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Economic Censuses of the United States: Historical Development

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BUREAU OF
THE CENSUS

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**Economic Censuses
of the
United States:
Historical
Development**

by Charles G. Langham

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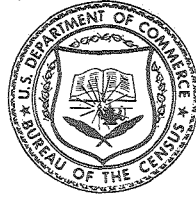
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Robert B. Voight, Chief

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ECONOMIC CENSUSES IN THE 19th CENTURY

The collection of census-type statistical data by the United States Government actually began with the first Decennial Census (1790), within a year after George Washington became President. This first census and the subsequent decennial censuses were authorized in the Constitution (Article I, Section 2), which specified that "the actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such a manner as they shall by law direct."

The 1790 and 1800 censuses were confined to a few basic population inquiries (name, race, sex, and age). The prime reason for taking these censuses was to apportion Congressional representatives and direct taxes among the States, with little consideration of providing for any systematic collection of statistical data for Government or private use. There was no substantial need for the Government to collect economic statistics because agriculture was by far the most important occupation of the American people and because the duties and powers of the Federal Establishment were narrowly defined by most political leaders.

The First "Economic Censuses"

By 1810 the fragile beginnings of industrialization were becoming manifest, encouraged by various Government bounties and subsidies and by a persistent desire among many Americans to be as independent of Europe as possible. Also, the fledgling American Government had survived the initial critical period of its existence and was beginning to exert greater influence on political and economic affairs.

Congress responded to the need for statistics on the extent of this newly developed industrialization when, in an Act passed on May 1, 1810, it directed the Federal marshals and their assistants responsible for conducting the 1810 Decennial Census to take "an account of the several manufacturing establishments and manufactures within their several districts, territories, and divisions." No specific questions were outlined, and no report form was prescribed; these matters were left to the discretion of the Secretary of the Treasury.

To facilitate the collection of data, the Treasury Department divided manufactured products into 27 broad categories, encompassing more than 200 kinds of goods. As they conducted the population enumeration, the marshals and their assistants were to visit the manufacturing establishments in their assigned territories to obtain information, generally on the amount produced and value of products manufactured. A total of \$40,000 was allocated to pay the marshals and assistants for taking this "account of manufactures." These officials performed their tasks during the period August 1810-July 1811. However, it was not until March 1812 that Congress authorized \$2,000 for the Treasury Department to employ a statistician to "digest and reduce returns" and prepare

a statistical report. Mr. Tench Coxe¹ was hired for this purpose, and his report was published in May 1813. This report basically covered the kind, quantity, and value of goods manufactured and the number of manufacturing establishments in each State, territory, district, and county. In his summary, Mr. Coxe candidly admitted that there had been serious undercounting and omissions in the enumeration. Although the report indicated total manufactures valued at about \$173 million, Mr. Coxe estimated that the actual figure probably exceeded \$200 million.

The War of 1812 (1812-1815) and the Napoleonic Wars in Europe caused an interruption of American trade with Europe; the scarcity of imported goods (and the diversion of capital from mercantile to industrial investments) encouraged the further development of U.S. manufacturing. Although agriculture was still the predominant occupation, about 12 percent of the labor force in 1820 was employed in "manufacturing and mechanical arts." As might be expected in view of these developments, several additional manufacturing inquiries were included in the 1820 Decennial Census. A total of 14 questions were asked to elicit information on location of establishments, raw materials used (kind, quantity, and cost), number of employees, machinery, expenditures (capital, wages, contingent expenses), and production (value, demand, and sales). Again, the data were collected by the Federal marshals and their assistants, and an abstract was published, this time under the auspices of the U.S. Department of State. Statistics were published for each State, territory, and district, but there was no attempt to compute U.S. totals because the data were again admittedly incomplete. This incompleteness was attributed to insufficient funds allocated to pay the enumerators and the fact that many establishments apparently neglected (or refused) to provide the required information. In addition, 1820 data were not comparable to the 1810 statistics because household manufactures (goods produced at home) were counted in 1810 but not in 1820.

