-2517 outgoing envelope	5,646
A2 agricultural operations	74-A27(L)	Same as above, except A2 report form	2,434
A40 agricultural services	74-A110(L)	A40 report form, BC-2516 return envelope, BC-2515 outgoing envelope	283
Operator previously requested duplicate form			
A1 agricultural operations	74-A105	A1 green report form, 74-A4 outgoing envelope	6,093
A2 agricultural operations	74-A105	A2 report form, 74-A4 outgoing envelope	7,878
A40 agricultural services	74-A105	A40 report form, BC-2516 return envelope, BC-2515 outgoing envelope	376

There were 618 unsatisfied abnormal-farm cases at this time; 443 received a separate mailing from Suitland consisting of a form letter (74-A8(L) Rev.), a form A13 or A14 (as appropriate), and a return envelope. The remaining cases were individually monitored in Suitland.

Telephone clerks received 40,592 agricultural operations and 1,602 agricultural services cases for followup. Most of these were carryovers from cases referred in the third followup.

Fifth Followup

The fifth cutoff date was June 10. The usual procedures for producing address labels and assembling the mailing packages were followed. The "abnormal" and Alaska cases were handled in Suitland. (This followup was the last to include a mailing to Alaska.) The mailout (via first-class mail) and telephone referrals were as follows:

Type of case	Followup letter	Contents of package	Quantity mailed
Agricultural operations Size code 4 (\$40,000-\$99,999 total value of production)	A9(L)	"Why This Census?" pamphlet, BC-2517 outgoing envelope	80,000
Size codes 5 and 6 (\$5,000-\$39,999 total value of production)	A9(L)	BC-2517 outgoing envelope	300,000
Size codes 7, 8, 9, 0, and A (up to \$4,999 total value of production and Agricultural Stabilization and Conservation Service listings)	none	74A25 mini report form, BC-1266 or 1664 return envelope, BC-2517 outgoing envelope	600,000
Alaska, single units	A26(L) revised	BC-351 return envelope overprinted "Alaska," BC-2517 outgoing envelope	337
Agricultural services	A47(L)	BC-2517 outgoing envelope	22,000
Abnormal farms (487 cases)	A9(L)	BC-2517 outgoing envelope	352
T1 and T2 (telephone referrals repeated from third and fourth followups)	(attached to A424 followup cards)		50,000
T3 (initial telephone referrals from fifth followup)	(attached to A424 followup cards)		30,500

Assembly, labeling, and mailing were subjected to the usual quality control measures. Several other operations involving the preparation of labels also took place at this time:

1. The universe of master company and associated establishment addresses—11,215 cases—was printed for use by Bureau analysts in Jeffersonville to control receipts. Special correspondence and telephone assignments were made based on the need to follow up the delinquent companies listed.
2. There were 418,222 unsatisfied cases with size codes 6, 5, and 4 (\$5,000 to \$99,999 in total value of products sold), including some cases not in the above mailout because of address changes, pending correspondence, etc., for which the names and addresses were reviewed to eliminate duplications before the sixth and seventh followup operations began.
3. A sample, consisting of 1,846 records, drawn in equal numbers from the universes of satisfied and unsatisfied cases with size codes 7, 8, 9, 0, and A (cases with up to \$4,999 in total value of production and Agricultural Stabilization and Conservation Service listings), was taken for a telephone survey of respondents' and nonrespondents' opinions about the agriculture census.

Sixth Followup

The sixth cutoff date was July 8. The followup mailout consisted of two separate mailings. The first mailing, the A26(L)

letter, was sent to a 1-in-100 sample of the small farm respondents (from farms with size codes 5, 6, 7, 8, 9, 0, and A) whose responses had been incomplete or otherwise unsatisfactory. The second mailing, the A28(L) legal letter, went to the nonrespondents. This letter contained excerpts from Title 13, United States Code, which cited the legal requirements for answering and the penalties for not doing so. The telephone referrals included the abnormal farms which were removed from the mailing lists on this followup, and telephone referrals repeated from earlier followups.

The new address labels were received in Jeffersonville on the evening of July 11 and were attached to the appropriate mailing packages or telephone referral cards. The mailout and referral for nonpostmaster return cases were distributed as follows:

Type of case	Followup letter	Contents of package	Quantity mailed
Agricultural operations Size codes 5, 6, 7, 8, 9, 0, and A (excluding abnormal farms, agricultural services, and Alaska)—with unsatisfactory responses	A26(L)	BC-2517 outgoing envelope overprinted with "AG-26," and standard letter size return envelope	4,972
Size codes 4, 5, and 6 (\$5,000 to \$99,999 total value of production), excluding cases selected for 1-in-100 sample, abnormal farms, Alaska, multiunits, or agricultural services, with no response received	A28(L)	BC-2517 outgoing envelope	236,503
Telephone referrals	(attached to A424 followup cards)		108,721

Approximately 90,000 postmaster returns of all types were remailed as part of this followup. The usual quality control measures were undertaken for this followup.

Some 24,191 address labels were printed so special correspondence and telephone followup could be made to any master companies and associated establishments (multiunits) whose returns were unsatisfactory.

Mail Closeout

The seventh and last closeout date was August 8. Its principal functions were to close out check-in keying, produce final check-in tabulations, produce final updates to the multiunit universe, and close out other clerical operations.

The final listings of labels were produced. One list was generated for previously selected telephone cases that were still unsatisfied. The second list was of the multiunits (master companies and associated establishments) and would serve as the final multiunit universe status listing. The list included the current check-in status code and nonrespondent operations of each company and was used to prepare address labels.

The Telephone Followup

The purposes of the telephone followup were to (1) obtain completed report forms from selected delinquent cases, (2) resolve cases referred because of missing data, and (3) obtain additional information for questionnaires that seemed to need adjustment or confirmation. The telephone followup for the 1974 enumeration assumed additional importance because the field followup employed in the 1969 census for areas with very high percentages of nonresponse was omitted for 1974 and its functions were merged into the telephone operation.

The Telephone Followup Staff

The Bureau's Jeffersonville office included a staff and facilities to carry on various telephone operations. Both wide-area telecommunications system (WATS) and Federal telecommunications system (FTS) lines were used for the census followup; 38 WATS lines and 10 FTS lines were reserved for interviews and obtaining telephone numbers for farm operations.

Initially, the telephone followup staff consisted of 80 members of the Jeffersonville office work force; during the course of the operation, 70 additional people replaced personnel who resigned or were reassigned to other activities, and provided additional staffing for various other phases of the followup. Training sessions were held during the regular followup operation as new personnel joined the staff.

The telephone staff was divided into three units: the telephone control unit, the telephone numbers researchers, and the telephone interviewers. The functions of these units are described below.

Telephone Operations

Case referral. Referrals to the telephone unit began in April, after the third mail closeout. Two basic types of assignments were sent to the telephone unit: nonrespondent referrals and problem referrals.

Nonrespondent cases for telephone followup were selected from the Bureau's mailing list by computer and were, at first, limited to farms and agricultural service operations believed to have had \$100,000 or more in sales in 1974. Later, the sales requirement was lowered to \$40,000.

Problem cases were referred to the telephone unit from the technical review and correspondence sections of the processing operation. At all times, professional statisticians were available to provide guidance and answer questions. Either professional staff stationed in Jeffersonville or analysts on assignment from the Bureau's Suitland headquarters continually verified the quality of the telephone enumerations and frequently handled special problems.

The control unit. Cases for telephone contact were routed through the telephone control unit where form A404 referral sheets were attached, address labels were affixed to the A424 controls and report forms, and telephone numbers of the respondents, if available from the report form, were written in

the telephone block of the referral sheet. The cases that had telephone numbers supplied were then sent to the telephone interviewers. Those lacking telephone numbers were sent to the telephone research unit.

The telephone numbers research unit. This unit attempted to obtain telephone numbers for problem referrals and non-respondents. An initial search was made in local directories. If the numbers could not be located, the unit called local information operators for assistance, using FTS lines whenever possible. The telephone numbers were then entered into the spaces provided on forms A424 and A404.

The WATS lines used for the data-collection calls were divided into bands, with only certain States included in each color-coded band. (Washington and Oregon, for example, were blue band, while Alabama was brown band and Indiana was white band.) Cellophane tape in colors corresponding to the band of the State in which the subject operation was located was attached to the forms A424 and A404, and the cases were returned to the telephone control unit.

The telephone interviewer unit. This unit employed 38 WATS lines on a 2-shift-a-day basis. Cases for telephone enumeration were distributed to the operators from the control unit by WATS band and State. If a telephone number proved incorrect, the package was returned to the researchers for correction. The procedures for control and disposition of delinquent cases by the telephone operators were as follows:

1. In-scope, completed report form. The form A424 was annotated, detached from the completed report and filed by State. The completed report was sent to the batch unit for check-in, and then referred to the technical review unit.
2. Out-of-scope report form. The A424 was detached and filed by State. After check-in, cases previously identified as "must" cases, but now believed to be out of scope, were referred to the technical review unit; all other out-of-scope cases were referred to the out-of-scope file.
3. Respondent requested a report form. The operator attached a form A404 to the report form and specified form letter A114(L). If the request was made before the mail closeout date, a report form was sent to the respondent.
4. Respondent agreed to file. The operator annotated, detached, and filed the A424, but took no check-in action. The report form was held in a surplus form area for a response, bypassing one followup only.
5. Respondent requested a copy of the completed form. A form A404 was attached to the completed report form, indicating that a copy of the report should be made. The copy and form letter A105(L) were then sent to the correspondence unit. The completed report form was sent to the control unit.
6. Respondent claimed to have filed. The case was referred to the correspondence reading unit.