Economic Censuses Discontinued, Resumed, and Augmented

Perhaps as a result of these unfavorable experiences (and the comparatively slow rate of economic growth in the 1820's), no attempt was made to collect economic statistics in the 1830 Decennial Census. The 1830's witnessed a sharp acceleration of economic activity that reached boom proportions in 1836-37, followed, however, by the country's first great depression (1839-43). Although President Martin Van Buren viewed the Federal Government as having neither the power nor the duty to act firmly to ease the crisis, there was considerable pressure to resume the collection of economic statistics and to expand the coverage.

¹Tench Coxe (1755-1824) was a political economist and a member of the Continental Congress who had held several government posts, including Assistant Secretary of the Treasury, U.S. Commissioner of Revenue, and Purveyor of Public Supplies.

The Decennial Census of 1840 therefore encompassed not only manufacturing but also fishing, commerce, and mining. One special form, "Schedule of Mines, Agriculture, Commerce, Manufactures, Etc.," was utilized by the marshals and their assistants to collect data on all of these subjects. Manufacturing was divided into 30 categories on the basis of the manufactured product (machinery, paper, furniture, etc.), plus an "all other manufactures" classification. In general, statistics were compiled on the quantity and value of goods produced, amount of capital invested, number of employees, and number of establishments.

Despite the retarding effects of the War of 1812, commercial fishing increased substantially during the first part of the 19th century. There was extensive growth in cod fishing and mackerel fishing, and this period also witnessed the beginnings of large-scale commercial fishing for herring, halibut, and oysters. Whaling activities expanded markedly after 1815 on the Atlantic Coast and after 1835 on the Pacific Coast. Fishing was thus a relatively significant industry by 1840 and a fitting subject for data collection in the 1840 Decennial Census. Commercial fishermen were asked about the quantity (and sometimes the value) of fish products taken, the number of men employed, and the capital invested.

Commerce and trade activities also accelerated during the early and middle decades of the 19th century, as evidenced in part by the fact that volume of trade (total imports plus total exports) increased almost two-fold, from about \$126 million in 1821 to approximately \$248 million in 1841. To measure the extent of commercial activities, the Decennial Census of 1840 included, for the first time, a series of questions on number of business enterprises in various categories (commercial houses in foreign trade, commission houses, lumber yards, grocery stores, etc.), capital invested, and number of employees.

Few statistics on mining are available for the years before 1840, but there is strong evidence that considerable expansion also occurred in this activity during the period 1800-1840.² The planners of the 1840 Decennial Census sought to remedy the dearth of information on mines and mining by including, for the first time, questions on this subject. A series of questions were asked on the following classifications of minerals: iron; lead; gold; other metals; coal; domestic salt; and granite, marble, and other stone. These inquiries generally covered quantity and value of minerals produced, men employed, and capital invested in mining operations.

The returns for manufacturing, fishing, commerce, and mining were tabulated and statistical tables were published on the "commerce and industry of the country." However, as in the 1810 and 1820 censuses, considerable undercoverage was acknowledged in 1840 census results. Many historians and statisticians consider the economic

²The available sketchy statistics give evidence of this growth. For example, an estimated 108 thousand short tons of bituminous coal were mined in 1800, but in 1840, 1.3 million short tons were extracted. Lead mining yielded only 1,000 short tons in 1800 but 17,000 short tons in 1840.

data tabulated and published for these three censuses to be of little value except as indicators of the gross outlines of manufacturing development. For example, Messrs. Robert C. Morgan and W. A. Shannon, Treasury Department statisticians, indicated in a technical paper prepared for the 34th Congress (1855-56) that economic census data before 1840 are almost worthless.

These inauspicious beginnings of economic census taking resulted from several interrelated factors, in addition to the customary handicaps faced by the early census takers, such as wide geographic dispersion, poorly defined boundaries, and inadequate transportation. The Federal marshals who supervised the field operations had many other duties and often could not devote adequate time and attention to the census. The marshals' assistants who conducted the actual enumeration often received sketchy instructions or no instructions at all. Although they might not normally have required detailed training or instructions to obtain answers to straightforward population questions (e.g., age and sex of members of a household), it is reasonable to assume that they might have had some conceptual or practical problems eliciting answers to more complex economic questions (e.g., the cost of raw materials consumed in manufacturing during the year).

Even assuming that the enumerator was perceptive enough to know what information he was seeking and how to ask for it, there was still a serious question as to whether the respondent could and would provide it. The prevailing philosophy in political economy was that of *laissez faire*--minimal role of government in economic affairs--and many entrepreneurs were suspicious and uncooperative when asked to provide information about their businesses to Government agents.³ In other cases, the census takers found that the respondents' records were inadequate or nonexistent (a common situation for new enterprises in a developing economy), and the owners or operators simply could not provide more than sketchy estimates.

Tabulating the statistics also presented problems because, in most cases, the Federal marshals supervising the enumeration had to compile and classify the data for their jurisdictions and generally prepare tables for publication. This decentralization inevitably introduced some irregularities in the reported information because the marshals, who were not trained statisticians, frequently used divergent procedures in performing these duties.

Improvements in the 1850 Census

The evident inaccuracies in the 1840 census (for both economic and demographic data) led to considerable debate in Congress during the 1840's, and several measures were passed in an effort to improve the 1850 Decennial Census. In March 1849 an Act was passed establishing a Census Board, with the Secretary of State,

³The 1840 census marked the first evidence of official concern with the need to regard census data as confidential. Administrative instructions to the marshals admonished them "to consider all communications made to him in the performance of his duty, relative to the business of the people as strictly confidential." Similar instructions were issued in the 1850, 1860, and 1870 censuses.

the Attorney General, and the Postmaster General as members. This Act also provided that a full-time secretary for the Census Board would be appointed by Congress, at an annual salary of \$3,000; in effect, this official functioned as the director of the census. The Board was given authority to design and procure suitable forms for the 1850 census, including forms not only for collecting the information but also for tabulating results and compiling the statistical tables. The Congressional Act creating the Census Board also contained specific instructions that data be collected and published on manufacturing, mining, fishing, and commerce to present a "full view" of the industrial development of the United States. The Census Board consulted with prominent statisticians in Government and the academic and business communities to develop six questionnaires, one of which (Schedule 5) was for the collection of the economic data. It was to be completed by each corporation, company, or individual accounting for annual production valued at \$500 or more for the year ending June 1, 1850. The 14 inquiries included name of business, manufacture, or product; amount of capital invested in real and personal estate in the business; quantities, kinds, and values of raw materials used; kinds of motive power used (water or steam); machinery, structures, or resources used in the manufacturing process; average number of male and female workers employed; average monthly cost of male and female labor; and quantities, kinds, and values of annual product. The questionnaire for social statistics included six questions on wages and prices, on average monthly wages for a farm laborer (with board), average daily wages for a day laborer (with and without board), average daily wage for a carpenter, average weekly wages for a female domestic worker (with board), and price of board to a "laboring man" per week. (Similar questions were included in the 1860 and 1870 censuses.)

The enumerators were supplied with written instructions on how each question should be answered and examples of properly completed questionnaires. In addition, although the Federal marshals still supervised field operations, they were relieved of the responsibility of compiling and assembling for publication the statistics for their respective jurisdictions. Instead, the classification and compilation of data preparatory to their publication were performed in a central office in Washington, D.C. General census results were published in June 1853, and partial data for manufactures became available in September 1854, but complete economic statistics for the 1850 census were not published until December 1859.⁴ The total value of manufactures (including fisheries and the products of mines), as reflected in the 1850 census, exceeded \$1 billion. This represented a fivefold increase over the \$200 million estimated for 1810. Although some undercounting was acknowledged, most statisticians have concluded that 1850 census data--both economic and demographic--are considerably more accurate than in previous censuses.