7. Respondent refused to file. After the first refusal, a form A404 was attached to the report with the date of refusal and the name of the person contacted. The case was assigned to a different interviewer for a second attempt. If this also met with a refusal, the dates of the refusals and the names of the nonrespondent and of the interviewers involved were noted on a separate sheet and the sheet was attached to the report form. The report was then checked against the microfilm mailout and current status lists to determine if duplicate reports had been returned or if the case had otherwise been resolved. If a satisfied case was located, the duplicate telephone case was referred to the telephone analysts for confirmation of status and, ultimately, deletion from the followup file; if no completed case was located, the case was returned to the control unit for transmittal to the mail followup operation.

Completed problem referral cases were returned to the originating unit of the processing operation. Cases that were not completed by telephone were referred to the telephone analysts.

As cases were completed, they were sent to the batch unit for check-in and thereafter followed the regular processing program. Data for cases for which completed reports had not been obtained, but which were known to be in scope, were normally edited by an analyst using information obtained from one or more of the following secondary sources of data within the U.S. Department of Agriculture on farms within any given county:

1. Agriculture Stabilization and Conservation Service (ASCS). The ASCS administers USDA "action" programs, and has 50 State offices and approximately 2,700 county and consolidated offices (i.e., offices that administer programs in more than one county).
2. Soil Conservation Service (SCS). The SCS provides technical assistance to farmers and landowners to solve soil and water conservation problems. This agency has 50 State offices and over 3,000 district offices (the latter serving a county, part of a county, or parts of several counties).
3. Extension Service (ES). The ES handles educational work and has approximately 4,000 local offices nationwide.
4. Farmers Home Administration (FHA). The FHA is a "credit" agency that makes loans to farm families and has 42 State offices and 1,600 county and district offices. (All States and counties are served from these offices.)

These agencies were under no obligation to provide the requested data, but gave their full cooperation to insure the most complete and accurate enumeration possible.

Results

Between the first week of April 1975 and the end of March 1976, 255,181 delinquent and problem cases were referred to the telephone followup unit. Of this total, 57,662 were ultimately

resolved by mail; 43,532 were resolved by telephone. Of the latter, 32,203 cases were completed with data.

Citrus Growers

For several agricultural censuses, particularly in Florida, there have been problems in enumerating owners of citrus groves. The large number of absentee owners are difficult to locate, and they often do not know the information to adequately complete a census report. Many of the owners have caretakers caring for their groves. (A citrus caretaker is an organization or person caring for, supervising, or managing citrus groves for owners.) The scope and type of each caretaker's operation may vary considerably. Some are responsible for complete management and care of the groves; others do only some of the grove work. Many caretakers do not do the harvesting.

For the 1964 Census of Agriculture there was a special enumeration of caretakers in Florida to improve the coverage of citrus groves. Around 100 caretakers were enumerated. Each was asked to complete one report form for all the groves cared for and to furnish the Bureau with a list of the grove owners' names, addresses, and acres of citrus. The names on the lists were matched to completed report forms to eliminate possible duplication of coverage.

In the 1969 Census of Agriculture, the direct enumeration of caretakers was continued to insure more complete coverage. Although absentee ownership and the necessity of locating the grove owners was not a problem, many of the grove owners' names were not on the mailing list used in the 1969 census.

1974 Enumeration

For the 1974 Census of Agriculture, the direct enumeration in Florida was continued and, because of similar coverage problems in Texas, direct enumeration was expanded to include that State. The actual enumeration was done by staff from the Suitland office during May 1974 in Texas, and August and September 1974 in Florida. This was the period of the caretakers' lighter workload and, since the harvesting season was over, the data needed for the 1973-74 crop year were available. In all, 74 caretakers were enumerated in the two States, accounting for about 9,000 grove owners, most of whom (about 7,500) owned groves in Florida.

To prevent duplication, grove owners' names and addresses were used during processing to identify any owner's report that had been covered in a caretaker's report. In late December 1974, each caretaker was sent a letter announcing that 74-A1 (agriculture production) report forms and 74-A40 (agriculture services) report forms were being mailed nationally. If the caretaker received either of these forms, he was to return the blank 74-A1 form after marking it with a citrus-caretaker number provided in the letter. However, he was to complete the A40 form and identify it by marking it with his caretaker number. He was also to tell his grove owners to mark "Citrus reported by Caretaker #00" on any report forms they might receive, but to be certain to fill in information on other agricultural operations they might have. When the caretakers

were enumerated, they were asked whether they had (or expected to have) agricultural operations of their own in addition to the citrus. If they so indicated, these additional operations were enumerated by telephone late in December 1974 and included on their original reports.

The Supplementary Enumeration

The Bureau of the Census routinely carries out a number of checks on the counts of agricultural operations and acreage obtained in each State during an enumeration. These checks, which are concerned only with the numbers produced by the census, are made by Bureau personnel in conjunction with various State government officials and representatives of the Department of Agriculture, using such sources as recent State farm censuses and estimates from the Statistical Reporting Service (SRS) and the Agricultural Stabilization and Conservation Service (ASCS). These checks are begun as soon as processing of the returns has progressed far enough to yield preliminary total counts for each State. For the 1974 enumeration, the acreage and operation count checks began in the latter half of 1975, after the final mail followups had taken place and the telephone followup operation was nearing completion. (The census report forms were processed, and preliminary reports were completed and released on a State priority basis.) In late 1975, checks of acreage and farm totals in Indiana indicated a marked disagreement between the census figures and estimates from other agencies. A sharp decline in the counts from those obtained for the 1969 enumeration was also noted. Declines in total counts compared to 1969 were seen in Maryland and Delaware, but these States are in the East and are highly urbanized. Decreases in farms and in acres in farms for heavily urban areas can occur through the expansion of cities and towns, real estate speculation and development, and so on; hence, these rather abrupt changes were not taken, in themselves, as indications of undercoverage. However, in a heavily agricultural State such as Indiana, the evident drop in farms and farmland alerted the Bureau to a possible problem. When, in late November 1975, SRS checks of the census counts for Iowa indicated a total acreage count of over 4 million acres below that of the preliminary 1974 SRS estimates, it was decided that the matter warranted investigation.

Iowa was a particularly convenient and appropriate State to check, because a State farm census had been completed each year and address lists were available for matching to the census mailing list. Initially, the State farm census lists for Fayette and Henry Counties were matched to the Bureau's 1974 and 1969 tabulations and mailing lists. Addresses appearing on both the Bureau's 1969 tabulations and the State census lists, but not on the 1974 lists, were extracted for a telephone enumeration to determine whether a significant number of them were still agricultural operations. Telephone calls were made by Agriculture Division personnel from Suitland headquarters in February 1976. The results were as follows:

	Henry Co.	Fayette Co.
Total addresses	125	110
Unable to contact	12	11
No farm operations in 1974	19	11
1974 farm not reported in census	94	88
Additional acres in farms recovered	25,106	16,776

As further checks were carried out in several other Iowa and Indiana counties, it became evident that significant undercoverage had occurred, probably on a national scale. Plans for a major supplemental operation, intended to pick up as many of the missed agricultural operations as possible, were begun immediately.

Preparation of the Mailing List

Given the time and budgetary constraints, it appeared impossible to assemble a mailing list for the recovery operation using all the sources used in preparing the original census mailing list. The 1969 data had been one of the items that revealed the sharp decline in numbers of farms and acreage, so it was felt the 1969 mailing list would constitute a readily available source for the supplementary list.

Accordingly, a computer match of 1969 in-scope addresses to the 1974 mailing list was made. By March 1976, a file of approximately 315,000 addresses listed as in scope for 1969, but not on the 1974 address list, had been assembled to serve as the basic mailing list for the supplementary enumeration.

The Report Forms

While large agricultural operations (those with total value of products sold of \$80,000 or more) and abnormal farms were to be sent standard A1 report forms, the remaining addresses would receive abbreviated versions of the A1 and A2 questionnaires. This decision was based primarily on two factors: (1) the time that had elapsed between the end of the census reference year and the beginning of the supplemental enumeration, and (2) the need to shorten the period between followups so as to finish the operation as quickly as possible. The period between followup efforts was to be shortened to only about 2 weeks (half the period used in the regular enumeration).

Accordingly, shortened versions of the standard report forms were prepared and designated forms 74-A1a and 74-A2a. Both new versions were designed to be compatible with the data-entry, computer editing, and tabulating programs written for the standard report forms, so that data omitted from the shortened report forms could be supplied during the computer-edit processing on the basis of the data reported.

Form A1a. Form 74 A1a was an 8" x 10½" 8-page booklet printed in black ink on white stock (this compares to the 22-page A1 form) and was sent to agricultural operations that had sales of \$5,000 to \$79,999 in 1969. The 38 sections of the standard A1 form were reduced to 20 in the A1a. Sections 1 (asking if the respondent had received more than one report form), 2 (type of agricultural activity), 29 (contracts and

binding agreements), and 30 (payroll and employment) of the A1 form were dropped entirely, while sections 5-17 (covering the various crops) were sharply cut back and combined into a single section (3, crops in 1974, including hay, vegetables, fruits, etc.). The other sections of the standard form A1 were also compacted, although usually not as drastically as were the crops sections.

Form A2a. The form 74-A2a, for operations with sales in 1969 of less than \$2,500, was an 8" x 10½" 4-page booklet, also printed in black ink on white stock. (The standard A2 was 6 pages long, not including cover page, instructions, the space left for remarks, and the end page.) Aside from the deletion of sections 1 (on more than one report form) and 2 (identification of agricultural activity), the content of A2a was essentially the same as the standard A2, although certain minor format changes were made to simplify the questions and to make the form more compact.

Mailout and Followup

The mail portion of the supplementary enumeration consisted of an initial mailing of the questionnaires, followed by two followup mailings at approximately 2-week intervals. Transmittal form 74-A60(L) was prepared to explain the reason for the enumeration and request prompt response.