⁴The Census Office (which was under the jurisdiction of the newly created Department of the Interior) was disbanded on two occasions as the various census reports were completed. Congress did not actually authorize the preparation of 1850 economic census reports until June 1858, at which time a clerical staff had to be reassembled.

Part of the improvement is attributed to the efforts of Mr. Joseph C.G. Kennedy (1813-1887). Mr. Kennedy, a statistician and Pennsylvania newspaper editor-owner, served as secretary of the Census Board in 1849-50 and was appointed superintendent of the census office in 1850. He resigned in 1853 to become U.S. representative to the first and second International Statistical Congresses in Brussels (1853-1854), during which he consulted with leading European statisticians and became familiar with government statistical programs in Europe. Mr. Kennedy was reappointed superintendent of the census office in June 1858 to supervise the preparation of the report on economic statistics. At the completion of this assignment, he was selected as superintendent of the 1860 Decennial Census.

The "Kennedy Report" and the Civil War

The 1860 Decennial Census was conducted under the same basic procedures followed in the 1850 census. Although there were some minor modifications of the questionnaires used to collect demographic data, the 14 economic inquiries were identical to those of the 1850 census. Four census volumes were published, including one devoted exclusively to economic statistics. A major innovation was the analysis of the census statistics prepared by Superintendent Kennedy. Mr. Kennedy used the census data as a basis for describing "all the great elements of a nation's prosperity as they existed in the year 1860."

In his section on "products of industry" (included in the Preliminary Report on the Eighth Census, published in 1862), Mr. Kennedy described the increasing impact of manufacturing and commerce in the United States, estimating that one-third of the entire population in 1860 was supported, directly or indirectly, by manufacturing. His report encompassed a comparative analysis of the various industries in which he interpreted the data to show how and why sectors of the economy expanded, stabilized, or decreased and to illustrate interrelationships among the factors of production and socioeconomic factors.

For example, he credited the expanded use of the sewing machine in industry with adding "thousands of industrious females" to the labor force, as well as promoting the growth of the garment industry. He praised the "cultivated intellect" of the Federal Army mobilized for Civil War duty and cited the increasing number of printing presses as being a prime factor in making books and newspapers readily available for the average citizen to improve his intellect.

The Civil War had a marked effect on economic development in both the North and the South. The need for war materiel provided major stimulation to industry, particularly in the North, where merchant capitalism was supplanted to a large degree by industrial capitalism. Wartime requirements for woolen cloth, clothing, iron, guns, munitions, and other products led to the use of production methods which hastened the Industrial Revolution in the United States. The need to mobilize a Federal Army of more than 2 million men brought an attendant economic mobilization, the first in the Nation's history. The Federal Government actively encouraged industrialization during and after the Civil War by tariff protection,

a central banking system, large grants to railroads, and generally conservative monetary policies.

Faced with a naval blockade and an economy based on cotton, the Confederate Government attempted to develop manufacturing. Industrialization increased (particularly cotton cloth and leather goods), and the Government took over some essential industries. In the wake of the war, with Negro slavery ended and the plantation system largely eliminated, the South was forced to develop a more diversified economy emphasizing manufacturing and commerce.

The Civil War emergency thus compelled the Federal Government to adopt explicit policies to promote industrial development. With the implementation of such policies--which continued after the war--came an increased need for and interest in economic statistics, statistics which could best be supplied through the periodic censuses.

Economic Censuses and the Industrial Revolution

Beginning in the middle of the 19th century (but at an even more accelerated pace after the Civil War), American society was transformed by the rise of industrialism. Many factors, including benign Government policies, encouraged this transformation. There was a successful blend of abundant natural resources, adequate supplies of capital and labor, technical advances in virtually all industries, readily available markets, and rapidly expanding and improving transportation networks. Before 1860 the American economy was basically agrarian, but by 1900 the value of manufactured goods was double that of agricultural products. During that 40-year period, the United States advanced from fourth place to first place among the world's industrial nations, as measured by the value of manufactures.