The mail packages were assembled at the Bureau's Jeffersonville, Ind., facility. Address labels were produced for operations in each of the Bureau's nine census geographic divisions and became available on a flow basis beginning the first week of March 1976. The first mailing was made on March 2 (to division 8, the Mountain States). By the last week in March, labels had been produced for all nine divisions and the last mailing (to division 6, the East South Central States) was made March 24. The initial operations involved the mailing of 315,181 forms: 6,778 A1 forms, 140,062 A1a farms, and 168,341 A2a forms.

First mail followup. The first mail followup took place within 2 weeks of the initial mailout for each census geographic division. The followup consisted only of a form letter to the addressee; form A61(L) was mailed to respondents whose 1969 total value of products sold was \$40,000 or more; form A62(L) was mailed to addressees with 1969 sales of less than \$40,000. The A61(L) explained the need for prompt response, noted that telephone followup would be made to many larger operations, and included an instruction to disregard this reminder if the report had already been completed and returned or if the respondent had been contacted by telephone and had given the data to the telephone interviewer. The A62(L) also requested prompt return of the report form and asked the addressee to contact the Bureau if there were any problems in completing the report form.

The first followup mailings began March 16 and were completed April 6. Approximately 16,700 A61(L) and 188,600 A62(L) letters were mailed.

Second mail followup. The final mailing followed the same general pattern as the first. Mailings to the different geographic

divisions began March 30 and were completed April 26. However, the package for this followup included not only a form letter requesting response, but an appropriate report form as well; standard A1 forms went to addresses with 1969 sales of \$80,000 or more; A1a's, to those with less than \$80,000 but more than \$5,000; and A2a's, to those with sales of less than \$5,000. The final mailing involved approximately 2,040 A1's, 71,200 A1a's, and 68,400 A2a's.

Field followup. The mailing list for the supplementary enumeration included approximately 3,000 operations whose 1969 total value of products sold was \$100,000 or more. These cases were set aside for a field enumeration. Inasmuch as a relatively small number of farms was involved, it was decided to use the interview staffs of the Bureau's regional offices for the enumeration. Accordingly, address lists of the operations in each region were prepared, and the necessary report forms and instructions were forwarded to the regional offices.

The field interview phase of the supplementary enumeration began in late March. Each regional office began enumerating the addresses on its list as it completed its Current Population Survey (CPS) interviews for that month. By the May 4 closeout, 2,553 A1 questionnaires had been completed for large operations.

Telephone followup. While the very largest cases were chosen for field enumeration, a telephone followup operation for the large cases not designated for field interviews was also organized. Since the Bureau maintains a trained staff and facilities for telephone operations at Jeffersonville, Ind., telephone enumeration was used extensively during the regular census. Timely collection of data in the supplemental enumeration required the use of telephone interviews. The additional circumstance, that a staff of telephone interviewers previously intended for a special survey operation conducted from the Bureau's Pittsburg, Kans., office was freed for other work when the survey was cancelled, led to the decision to use both offices in a major effort to obtain responses by telephone to the supplemental enumeration.

Accordingly, 20 WATS lines were reserved for each office enumeration staff, an interview training program was prepared, and in mid-March 1976 Bureau personnel held training sessions in Pittsburg and Jeffersonville for the telephone interviewers. Essentially the same procedures were used for the supplementary followup as were used for the telephone followup of the regular census, with modifications made as a result of experience gained during that operation. Principal innovations were: (1) use of the form 74-A229 (Telephone Unit Control Record) cards, (2) addition of a roving analyst to the telephone operations, and (3) use of the forms A1b (Telephone Screening Questionnaire) and A1c (Telephone Data Record) by the telephone clerks in their calls to respondents.

An A229 card was filled out for each case sent to the telephone unit. An address label for each case was attached to the card and entries were made for the date the case was received and the telephone number and time zone of the addressee. A card for each case was kept at a central control and

any action taken on a case was entered on the A229 card for that case, together with the date and any remarks. Therefore, the current status of every case was always available and close control could be exercised over the entire telephone enumeration process.

The roving analysts were subject-matter specialists assigned to the telephone units from the Suitland headquarters to provide assistance whenever the telephone clerks encountered special problems.

The A1b screening forms were used by telephone clerks to determine if the persons they contacted were farm operators and, if so, the approximate size of their operations in terms of total value of sales. Agricultural operations were stratified into those with sales of under \$20,000, \$20,000-\$60,000, and over \$60,000. Size of the operation determined what items from the A1c report forms would be addressed to expedite the enumeration of the smaller farms. The A1c report form included all the items on the standard form A1; certain items and/or columns were shaded or crosshatched to indicate that those items were not to be asked of operations in one or both of the smaller sales categories established by the A1b form.

The initial workload for the telephone units consisted of large and abnormal operations with 1969 value of sales of \$100,000 or more. The first calls were made March 20 and were primarily directed to operations that would be subject to field followup (simply that an interviewer would be visiting) or other very large cases. However, by March 30, the second mail followup for divisions 1 and 8 had been completed, and the address lists of remaining nonresponse cases from those divisions were turned over to the telephone operation for followup. Those operations on the lists with 1969 sales of \$40,000 or more were all called, while operations with 1969 sales below that level were sampled. Thereafter, the closeout dates for the second mail followup for each division in the supplementary enumeration was determined to some degree by the workload of the telephone units. By April 26, the second mailing for the last division had been completed and the remaining lists were turned over to the telephone unit for further followup.

The telephone followup continued until mid-August 1976, although the major effort was completed by the end of May. Of 46,700 cases referred to the telephone units for followup, 35,061 were resolved by telephone, while 11,639 others were completed by mail.

Results

The supplementary enumeration effort received 263,714 replies by mail or telephone; of these, 175,933 were out of scope. Of 92,781 in-scope operations enumerated, 2,756 were farms with sales of \$40,000 or more, 46,307 were farms with sales between \$2,500 and \$39,999, and 43,718 were small farms with 1974 sales of less than \$2,500.

Enumeration and Followup Problems

The Bureau encountered a number of problems during the 1974 Census of Agriculture that had a significant effect not only on

the enumeration, but on the plans being made for subsequent censuses. Some of these problems were as follows:

1. The initial planning and preparatory work for the 1974 census was halted in late 1972 when the decision was made to suspend the census until 1977 to bring it into conjunction with the other economic censuses. When this decision was reversed by Public Law 93-86 late in 1973, the limited time available for planning and testing resulted in less thorough and complete preparations than originally intended.
2. The computer programs for unduplication of the Bureau's mailing list deleted from the original list a number of addresses that represented agricultural operations, requiring correction and updating and supplemental enumeration work while processing was underway. Further problems concerned the reliability of the computer hardware and resulted in occasional delays in processing the census file.
3. The standard data-collection form 74-A1 was considered by many respondents to be too long and complex. Resistance to providing data for specific items, particularly with regard to off-farm income, was frequently encountered.
4. Some members of the agricultural community seemed reluctant to provide data, even before enumeration began. Suggested reasons for this uncooperative attitude ranged from a general distrust of Government to objections to specific items requested and the feeling by farmers that the data would be used against them, either by the Federal regulatory agencies or by farm suppliers and marketing companies. The latter attitude was probably the most important single difficulty in the census operation, and was the one least susceptible to solution.

Processing the Data

General Procedure

The task of processing the mass of data from the agriculture census was complex and involved a number of clerical and computer operations.

Respondents returned their report forms to the Bureau facility in Jeffersonville, Ind., where the clerical processing was done. Except for certain electronic processing that took place during the data keying (see below), all computer operations were carried out in Suitland.

The clerical work included the receipt and check-in of returns, routing of forms and other mail to the appropriate work stations (such as the correspondence section, the census file number search section, editing section, etc.), screening and reviewing of report forms, data keying, and, after computer editing, reviewing the computer changes and corrections.

The general order of processing the returns was as follows:

1. Sorting and check-in

2. Screening; edit review of pre-identified large farms, multiestablishment companies, and abnormal farms (grazing associations, Indian reservations, etc.); follow-up of grossly incomplete reports; and response to respondents' inquiries
3. Data keying
4. Computer processing
5. Review of computer editing
6. Tabulating the data.
7. Review of preliminary tabulations
8. Final tabulations of county, State, regional and U.S. tables
9. Final review and disclosure analysis (unpublished data, available to the public on request, did not go through disclosure analysis until requests for specific items were received)

These operations are described in more detail below.

Clerical Processing of the Report Forms

Receipt and check-in. Correspondence, report forms, and postmaster returns (PMR's) were separated on receipt in Jeffersonville, and all except the PMR's were opened. The report forms were sorted by form number and type—completed reports for single units, multiunits, "must" (review) cases, etc., and those obviously requiring correspondence—and then by State. The different forms for each State then were counted and batched into work units, usually of 50, 100, or 200 forms each, depending on their complexity and how they were to be routed after check-in keying. The types of receipts and their disposition were:

Type of receipt	Disposition after check-in keying
A1, A2, or A40 not requiring correspondence	Screening
A1, A2, or A40 requiring correspondence	Correspondence reading
A1 or A2 cover only, or cover and first page	File
A1 "must" case or abnormal farm	Technical review
Multiunit folder or folder with two or more forms—A1, A2, or A40, or any combination	Technical review
Correspondence with census file number (CFN)	Correspondence reading
Congressional correspondence (copy made and original forwarded to Suitland)	Correspondence
Postmaster return (PMR), first time	Correspondence typing
PMR, second or third time, with—	
Address change indicated	Correspondence
Size code B, M, P, 1, 2, or 3	Technical review
Refusal	Technical review
Any other type	File
Postal address corrections	File

Each work unit was placed in a separate plastic bag with a cover sheet identifying the contents. The cover sheet included check-in and followup codes assigned to the work unit. The check-in codes were as follows:

- 0 Nonresponse
- 3 PMR

- 4 Respondent originated correspondence
- 5 Out of scope
- 6 In scope
- 7 Form remained
- 8 Form label generated
- 9 Out-of-scope recycle

The coding scheme was designed so a higher number superseded a lower one. Many cases, especially PMR's and correspondence, were checked in more than once. These cases were considered incomplete, even if something had already been received from the respondent. The respondents were contacted in these cases and, after completed reports were received, the cases were checked in with new codes.