The following statistics, all collected in economic censuses, reflect this expansion: In 1859 there were only about 140,000 industrial establishments in the country, employing 1.3 million workers and producing goods with a gross value of \$1.9 billion. By 1899 there were over 500,000 establishments providing jobs for 5.3 million workers and producing goods with a gross value of \$13 billion. Value added by manufacture increased from \$854 million in 1859 to \$5.6 billion in 1899.

Industrialization led to specialization, the growth of huge combinations and monopolies, and the concentration of economic power, all of which had direct ramifications for the economic census takers. As specialization increased, it became more difficult to develop general questions applicable to all establishments. Many unique schedules, tailored to the characteristics of each industry, had to be designed in order to obtain meaningful statistics. At the same time, the concentration of economic power (and the frequent abuse of that power) brought a growing public demand for Government regulation of business, which culminated in the antitrust movement. As Government exercised increasing power over economic affairs, it required more and better data upon which to base its far-reaching decisions.

In 1869-70, Congress attempted to draft new census legislation to supercede the 1850 law under which the 1850 and 1860 censuses had been taken, but which was deemed inadequate to meet the changing conditions of 1870. However, agreement could not be reached, and the 1870 Decennial Census had to be conducted in accordance with the provisions of the old law. The 1870 questionnaire for "products of industry" was modified slightly to collect additional or better information on machinery and machine power sources, age of youthful workers, cost of labor, and number of months the establishment was in operation, but the census volume on "statistics on industry and wealth" contained basic tabulations closely resembling those of 1850 and 1860. Although there were some innovations in 1870 (e.g., the use of tallying machines and the introduction of maps and charts to portray census results), it was not until the 1880 census that major changes in economic data collection were implemented to meet the changes brought by the Industrial Revolution.

Economic Censuses Adjust to the Times: The Censuses of 1880, 1890, and 1900

A new census law for the 1880 census, passed in March 1879, made provision for the Nation's changing economic structure. This law provided for (1) many additional special schedules tailored to various specialized industries and businesses, (2) expansion in the scope of the censuses, (3) utilization of census supervisors and "experts" to conduct the census, instead of the Federal marshals, and (4) a requirement that supervisors and enumerators take an oath not to reveal "any information contained in the schedule [i.e., questionnaire], lists, or statements obtained by me to any person or persons, except to my superior officers."⁵

The number of general economic questions was expanded to 29, and there were 49 special questionnaires designed for particular industries in the manufacturing area. The 49 special questionnaires contained more than 2,000 inquiries. Although there was considerable overlap of questions (i.e., the same item appearing on several special questionnaires, or on the general questionnaire and also one or more special questionnaires), more than 700 of the inquiries were unique. The number of questions on the special manufacturing questionnaires ranged from eight (on a supplemental questionnaire for forges and foundries) to 141 (on a questionnaire for cotton manufacturers).

Whereas questions on mining and mineral industries had been included on the "products of industry" questionnaire in the 1850, 1860, and 1870 censuses, 42 special questionnaires were used to collect data on this subject in the 1880 census. These special questionnaires contained a total of almost 3,000 inquiries, including over 1,600 unique items. The questionnaires for coal mines and copper mines contained more than 200 questions, but the median number of items on the special questionnaires for minerals was 53.

⁵Census workers were subject, upon conviction, to a fine up to \$500 for communicating "to any person not authorized to receive the same, any statistics of property or business" reported on a census questionnaire.

Five special questionnaires were used to compile statistics on commercial fisheries. The 87 questions generally elicited information on the amount and kind of fish taken, type of equipment used, employment, and finances. There was a basic report form for all commercial fishermen, plus more detailed questionnaires for dealers in fresh fish and dealers in salt fish, and two for river fishing activities.