Followup codes were also used on the work sheet to indicate what followup action (if any) should be taken. Check-in codes 5 through 8 received followup codes of 0, since followup would not usually be necessary for them. (A code 8 case would, of course, be checked in later with a new code.) However, codes 3, 4, and 9 were all subject to followup codes; a followup code of 1 for a case with a check-in code of 3, for example, would mean that the report in question was a first-time PMR, while a 2 meant a second-time PMR, and so on. The meaning of the followup codes for each check-in code varied and indicated anything from the status of a PMR (codes 31, 32, 33, etc.) to the cases selected for the quality control sample (code 99).

Quality control. Throughout the census, samples of receipts were selected to determine if the processing of those receipts was functioning properly and whether any erroneous followup had taken place. All congressional correspondence was part of this sample. All other returns, except correspondence without CFN's (census file numbers) and envelopes marked AGCOR (a term designating census-originated correspondence), were sampled at a 1/1,000 rate through the second followup, and then at rates of 1/500 for the third, 1/250 for the fourth, and 1/100 for the fifth and sixth followups.

The CFN's of the selected pieces were transcribed to check-in control forms, and coded by type of receipt (blank report, cover only or cover and first page, report form with data, PMR, respondent-originated correspondence only, or congressional correspondence). The transcription sheets were keyed weekly as a separate work unit in the normal check-in keying operation, and the keyed quality-control actions records were matched to the actual check-in actions to uncover any processing discrepancies.

Check-in keying. The CFN's and disposition codes assigned at receipt of each census return, piece of correspondence, PMR, or address change were recorded on a key-to-disk system with output on computer tape (approximately 175,000 CFN's per tape reel). The keying was subjected to verification and quality control procedures, and the resultant records were transmitted to Suitland via telephone datalink for updating the census master address file or for annotating receipts to that file so the respondents would not receive followup mailings. Forms re-

jected in keying because of faulty CFN's were removed from the work units, corrected, and recycled through keying.

As they were keyed, approximately 10,000 forms selected for the processing evaluation sample were identified and tagged with yellow tags. Each was identified by an evaluation sample code on the address label. All cases with codes A (evaluation sample), B (evaluation sample and corporation), or C (evaluation sample and partnership) were selected. For each selected case, one xerographic copy was made of any correspondence and all pages with entries or remarks. The originals were returned to the work-unit package and the copies were sent to Suitland for further processing.

Screening and Clerical Correction

A screening unit was organized to deal with the single-unit A1, A2, and A40 returns, to reduce potential data-entry system problems, and to separate cases that needed technical review. Following check-in keying, the report forms were clerically screened on a flow basis in State-priority order. Any corrections were made that were needed to speed data-keying, such as deleting fractions or converting them to decimal numbers, lining through extraneous material, and ensuring the readability of the entries to be keyed. Following directions provided in condition-action tables, each report was reviewed to make certain that—

It was in scope for the census.

Remarks were not present that required action by the Bureau (if there were, the action was to be specified).

Remarks containing data were translated to appropriate data entries or referred to technical reviewers.

The address label contained no unprocessed changes. (Changes for followup cases only were to be made, using a mail file update document form 74-A301.)

The State code was consistent with the rest of the work unit.

The reported State and county locations for the report were consistent with the geographic coding on the address label.

Entries for total production expenses and/or total value of products sold reported on an A2 (short) form were less than \$50,000 (if more, the data were clerically transcribed to an A1 form).

Entries for total production expenses and/or total value of products sold reported on an A1 form were less than \$500,000 (otherwise, technical reviews for consistency would be needed).

Key codes were entered and/or corrected for the crop/livestock names.

The type or organization was indicated and, if a corporation or an abnormal farm, the return was tagged for further action (collection of information on the corporate organization or special handling for abnormal units).

Entries on an A40 (agricultural services) form indicating the

existence of owning/controlling or owned/controlled companies received the attention of technical reviewers.

A1 forms with entries indicating the total acreage on the place was zero were referred for technical review to make certain that the addressee was, in fact, a landlord only and, therefore, out of the scope of the census.

If entries were found in section 26 (other livestock or animal specialties), they were photocopied for use in adjusting computer edit specifications at Bureau headquarters.

If the remarks or responses indicated a need for a form letter or other correspondence, the screening clerk indicated the appropriate form letter to be used and forwarded the case directly to the correspondence typing subunit or, in the case of specialized problems, to a correspondence analyst. This eliminated double handling in the correspondence unit.

Verification and quality control. All screened report forms were subjected to verification. During the clerks' qualification period, the first 200 report forms processed by each clerk were verified on a 100-percent basis. If 4 percent or less of these reports contained critical screening errors, the clerk was considered qualified and subsequent work was moved to sample verification. (Critical errors were those where the clerk failed to correct or refer sections or to complete necessary steps; noncritical errors were usually those where some unnecessary action was taken. Noncritical errors were tallied, however, as their continued repetition could result in increased operational costs.) Records were kept on the individual clerks. The verifiers corrected the errors, and then discussed them with the clerks and supervisors. Where the individual clerk's critical error rate exceeded 4 percent, additional work was verified completely. Clerks were retrained if still unqualified after the 100-percent verification of 400 reports; they were removed if the error rate continued.

After qualification, each clerk's work was sampled at a 5-percent rate. In addition, every report form on which a GAC (geographic area code) change had been marked on the label had that change verified. If two or less of 40 sampled reports (exclusive of the GAC changes on nonsampled reports) contained critical errors, the work was accepted. To remain on sample-verification status, the clerk had to have at least 8 "accept" decisions in each sequence of 10 decisions.

Tables 4.1 and 4.2 summarize the verification results.

Census File Number Research

Whenever a report or piece of correspondence was received on which (1) the census file number (CFN) was missing or was obliterated, or (2) other codes, such as size, were needed, it was referred for resolution to a special research unit in Jeffersonville. This unit used 16mm microfilm reading and printing equipment and two sets of microfilm files: (1) A name control file for each State in which the name control (i.e., the first four characters of individual surnames or, in the case of partnerships,

Table 4.1. Verification Summary

Report type	Verification rate	Reports processed	Reports verified ¹	Defective reports ¹	Total errors ¹	Critical errors ¹	Error rate ¹	Accept decisions	Reject decisions
A1	Total	900,299	900,299	26,701	33,660	28,821	2.97	951	64
	100%	39,216	39,064	5,043	9,031	² 6,838	12.91	(X)	(X)
	5%	861,083	43,415	1,091	1,240	1,107	2.51	951	64
A2	Total	699,456	699,456	6,204	6,735	6,206	.89	821	10
	100%	5,763	5,763	72	127	74	1.25	(X)	(X)
	5%	693,693	34,956	309	333	309	.88	821	10
A40	Total	31,400	31,400	131	354	134	.42	33	0
	100%	2,400	2,400	31	154	34	1.29	(X)	(X)
	5%	29,000	1,451	5	10	5	.34	33	0

X Not applicable.

¹ Totals weighted.² 14 errors not reported critical or noncritical.

Table 4.2. Distribution of Errors Detected, by Type

Error description	A1		A2		A40	
	100%	Sample	100%	Sample	100%	Sample
Total	9,031	1,240	127	333	154	10
Total critical errors	6,838	1,107	74	309	34	5
Failure to refer to technical review	2,590	611	37	161	17	4
Error in transfer, transcription, or change of data entry	3,928	406	16	96	6	0
GAC error	144	64	10	20	5	0
Other	176	26	0	4	6	1
Total noncritical errors	2,179	133	53	24	120	5
Incorrect designation of reason for referral	2,082	114	40	8	119	5
Failure to mark report with entry in sec. 26 for reproduction	87	17	0	0	0	0
Other	10	2	2	8	1	0
Not reported	14	0	0	0	0	0

the first surname; company names; association; etc.) was used to sort and list alphabetically the complete name and address for each case originally mailed; and (2) a complete universe name and address file in CFN sequence. Since there are a number of names (such as Smith) with the same four-character name control (SMIT), reviews of such entries were necessary. These entries were assigned CFN's in ZIP code order, so that if the ZIP code or even the general area of the State was known, the CFN could be readily found. The unit used various directories and county/ZIP code or county/telephone area code lists to assist in identification.

Correspondence

All correspondence from respondents was handled in a correspondence unit in Jeffersonville which, in turn, was divided into subunits dealing with (1) reading and responding to routine problems, (2) typing and mailing replies, and (3) maintaining suspense files to insure followup of specialized cases.

All work in the correspondence unit, which consisted principally of mailing appropriate form letters and report forms, was subject to verification before any materials were filed or released. Verification in the reading unit consisted of 100-percent review of the cases until 64 successive correct cases were found, and then of 5-percent sampling (from a random start)

until a defective case was found. Then the next four cases were reviewed. If one of the four was handled incorrectly, 100-percent verification was resumed; otherwise, sampling remained at the 5-percent rate. Clerks failing to qualify after processing 400 pieces of correspondence were retrained; continued failure led to replacement.

Verification of the typing was designed to insure an average outgoing quality with an error rate or no more than 3 percent, and the suspense files were reviewed weekly for handling efficiency. All errors found in 100-percent verification of the first 200 pieces of correspondence were discussed with the unit supervisor and the clerks involved before corrections were made. Clerks with persistent failure records were either removed or transferred to other types of work.

The following tables summarize the verification results.