As the tempo of the Industrial Revolution accelerated, there was rapid growth of the transportation industry (particularly railroads) and the communications industry. The first transcontinental railroad was completed in 1869, and rapid construction of new railroad facilities was manifest throughout the latter decades of the 19th century. Track mileage increased from 31,000 in 1860 to 93,000 in 1880 and to 167,000 in 1890. The telegraph industry was given impetus by the Civil War and the Nation's westward expansion. In 1854, there were only 34,000 miles of telegraph wire, but by 1880, 291,000 miles of wire were carrying over 30 million messages annually. The growth of the telephone industry was even more expeditious: The first commercial telephone exchange was opened in 1878, only 2 years after the invention of the instrument, and by 1880, 54,000 telephones were in use.

Although some data on telegraph facilities were collected in the 1850 census, the 1880 census marked the first major effort to compile detailed statistics on transportation and communications. Congress directed that the Superintendent of the Census collect and publish data on steam railroads, steamboat companies, express companies, and telegraph and telephone companies. Seven special questionnaires (466 inquiries) were utilized for this purpose. Most of the questions (375 items) were designed to compile voluminous statistics on the financial and physical characteristics of railroads. Financial characteristics included income, expenses, and analysis of earnings, while physical characteristics encompassed such things as track mileage, amount and kind of rolling stock (locomotives and cars), and fuel used to power locomotives. A detailed report was requested from each railroad, to provide information on virtually every facet of its operations, even including a tabulation of employees and others killed or injured in accidents.

In addition to the questions about current railroad characteristics, there was a special inquiry on history of construction, from which statistics were tabulated on mileage built and existent, by groups of States, for individual companies, annually from 1830 to 1880. The Superintendent of the Census reported that information was received from every railroad known to exist in 1880. The instructions accompanying the questionnaire indicated that "in cases... in which the records have been lost, the officers of such companies and roads are requested to obtain... this information in the best form possible. The recollection of officers and employees long in service of a road may be used... if more reliable data be not accessible."

Inquiries on the same general subjects (but fewer and in less detail) were directed to steamboat companies (21 questions), express companies (30 questions), telegraph companies (24 questions), and telephone-telegraph companies (16 questions).

The rise of organized labor was still another product of the Industrial Revolution in the United States. The greatest of the early labor unions, the Knights of Labor, was organized in 1869, and the labor movement grew sporadically during the latter decades of the 19th century, confronted by generally unfavorable public opinion and a pro-business attitude in Government and the courts. At the same time, business and industrial leaders with common interests frequently formed trade societies and associations. Industrial unrest, with its byproducts of strikes and lockouts, accompanied the growth of organized labor. The 1880 census--for the first and only time--included a series of inquiries on labor unions and trade societies (number, objectives and methods, membership, receipts, and expenditures) and on the number, location, causes, and results of strikes and lockouts during calendar year 1880. Four special questionnaires containing a total of 101 questions were used to collect this information.

A special survey on wages and prices was included as part of the 1880 census. Three special questionnaires were designed to collect statistics on wages in the manufacturing industries and in the building trades and on average retail prices of the "necessaries of life." A total of 167 questions were asked on these subjects.

With the concentration of economic power and the growth of huge companies and combinations, the individual entrepreneur was forced to assume more and greater risks from fire, theft, and natural disaster. Many entrepreneurs sought protection against these risks--protection which could best be provided by transferring the risks to private insurance companies.

The first casualty insurance policy was not issued in the United States until 1832, and the first fidelity bond, 1840. But by 1860, the insurance industry had grown to the extent that a few questions on this subject (primarily on life insurance) were included in the 1860 census. Life, fire, and marine insurance companies were included in the scope of the 1880 census, and 15 special questionnaires were used to compile statistics on the organizational characteristics, finances, insurance in force, and other characteristics of insurance companies. However, considerable difficulty was encountered in collecting and tabulating the data, and, except for a preliminary statement in the statistical compendium, no report was issued on this subject.

The new census law provided for major changes in personnel procedures. "Supervisors of census," appointed by the President and confirmed by the Senate, assumed administrative duties from the Federal marshals, who had been overseeing the decennial censuses since the first one in 1790. In the economic area, "experts" and "special agents" (not regular enumerators) were authorized to collect, classify, and analyze statistics on manufacturing, mineral industries, and commercial fisheries in 279 large cities and towns. These specialists were typically college professors, engineers, economic statisticians, and others with training and experience in the appropriate subject-matter areas. For example, three engineering professors (George F. Swain and Dwight Porter of the Massachusetts Institute of Technology and James L. Greenleaf of Columbia College's School of Mines) were special agents responsible for analyzing the statistics on water power

used in manufacturing and preparing a report on this subject.

The following industries were assigned to specialists in the designated areas: Manufacturing of iron and steel; cotton, woolen, and worsted goods; silk and silk goods; chemical products and salt; coke and glass; and all branches of commercial fishing and mining. The experts and special agents were paid at a rate not to exceed \$6 per day plus expenses, while the regular enumerators collecting economic data in other areas were paid \$0.15 for each establishment reported on the general questionnaire and \$0.25 for each establishment reported on the special questionnaires.

A new policy of releasing periodic bulletins containing preliminary census results was initiated for the 1880 census. The statistical compendium summarizing census data was published in January 1882. The basic census volumes reporting manufacturing statistics and transportation-communications data were released in October 1883, and the mineral industries volume, July 1886. Several special monographs (e.g., on water power used in manufacturing; precious metals; and petroleum, coke, and building stone) were published in the mid-1880's.

The economic statistics compiled in the 1880 census were more comprehensive than in any previous census in the United States. The use of experts and special agents generally resulted in more complete and consistent returns, which facilitated the tabulation and publication of more accurate data on the Nation's economy.

The 1890 census followed the basic procedures established for 1880, and in many cases the same questionnaire formats were utilized. The 1880 experience of employing experts and special agents to compile economic data in selected places was deemed so successful that, for the 1890 census, specialists were used in 1,042 important manufacturing and commercial centers. Another 1880 innovation--that of issuing bulletins announcing preliminary census results--was also extended for the 1890 census. During the period 1890-1895, more than 6,000 pages of preliminary bulletins were released, including a substantial amount of economic data.

The 1890 census also marked what was probably the first use of "administrative records" (records used by governmental or private organizations to administer programs or in day-to-day operations) to compile economic census data. Congress directed that statistics be collected on the recorded indebtedness (i.e., real estate mortgages) of private corporations and individuals. Special census agents were sent to real estate recorders' offices to abstract information about mortgages made during the period 1880-1890. Information abstracted included a description of the property, provisions of the mortgage, and the addresses of the mortgagor and mortgagee. Then, questionnaires (and postage-free return envelopes) were mailed to the mortgagors, who were asked to supply additional information about their mortgage (whether or not it had been fully paid and, if not, how much was owed) and return the completed report form to the census office.

The inquiries on transportation were expanded considerably, with coverage extended to sailing vessels and rapid-transit facilities in cities. (Rapid-transit facilities primarily included electric railroads, which became widely used in the 1880's. The first electric railroad was built in Kansas City in 1883, and, by 1888, there were 13 electric rail systems in use in American cities.)

The 1900 census⁶ included questions on the following economic subjects: Manufactures, mines and quarries, street and electric railroads, and, for the first time, central electric light and power stations.

The scope of the manufactures census was limited by law to an exact parallel of the 1890 census. Information was generally compiled on number of establishments, capital invested, number of wage earners and total wages paid, cost of materials, and value of products. One general and 32 special questionnaires were used (a considerable decrease from the 76 special manufacturing questionnaires utilized in the 1890 census). Most manufacturing returns were submitted on the general questionnaire (about 530,000 of the 644,000 total returns), but there was still some criticism from respondents that the special questionnaires required too much information in too much detail. According to the chief statistician for manufactures, Mr. S. N. D. North, "experience has again demonstrated that it is impossible to obtain from the great body of manufacturers of the country... explicit replies to the somewhat intricate questions which appear on these schedules."