Table 4.3. Verification Summary—Reading Unit

Verification rate	Total pieces of correspondence	Pieces verified ¹	Pieces in error ¹	Error rate ¹
Total	409,247	409,247	3,557	0.87
100%	9,427	9,427	457	4.85
Sample	399,820	19,991	155	.78

¹ Totals weighted.

Table 4.4. Verification Summary—Typing Unit

Verification rate	Total corres.	Pieces verified ¹	Pieces in error ¹	Error rate ¹	Accept decisions	Reject decisions
Total	177,986	177,986	3,371	1.89	201	27
100%	5,609	5,609	189	3.37	(X)	(X)
Sample	172,377	12,081	223	1.85	201	27

X Not applicable.

¹ Totals weighted.

Some correspondence was referred to Bureau headquarters for handling. This included all congressional and potential congressional correspondence (those items that indicated the respondent was sending a copy of the letter to a Congressman or Senator), complex problems involving multiunits, and unusual or difficult situations that could not be resolved using letters.

During later processing phases, the correspondence unit in Jeffersonville prepared letters sent to obtain additional information needed to edit or complete the report forms. These letters also were subjected to quality control procedures.

The principal form letters used are listed below.

Form No. 74-	Purpose
A101(L)	Grant time extension
A102(L)	Recommend sources of assistance in completing report
A103(L)	Request census file number
A104(L)	Return report form for completion
A106(L)	Return report form for additional information
A107(L)	Cite pertinent sections of census law in response to questions about legality or authority of the census
A108(L)	After review of correspondence, advise that report form is not necessary
A109(L)	Request best estimates in absence of records
A110(L)	Request duplicate report when original not received
A111(L)	Acknowledge receipt of report form after followup
A112(L)	Determine whether respondent had agricultural operations in 1974
A113(L)	Request report covering part-year operation
A114(L)	Furnish additional report form when original not delivered
A115(L)	Explain to refusal cases need for census
A116(L)	Request additional information (without returning report form)
A117(L)	Respond to request for payment for completing report (no payment authorized by census law)
A118(L)	Indicate request for published data will be filled
A119(L)	Return noncensus materials included with report form
A120(L)	Respondent omitted from initial mailout.
A121 (flyer)	Readdress PMR (postmaster return)
A122 (card)	Acknowledge receipt of correspondence
A123(L)	Original addressee deceased, request to executor for information
A125(L)	Respondent received incorrect form
A126(L)	Request report, Jeffersonville assistance number supplied
A601(L)	Agricultural services—return report form for additional information

In addition, an entire letter could be tailored to a particular situation.

Some of the forms containing the suffix (L), listed above, were preassembled four-copy sets of letterheads with the text printed on NCR (no carbon required) paper. The first copy (original) was white; the second, yellow; the third, pink; and the fourth, goldenrod. The second and third copies were retained for second-request and third-request followup as indicated by the suspense file (these were mailed at 2- and 4-week intervals,

respectively, after the original letter was sent), and the fourth copy was filed.

Postmaster returns (PMR's). The correspondence unit was also responsible for reports forms that the Postal Service returned as undeliverable. Those cases annotated "out of business" or "deceased" were reviewed before their records were deleted from the master file. "Must" and abnormal cases were rechecked against the historic record to verify or correct the mailing address. For other cases, the following procedures were prescribed: A correction document was prepared for encoding (and entry in the master file) to reflect any name or address changes and a new mailing label was prepared. If the PMR was a multiunit mailing package, the contents of the old envelope were removed and inserted in a new BC-242 envelope as before. The new mailing label was attached and "R2" was written in the lower left corner of the envelope face. For single-unit report forms, the original form was used when possible. If the original form could be used, it was placed in a BC-130 blue envelope together with a form A121 flyer, and the envelope was labeled and marked "R2." When the old form could not be used, a new one was selected and packaged as the original had been (see ch. 2, table 2.2, p. 24), but with a new mailing label and with "R2" marked on the form or mailout envelope (if used). All remailed materials were sent out as first-class mail.

If an R2 mailing piece was again returned as undeliverable, a third mailing took place only if an address change was provided by the Postal Service. The same steps described were followed, except that "R3" was written on the outgoing mail, and the check-in unit was notified that the forms had been remailed but that no further followup would take place. Any R2 or R3 cases that were returned marked "Refused" or contained "black" A1 forms were referred for technical review; all other PMR's were filed.

The volume of PMR's was much higher than for the 1969 enumeration, when there were approximately 38,000 PMR's; for the 1974 census, over 310,000 first-time and 33,000 second-time returns had to be handled.

Technical Review

A staff of 3 senior analysts, 10 technicians, and 30 clerks and technical assistants in Jeffersonville performed a number of specialized functions, such as the following:

1. To screen or review all reports from "must" cases, multiunits, corporations, and abnormal farms. For example, corporations not previously included in the precensus were identified by label coding so that a corporate report form, 74-A29, could be sent for organizational information covered in the precensus (see ch. 2) but not included in the census.
2. To screen agricultural services returns indicating the existence (or disappearance) of owning/controlling or owned/controlled companies, and record the pertinent details for use in the Bureau's standard statistical establishment list (one of the bases for the economic censuses).

3. To resolve cases where there was doubt that the reported operation was in scope of the agriculture census or where entries were internally inconsistent. To determine in-scope or out-of-scope status, the analysts looked for evidence of agricultural activity or for remarks that would indicate out-of-scope status, such as "This place was never a farm," "Deceased," "No agricultural operations here," "This place has been sold," or "No longer in operation." Similarly, the return was checked for any place for which the total acreage reported was zero; if the addressee was in fact a landlord only, the report was determined to be out of scope.
4. To transcribe to A1 forms the data from any A2 report forms (intended for places with sales under \$2,500) which indicated actual sales of \$50,000 or more. Telephone calls and subject-matter analysis supplied the additional data required for the A1 forms. (A computer program provided for mechanical conversion to A1 format and imputation of missing data for A2 forms showing sales of \$2,500 to \$49,999.)
5. To review and correct, if necessary, records rejected by the computer because either the entire report or certain items were unacceptable.

In general, these rejections constituted about 2.7 percent of all the data processed through the first computer formatting cycle and represented that fraction of records containing errors that passed through the data-keying verification process. The technical review unit received the rejections in the form of listings, printed out by the computer, which identified the records in question, together with the preceding and subsequent codes which might help in locating the original report forms and spotting the difficulties. The reasons for rejection appeared on the listings, and included the following:

Rejection of the entire farm report

- A non-numeric character (such as an asterisk or a slash) was detected in address label codes
- The census file number check digit failed
- An invalid State code was detected
- The county code was outside the acceptable range for its State
- The form code differed from the rest in the batch
- An evaluation code other than A, B, C, D, E, or X was encountered
- An identification number indicated a report, but no data followed
- Control information for the work unit indicated that a record was to follow, but it did not
- The farm record had more than 10 items rejected (indicating possible out-of-sequence keying)

Item rejection

- The key code was non-numeric, and therefore incorrect
- The previous entry indicated that a columnar entry would follow; instead, a key code was encountered or the record ended

Legitimate data may have been miskeyed or extraneous data were added

The column number was unacceptable

The key code was out of sequence

The columnar entries were out of sequence

Non-numeric entries appeared in a data field

The entry exceeded the capacity of the data field

Data were outside acceptable parameters

The key code entered was not one used for the particular report form

The key code was not valid for the State in which the farming was done

It was possible for a particular data item to violate more than one condition, but only one condition was listed. Therefore, the reviewer had to make all of the corrections necessary for the item in order to avoid rejection during the second computer cycle.

In the case of report rejects, the computer skipped the record during formatting; hence the report form had to be retrieved from the holding area, reviewed, and put through the data-keying process again. Many rejections occurred because of out-of-sequence keying that was not corrected in the keying stage. When the computer rejected specific items only, it formatted the farm record, leaving out the rejected items. The reviewer replaced these with the proper data (or the original data were allowed to stand) by preparing form A210, Individual Form Correction Transcription Record. The A210 forms were data keyed with 100-percent verification, and the changes were processed with the original records in a second computer cycle. The rejection-review-correction operation was repeated as necessary to create an acceptable data file.

Data Keying

The system. An electronic key-to-disk-to-tape system in Jeffersonville was used to prepare 1974 agriculture census data for computer processing. The system actually consisted of 8 to 10 systems of 16 to 20 individual key stations each. Each key station was equipped with a keyboard and a CRT (cathode ray tube) viewing screen so that keying could be monitored and edited (see below) during the actual operation, or so that data already keyed could be recalled for review or verification. Each system was linked to a drive for one to four computer disks, each with a capacity of 2.5 million characters. Inasmuch as programs and controls took up approximately 0.5 million of the characters, each disk could contain the data for about 5,700 report forms at one time, assuming an average of 350 key strokes (characters) per form. In practice, a portion of each disk was allocated to a particular key station so there would be no danger of overlap in recording. Verification took up additional space on each disk; the verification process allowed rekeyed data to be visually compared to those already on the disk. The actual report was consulted in cases of conflict and, when necessary, the original keying was corrected. A requirement programmed into the system, that every difference be rechecked,

eliminated the need for quality control of the verification process.

After verification and correction, the data were moved automatically from the disk to a magnetic pooler tape. Each pooler tape held approximately 2,500 farm records. The data were transmitted to Bureau headquarters in Suitland for use on the computer either by telephone datalink or by sending a copy of the tape via air freight. Air freight was used only if there were datalink transmission problems. As soon as the data were transferred satisfactorily, the pooler tapes in Jeffersonville were erased and reused.

As a further safeguard against loss of data in the system, the contents of each disk were transcribed to "systems-save" tapes every 2 hours. These tapes were held for 5 to 8 days or until the data had been accounted for and safely transmitted to Suitland.

The operation. Screened and reviewed report forms were transmitted in batches for data keying, each batch (or work unit) containing approximately 100 A1 forms, 200 A2 forms, or 200 A40 forms, together with a control form (A405). Following detailed instructions, the clerks keyed the batch control record and the entries on each report within the batch. For each report, codes from the address label were keyed and, for completed items only, the item code with its response. Certain items allowed for negative or minus entries (e.g., income); these responses were entered simply as "3" in the units column. As the codes and responses were keyed, certain limited edits were performed electronically by a series of computer programs that were changed according to the type of form being keyed; certain details were also modified when analysis of the raw data indicated such a need. The data-keying edits were designed to ensure that—

1. Check digits, State and county codes, and key codes were valid.
2. All identification information from the address label, except the evaluation code, and the item codes and data fields were keyed with numeric characters only.
3. The key codes were in the proper sequence within each record. After each record was keyed, the system provided the following information on the viewing screen, together with the entry or entries involved:
 "FIELD INCORRECT" was displayed if an item was keyed out of sequence or keyed more than once. These problems were reviewed and corrected.
 "DUPLICATE" indicated that the machine found the record was the duplicate of one already keyed. The duplicate records were examined to determine which ones would be removed.

After all records in a batch were keyed, another electronic edit verified that the batch contained the proper control codes and that there was some identification code for each record in the batch. The edit again compared the reports for possible duplication, and displayed on the operator's screen the number of forms keyed. If this count differed from the one on the control record, the difference was reconciled.

The edits described above were, however, only a few of those necessary to process the data, but they did make it possible to correct many errors before the records reached the computer and while the report forms were still at hand for checking purposes. The balance of the editing was accomplished in the main computer operations and the ensuing technical review of rejected records. (See p. 48.)

After data keying and verification, the report forms were placed in a holding area until the data were satisfactorily processed through the computer. The processed forms then were moved to central files for storage.

Verification and quality control. The quality control procedure for the 1974 census was designed to insure that keying was complete and accurate. The plan provided for 100-percent independent key verification during each operator's training period; that is, the verifier would completely rekey the trainee's work and compare both sets of records. As each keyer's work improved in quality and accuracy, verification of his work was reduced to a 10-percent sample rate during the next qualification stage, and finally a 4-percent sample rate at the process-control stage. This plan was geared to allow an estimated average outgoing quality limit of 2.5 percent error for all records keyed, and to attempt to limit a keyer's omission rate to a maximum of 0.36 percent in any one field. An error was defined as any of the following: (1) A keystroke error in keying an item code or an entry, or (2) omission or (3) duplication of an item code or datum. For accounting purposes, one error was charged against the clerk for each record in error, except for omissions, where one error was charged for each omission.

The average outgoing quality varied for different report types, depending on the degree of keying difficulty, and also was subject to modification as processing proceeded.

During the training period, the first three work units (batches) of each keyer were 100-percent verified and corrected. If the trainee had a cumulative error rate (the number of defective records divided by the total number of records verified) of 3.6 percent or less with an omission rate (the number of fields omitted divided by 14 times the number of records verified) of 0.36 percent or less, the keyer advanced to the qualification stage. If not, further training took place, and the trainee had an opportunity to qualify with three more work units before other administrative action was considered.

In the next stage, the successful trainee attempted to qualify for process control. During the qualification period, every 10th report form in a work unit was verified, beginning with a random start, and each batch was accepted if the number of rejected records did not exceed 5 percent. If more than 5 percent of the records were rejected, the batch was 100-percent reverified. If the reject rate reached 15 percent, the entire batch was rekeyed. To qualify, the operator had to have a sequence of four accepted batches within a maximum of eight. A second series of work units was allowed before the operator's removal was considered.

After the operator qualified for process control, the sampling verification procedure was repeated for every 25th record and

the acceptance criteria was lowered to about 4 percent. Operators had to have a minimum of seven accepted batches in each sequence of 10, or else return to the qualification stage. If an operator was absent from keying for a week or more, at least one work unit had to be verified 100 percent with no more than a 2.5-percent error rate before the operator could be returned to process control. Failure to achieve this rate after three attempts led to disqualification. At all verification points, all errors found were corrected before transmission to headquarters. "Must" cases were verified and corrected 100 percent and were assigned only to keyers who had qualified for process control. To maintain their standing, these operators were not allowed to exceed a 2-percent error rate.

Correction transcription records received as a result of the review process and keyed (by operators already under process control) also were subjected to 100-percent verification. After all detected errors were corrected, this plan limited the average outgoing error rate to 1.5 percent per record.

During the first 6 weeks of processing, when nearly 8 percent of the workload was keyed, 140 operators entered training. Of these, 124 reached the process control stage, 13 failed training, and 3 failed in the qualification stage.

The table below summarizes the verification results.

Computer Processing of the Standard Report Forms

General. Processing the data by computer began in February 1975, when the first individual records were received from the

clerical operation in Jeffersonville. Thereafter, the forms were processed through each of the steps detailed below on a flow basis (as they arrived). Of the approximate 4.2 million records processed, about 2.5 million were agricultural operations under the Bureau's definition.

Formatting. The first step in the computer processing was the formatting of the data into binary records. Each computer record contained up to 30 segments, each of which held the data from one or more sections of the report forms.

The record layout included both variable- and fixed-length segments. A variable-length segment was made up of data for a series of items (subsegments), such as a particular crop, type of machinery, fertilizer, and so on. Each of the 11 variable-length segments had a code for the items contained within that segment. For example, the first three items and item codes in segment 9 were 121, soybeans for beans; 122, peanuts for nuts; and 123, dry field beans. The layout for each item contained the item code and from two to six data fields. For example, the layout for cotton contained the item code and six data fields, as follows:

Word	
1	Item code
2	Acres harvested
3	Quantity harvested
4	Acres irrigated
5	Acres fertilized
6	Tons of dry fertilizer used
7	Tons of liquid or gas fertilizer used

Table 4-5. 1974 Census of Agriculture, Regular Census Data Keying Final Verification Summary

Form type	Verification rate	Work units verified	Reports		Records verified ¹	Records in error ¹	Omitted fields ¹	Error rate ¹ (percent)	Omission rate ¹ (percent)	Decisions	
			Keyed	Verified ¹						Accept	Reject
Total forms	Total	21,546	2,164,086	2,174,489	17,742,529	374,808	341,766	2.11	0.14	15,316	2,174
	100%	1,567	189,039	188,904	1,479,845	50,789	57,860	3.43	.28	(X)	(X)
	10%	1,744	204,760	20,450	164,636	4,545	4,157	2.76	.18	1,509	211
	4%	15,183	1,662,027	66,913	547,791	10,609	9,174	1.94	.12	12,969	1,763
	Must	869	36,139	36,139	422,029	7,878	7,214	1.87	.12	257	132
	Other ²	2,183	72,121	72,121	499,520	5,466	5,772	1.09	.08	581	68
74-A1	Total	17,944	1,561,629	1,567,695	14,865,029	320,344	293,412	2.16	.14	12,750	1,899
	100%	1,205	118,649	118,530	1,148,151	39,947	45,982	3.48	.29	(X)	(X)
	10%	1,392	136,109	13,585	131,833	3,793	3,529	2.88	.19	1,188	185
	4%	12,521	1,202,881	48,373	459,875	9,172	7,975	1.99	.12	10,753	1,514
	Must	869	36,139	36,139	422,029	7,878	7,214	1.87	.12	257	132
	Other ²	1,957	67,851	67,851	479,644	5,289	5,551	1.10	.08	552	67
74-A2	Total	3,208	541,821	545,168	2,607,501	48,905	43,768	1.88	.12	2,276	229
	100%	356	69,844	69,828	329,735	10,808	11,832	3.28	.26	(X)	(X)
	10%	343	66,862	5,587	32,099	732	594	2.28	.13	313	25
	4%	2,283	400,845	16,168	77,476	1,224	1,031	1.58	.10	1,934	203
	Other ²	226	4,270	4,270	19,876	177	221	.69	.08	29	1
	Total	394	60,636	61,626	269,999	5,559	4,586	2.06	.12	290	47
Ag Serv. (74-A40)	100%	6	546	546	1,959	34	46	1.74	.17	(X)	(X)
	10%	9	1,789	178	704	20	34	2.84	.34	8	1
	4%	379	58,301	2,372	10,440	213	168	2.04	.11	282	46

X Not applicable.

¹ Totals weighted for these columns.

² Reports keyed after closeout for their State were verified 100% and tallied separately from regular 100% verification.

If any of these data fields (i.e., words 2 through 7) contained an entry, the entire subsegment was formatted (those subsegment fields not having reported entries were formatted with zeroes) and if any of the items were formatted, a segment was formatted with only those subsegments needed to carry the reported items.

The first word of each variable-length segment contained the segment number, the number of items in the segment, the number of words in the items and in the segment, followed by as many subsegments as were needed to carry the reported items.

Each of the 19 fixed-length segments consisted of a segment identifier followed by words containing data items. In the layout of these segments, every data item was assigned a fixed location within its respective segment. The segment identifier included not only the segment number, but also the actual length of the segment, pointing to the last significant data item entry. The absence of any data item before this last significant item entry was indicated by a field value of zero. The layout of the fixed-length segment for sheep and lambs, for example, was as follows:

Word

1	Segment identification
2	Market value of sheep and lambs
3	Number of sheep and lambs on the place
4	Number of sheep and lambs sold
5	Number of lambs under 1 year old
6	Number of ewes 1 year old or older
7	Number of rams and wethers 1 year old or older
8	Number of sheep shorn
9	Pounds of wool shorn

This segment was present only in the records of farms having sheep and lambs. The total number of words in the segment is nine. If there were no lambs under 1 year old and no sheep were shorn, the number of words would be seven (words 8 and 9 would be dropped) and word 5 would contain zero.

The following operations were performed in the computer format run:

1. Crop production was converted into standard units of measure for those crops showing more than one unit on the form.
2. "Landlord only" and other types of out-of-scope records that could be identified in this run were separated from the data file.
3. Invalid codes were identified and classified, and appropriate action taken, as follows:
 - a. *Invalid State, county, and farm codes.* These records were printed out and dropped from the formatted file. The A1 and A2 report forms involved were corrected and then rekeyed.
 - b. *Rejected item codes.* These were codes that were either not assigned anywhere on that particular report form or were valid crop item codes which were invalid for a specific State (e.g., codes for pineapple in North Dakota). For listing-identification purposes, the offending item code (cell code), the

item code immediately preceding and the two item codes immediately following it, together with all their associated data, were printed out. Valid item codes that appeared out of sequence, including duplications, were handled in the same manner. All offending item codes and their respective data were omitted from the formatted record. Printouts of these records isolating the offending codes were reviewed and the necessary corrections were carried to the formatted record via a correction match program.

- c. *Maximum acceptable rejects exceeded.* A limited number of errors listed in 3b above were permitted. Once this maximum was exceeded the input record was not formatted but was displayed in its entirety. The appropriate report forms were reviewed, corrected if necessary, sent through data-keying, and formatting was once more attempted.

Editing. Computer editing is the mechanized process of validating, cross-checking, and refining reported data; it involves checking for reasonableness and internal consistency so that unusual information can be verified and corrected if necessary. The computer program for the 1974 census was designed to perform certain tests and comparisons involving key ratios, such as acres harvested and yield. These ratios were tested by comparing them against tolerance limits established on the basis of experience in previous censuses and current surveys. Computer correction of errors was done by (1) rounding, (2) substituting the sum of the detail items for a reported total, or (3) imputing on the basis of one of several ratios in which the questioned component was contained.

The computer edit programs for the 1974 Census of Agriculture were necessarily long and complex. The individual computer tests and checks amounted to several thousand steps, but only a small fraction of these were required to edit the responses reported on any one report form.

The mode selected for the communication of the computer edit specifications from the subject-matter specialists to the computer programmers was the decision logic table, i.e., a tabular display of all the elements of a problem from conception to solution, with flowcharts and texts to provide additional information where necessary. Approximately 3,000 pages of decision logic tables and related materials were prepared to edit the A1 and A2 forms for the general agriculture census. (The A40 forms for agricultural services were processed separately.) This total included several rounds of revisions that were necessary to arrive at the desired precision and consistency in the results.

Computer editing was done in batches, by State, to permit faster processing of all the reports from a given State. A batch consisted of formatted records sorted by State, county, and census file number. Batches for editing were assembled by setting cutoff dates: Records received during a specified period (2 weeks early in the census and as much as 8 weeks in the later stages) became part of a batch. The last batch was processed after the analysts' review of must cases. (See p. 44.)

The batch edits of the A1 and A2 forms included supplying missing entries, reconciling the acres reported for individual crops with the acres reported as total cropland, imputing production for crops when the reported yield per acre was outside acceptable limits, and editing to assure consistency between and within the different sections of the report form. The computer edit also calculated and checked values for products sold, using average prices in each State for each production item, and these computed values were substituted if the reported value of products sold was outside acceptable limits. Furthermore, the batch edit determined whether each record met the criteria for the standard A1 form, the short A2 form, or was out of scope; and coded (classified) farm records according to size, tenure, economic class, and type of farm.

During the computer edit process, records that did not meet the minimum criteria for a farm were dropped from the data file and were transferred to the out-of-scope file. A listing of all out-of-scope reports was prepared and sent to Jeffersonville for clerical review of the corresponding forms to ensure that they had been properly keyed and classified.

The computer edit identified and retained, as representing farms, reports for those places that normally would be expected to have sales of agricultural products of \$1,000 or more. A total of 285,934 farms with sales of less than \$1,000 were included in the "all farms" group, and 32,720 farms with sales of less than \$2,500 were retained in the category for farms with sales of \$2,500 or more.

A set of 42 criteria codes was established to designate the reason a particular farm with sales of less than \$2,500 would be included. For example, if a farm usually yielded yearly sales in excess of \$2,500, the farm was included. Other codes covered expenditures, acres in various crops, livestock or poultry on hand, and so on.

For farms with sales of less than \$1,000, a set of 13 criteria codes was established. These codes simply indicated the broad type of product (cash grains, vegetables, livestock, pastureland, etc.) involved, with no minimum quantity or acreage specified.

If a record met more than one of the minimum criteria, the code for the first criterion satisfied was assigned to the record. (E.g., if a record showed that normally the value of both cash grains (criteria code 1) and cropland grazed (code 11) would qualify the farm under the census definition, the record was given the criteria code 1, for cash grains.)

In addition to determining which records were in scope, the computer edit also converted to A2 records the A1 records for farms that did not meet the criteria for A1's, and converted to A1 records those A2 records that exceeded the criteria for A2's.

When information from A2 short report forms met the criteria for A1 report forms, the additional detailed information that would have been given on the longer form was imputed on the basis of responses for farms of similar size in the same geographic area. Any A2 records converted to A1's, because more than \$40,000 in sales were reported, were coded as "must" cases. Records of the changes for these forms were printed out during the batch edit and sent to Jeffersonville for review.

Failed-edit correction. Upon completion of the batch-edit program, a failed-edit listing was produced by high-speed printer for each form that had one or more items fail the edit program. The listing displayed those items for each form that (1) had failed the edit, and (2) those that did not fail but were changed by the edit. Each page of the listing contained the items for one farm, although some farm records were two pages long.

The listings were shipped to Jeffersonville, separated, placed in State folios in lots of 500 consecutively numbered records, and matched to the report form file. The listing sheets and corresponding report forms were then reviewed by technical analysts who assessed and ensured the quality of the work as it was performed. From one to six clerks were assigned to each technical analyst and the majority of the cases were handled clerically.

Code	Action
1	Make corrections—re-edit record
2	Make corrections—bypass specified sections of the edit
3	Make corrections—bypass the edit except coding (edit section 551), Standard Industrial Classification coding (554), and summing (575)
4	No corrections—change fail-edit flag to passed edit or change FMTER (format error) flag to zero
5	Delete record from file
6	Change RD (referral disposition) code to 1—make corrections and re-edit record
7	Convert record from A2 to A1, subtract RD code 6 from RD code and proceed as indicated

An item locator code was assigned to every location within the farm data record where an edit failure had occurred. These item locator codes were used when inserting corrections in the farm data file. A file of each such correction or alteration, called the change index, was also maintained. Every time the contents of an item were altered during processing, the operation was noted in the index; the item, the content of the item before the change, and the content of the item after the change were ultimately listed on a microfilmed "universe of changes" file.

To replace a record entailed rekeying the entire report form. If corrections were not needed for a record, a referral disposition code of 4 was assigned. When there were 40 or more corrections for a farm, the form was corrected, rekeyed, and reprocessed through the computer. After technical analysts marked corrections on the failed-edit listing sheets, clerks batched them for keying by underlining the data to be keyed and inserting missing locator codes. (The underlining of data to be keyed was later dropped as unnecessary.) The corrections were keyed to tape, verified 100 percent, and transmitted to Suitland for computer matching to the data file. The corrected files were re-edited to insure that the corrections had been made properly and to determine if further corrections were necessary.

Final data merge. After batch editing and correction were completed, the corrected files for each State were merged into one file sequenced by State, county, and identification number. The following operations were also performed in this merge:

1. Unduplication. If there were two or more records with the same census file number, the first one was kept in the

data file and the rest were dropped. All the duplicate sets of records (including the record kept) were displayed for review.

2. Imputation counts. Farms were tallied by size, total value of products sold, and type, and the tallies were used to impute data for nonrespondents. (Imputation is discussed below.)
3. Certain problem data records were displayed for further review to determine if they should be corrected before the tabulations.

Imputation for nonresponse. Imputation of data for nonrespondents was done after the files were corrected, merged, and unduplicated. The procedure used was, in effect, the duplication of responses from another farm in the same county. This meant that all the data for the farm selected were counted twice. The general rule for imputation for nonrespondents was:

Number of farms to be imputed (weight doubled)=

$$I = D \left(\frac{F}{M-P-D} \right)$$

where D = number of nonrespondents on the county mailing list at the final closeout.

F = number of checked-in, in-scope farms for the county.

M = number of addresses on the mailing list for the county.

P = number of postmaster returns received for the county.

Farms were selected for duplication (doubling of weight) on the basis of their expected size as recorded on the census mailing list. Farms with expected total value of products sold of up to \$40,000 were candidates for duplication; their actual total value of products sold could be as high as \$80,000, but any farm with an expected total value of products sold in excess of \$40,000 was subject to a 100-percent followup.

Tabulating the Data

General. After the edited and corrected records had been merged, the data were ready for tabulation. Two different types of tabulations were produced by computer—analytical tabulations (by county) and tables for publication in the preliminary reports. The preliminary report tables were reviewed and, when accepted, were prepared for publication. (See ch. 6.) The analytical tabulations provided data in a detailed format that was used as an aid in locating problems in the data for over 2 million report forms. After both sets of tabulations were reviewed and the farm records had been corrected, the detail file was again tabulated for the State reports and the U.S. summary.

Analytical tabulations. The analytical tabulations were divided into two tally programs: one tallied advance miscellaneous and summary data; the other tallied items with detailed breakdowns for all farms and for farms with sales of more than \$2,500. These tabulations were then used with the change index (see p. 49) for review of the preliminary reports.

County tabulations. Data tabulated by the computer had to be translated from magnetic tape to printed documents or paper copy. The paper copy was produced by high-speed printers that were auxiliaries to the Census Bureau's computer systems. The tables thus produced were reviewed by subject-matter specialists in the following order: (1) Available comparable data for 1974 key items, (2) State and county tables, and (3) county tables.

Reviewers were provided with several tools to help them determine whether totals for a particular item were questionable. There was a substantial amount of related check data, as well as counts from the 1969 Census of Agriculture, for almost all items. U.S. Department of Agriculture (USDA) estimates for principal items were also used.

The Census Bureau staff reviewed the available comparable data for key items while State office representatives of the USDA's Statistical Reporting Service (SRS), assigned at the expense of the Bureau, reviewed the State tables and made an initial check of county tables. Most States were represented by at least one SRS statistician, although there was only one for New England States and one for Maryland and Delaware. The Texas office sent two statisticians because of the unusually large number of counties in that State. The SRS offices in Alaska and Hawaii did not send anyone; instead, tables and written instructions for review were mailed to them for examination and were returned to the Bureau with their criticisms. The SRS statisticians usually spent 1 or 2 weeks reviewing data for their respective areas. Initially, the SRS review was to take place from late October 1975 to mid-January 1976. However, the discovery of significant undercoverage problems and the implementation of a supplemental data-collection operation early in 1976 necessitated a second period of SRS review from the last week of April to the last week of July 1976. On arrival at the Census Bureau, the SRS statisticians were given a brief orientation covering census procedures, preliminary table format, analytical table and change index format, and their review responsibilities.

The county reports occupied most of the SRS reviewers' time, although this was limited primarily to reviews of the crop and livestock items. They were asked to provide notes relating to any entry they considered questionable on the basis of comparison with check data or personal knowledge, and to write their criticism on forms specifically designed for that purpose. Generally, SRS reviewers only identified potential problems.

After the SRS State representatives had finished their review, the actions taken by the Bureau staff included the following:

1. Review criticisms prepared by SRS State representatives.
2. Independently review and identify inconsistencies and potential problems, particularly for the items not reviewed by SRS statisticians.
3. Check lists of large farms from current lists and from 1969 Census of Agriculture lists to ensure that these operations were included in county and State totals.
4. Obtain reports from farm operators for large places that had not been included in the tabulations.
5. Identify and correct data-keying, reporting, and processing errors.

6. Identify and eliminate duplicate reports.
7. Assign correct State and county code numbers for large operations to ensure that these operations were tabulated in the proper State and county.

The Bureau staff in Suitland worked with individual report forms (which had been returned to Suitland after the failed-edit corrections) for the "must" cases and the very large farm operations, as well as with the preliminary reports and analytical tables. Once the review of the preliminary reports was completed and the selected individual report forms checked, the criticisms were sent to Jeffersonville for a review of the problems involving the other report forms.

County data corrections. When review of preliminary reports was complete, corrections were made to individual farm records in the same manner as they had been after the batch edit. The county tables were tabulated again for another review to ensure that problems were corrected. If any corrections had not been made, the data were corrected by computer or hand corrections were made to the tabulation printouts. The data file was corrected as often as necessary to ensure its accuracy.

Tabulations for States, divisions, regions, and the United States. County and State tables and State cross-tabulations were prepared for farms having gross sales of \$2,500 or more. Data for divisions, regions, and the United States were obtained by summing the data from the State tabulations. Many of the tables in volume II were posted from volume I tabulations, unpublished tabulations, and publications of previous censuses. Computer runs were necessary for special frequency classifications of crops and livestock and for data not published in the State volumes.

1969 historical data. The historical data for 1974 tables were taken from two sources: 1969 sales tapes and 1969 volume I tabulations.

Final disclosure analysis. The Bureau of the Census is prohibited by law from publishing data that would reveal information furnished by individual respondents. A thorough review is made of all tables prior to their publication to locate and prevent disclosure of confidential information. Part of this review, called disclosure analysis, was done for the 1974 census by computer. However, the computer programs were incapable of accomplishing the whole task; therefore, much of the disclosure analysis was done by statisticians. Figures were suppressed if they would be direct disclosures or if they could be used to reveal information about an individual operation by derivation (e.g., if adding or subtracting a subtotal from a total would expose individual data).

The guidelines for detecting disclosure of information were stricter for county data than data for States, divisions, regions, or the United States. Data for any one farm is not as likely to be identified from statistics for larger areas as from statistics for the smaller areas. Figures were not released for counties with less than 10 farms because of the possibilities of disclosure.

The established guidelines usually applied to cases of only one or two farms reporting an item. If more than two farms reported an item, the item was not considered as a disclosure unless the information to be published would reveal, by comparison of different tables, that one or two farms had 95 percent or more of the total. Exceptions in the application of this rule were generally made only for the larger specialized operations—e.g., poultry, feedlots, greenhouses and nurseries, and the raising of selected crops in areas where they were rare—any of which might easily identify a specific farm. The number of farms reporting an item was not considered a disclosure; only related information about the item was suppressed from publication.

Comparative data from the 1969 Census of Agriculture were published in several of the 1974 tables. Many tables contained the same information arranged by different classifications, so that when it was necessary to suppress a figure in one table it was necessary to delete it from other tables. In the same manner, if an item was deleted from one county table, it was necessary to delete the same item from one or more other tables.

Computer Processing of Agricultural Services Report Forms

Computer editing. The principal functions of the computer edit were:

1. Check for data-keying errors;
2. Check for clerical coding errors and/or omissions;
3. Make consistency checks on various data relationships;
4. Make completeness checks, i.e., to examine various sections of the report forms to ensure that necessary responses had been made;
5. Identify and display data on very large and other selected types of operations for professional review;
6. Provide an establishment SIC code for each report based on its primary agricultural service activity.

When an item within any record was found to require review or correction, the record was added to the printout list of failed-edit cases. The computer program included parameters that provided a basis for most of the consistency checks, including the following:

1. The kind of business (as reported in section 7 of the report form) compared with the type of service(s) performed by the establishment (as reported in section 8)
2. Total gross receipts for all services performed (the sum of all dollar entries in section 8 of the report form) compared with receipts reported in the principal county plus other counties (the sum of all dollar entries in section 9)

3. The type of agricultural service(s) performed by the establishment (as reported in section 8 of the report form) compared with the type in which the workers of the establishment were involved (as reported in section 10)
4. Total receipts from services and sales of merchandise (as reported in section 3 of the report form) compared with the sum of section 8 plus sections 11 and 12
5. The number of paid employees compared to annual payroll
6. The number of paid employees compared to the number of seasonal paid employees
7. The number of unpaid employees compared to the number of seasonal unpaid employees
8. Total annual payroll compared to total gross receipts
9. Payroll for the first quarter compared to annual payroll
10. Legally required labor expenditures compared with annual payroll
11. Voluntary labor expenditures compared to annual payroll

The items checked for completeness included the following:

1. Gross receipts for agricultural services
2. The number of unpaid workers for individual proprietorships and partnerships
3. The number of paid employees and the annual payroll for corporations and agricultural service operations with reported values of products sold of \$100,000 or more
4. Paid employees when annual payroll was reported, and vice versa for all establishments
5. Acres plowed, fertilized, etc., and bales of cotton ginned when dollars were reported, and vice versa for all establishments
6. Total annual payroll
7. Total gross receipts
8. Type of organization

If inconsistencies or incomplete data were detected, the report was flagged for review. In some instances the necessary changes were made to the record to establish consistency and completeness, but approximately 26,000 cases were flagged for clerical review by the edit program.

Correction program. The edit-reject diary printouts of all flagged cases were analyzed in Suitland by the professional staff. This phase of the data processing lasted from January through June 1976. It involved making corrections to the data for consistency and completeness, deleting duplicate cases, and overriding flags on data determined to be acceptable (i.e., making certain the edit program would not flag the data again). Corrections were often made on the basis of factors that had not been used in the design of the parameters for the edit program. The most prevalent of these factors was the primary activity of an establishment, since the lack of historical data about these activities made it impractical to prepare an edit program using parameters based on individual types of activities. The professional staff, therefore, based many correction decisions on analyses of pretest data and on experience gained during the followup phase. Other corrections frequently involved keying and clerical editing errors. All records that were corrected or were accepted without change after review were recycled through the computer, using the edit program.

Preliminary summary diary review. Once all the data had successfully passed through the computer edit, a preliminary summary diary printout was generated that listed the major data items for each record and totals of these items by county, State, type of organization, and SIC code of the establishment. This printout (1) allowed corrections of errors not previously rejected by the edit program, (2) made possible preliminary adjustments of particular statistical tables to be published, (3) provided statistical totals for significant data not included in the publication plans but meriting consideration for inclusion, and (4) supplied tabulations for one of the county tables.

When errors were detected, clerical corrections were made and keyed for transfer to the computer records. This summary diary review was intended to ease much of the burden of post-tabulation adjustments to the data, although it was anticipated that table adjustments would be necessary to avoid disclosing information about individual establishments.

Tabulation of the data. Upon completion of all corrections, the data were tabulated by computer and the totals were posted to tabulation sheets by hand. These sheets represented the format and content of the final publication tables. The basic plans for these tables had been developed during the initial planning stage. Revisions based on recommendations and working experience were made to the table plans throughout the processing stage of the census.

Review of the tabulations. All tabulations were examined to ensure that the data were reasonable and consistent. This review was performed in Suitland during August and September 1976. The clerical staff located the report forms that had to be reviewed in connection with problems in the tabulations, reviewed the table printouts for consistency of data within individual tables and among related tables, carried routine data changes to tables, assisted in the final consistency and completeness check of tables before release, and made hand tabulations for special projects. The professional staff analyzed

the data for reasonableness and accuracy, located tabulation errors, reviewed the relevant report forms, decided what data changes were necessary and how they could most efficiently be transferred to the tables, and transferred the more complex changes to the tables.

Occasionally it was necessary to decide whether changes to

individual record data were required, or if adjustments to the total would suffice. Corrections were made on the basis of further review of the original report forms. Upon completion of all tabulation changes, there was a final review to insure that all problems had been resolved. The corrected tables were released to the publication preparation staff in December 1976.