Special agents were again employed to compile manufacturing data in selected areas: A total of 1,891 specialists, supervised by 20 "expert special agents," were assigned to these duties in 1,340 cities and towns. There were 59 special bulletins prepared on various special subjects in manufacturing, such as shipbuilding, slaughtering and packing, and lumbering. Bulletins on manufacturing were also released for each of the States and territories except Alaska. Final manufacturing data were published in four volumes and summarized in a statistical abstract.

Statistics on mines and quarries, street and electric railroads, and central electric light and power stations were initially published in bulletins and later in final reports somewhat less detailed than the bound volumes of manufactures statistics. Data on mining covered the same general topics as the manufactures statistics (number of mines and mine operators, wage earners and total wages, cost of supplies, other operating expenses, and quantity and value of minerals extracted), published by geographic area and by type of mineral.

For street and electric railroads, statistics were assembled on such topics as number of companies, length of rail lines, cost of construction and equipment, employees, and passengers. Data compiled for central electric light and power companies included number of

⁶Statistics for manufacturing are for the year 1900. Data for mining, street and electric railroads, and electric light and power stations are for 1902 but these results were released as part of the 12th Decennial Census publication series.

stations, cost of construction and equipment, earnings, expenses, and power generated.⁷

Thus, the 19th century witnessed a major growth in the scope and coverage of economic censuses which roughly paralleled the growth of the American economy. The 1810 census encompassed only three broad inquiries on manufacturing, but the 1890 census included more than 8,000 inquiries (or levels of detail) relating to manufacturing, mining, fisheries, insurance, mortgages, and transportation. The common pattern was that a partic-

⁷Data on power companies were actually collected in the 1902 census of electric light and power industry. These censuses were conducted quinquennially during the period 1902-1937.

ular segment of the economy, previously not included in government data-collection activities, would experience notable expansion, often encouraged by various external variables such as war or discovery of new methods or resources. In the wake of this growth, authorities in Government and the private sector would express a need for statistics by which to measure the characteristics of the developing industry.

The relationship between government and business and the prevailing economic philosophy in Government were also factors. As the Government expanded its role in regulating the economy and turned away from laissez faire in the purest form, it required more data and better data upon which to base future decisions and evaluate past decisions. Economic censuses in the 19th century could not and did not develop in a vacuum. Instead, they reflect the currents of the Nation's economic history.

ECONOMIC CENSUSES IN THE 20th CENTURY

At the beginning of the 20th century, the United States found itself the world's leading industrial nation, with an economy characterized by the dominance of manufacturing. During the second half of the 19th century, economic progress had been reflected by appreciable increases in per capita real income and reduction in the length of the work day. Despite these advances, violent economic fluctuations buffeted the Nation periodically, bringing bank failures, stock market panics, lengthy depressions and recessions, and major unemployment.

Government decision-makers, members of the academic community, business leaders, and other experts entered the new century faced with an urgent need for more data--and more current data--on the burgeoning but unpredictable economy. In March 1902, two important steps were taken to meet this need. First, Congress directed that "in the year 1905 and every 10 years after that, there shall be a collection of the statistics of manufactures." This was in addition to the coverage of manufacturing in the decennial censuses, so it actually meant that data on this topic would be compiled every 5 years (quinquennially). Secondly, the Bureau of the Census was established as a permanent agency in the U.S. Department of the Interior (and later transferred to the newly created Department of Commerce and Labor). It was thus possible to retain a certain number of persons familiar with census work and provide an organization to collect certain data (e. g., manufacturing statistics) during the interval between decennial censuses.

Enumerations on Specialized Economic Topics, 1902 to 1937

The Congressional Act establishing the Census Bureau as a permanent agency also authorized quinquennial censuses of electrical industries beginning in 1902 and decennial censuses of water transportation beginning in 1906. The censuses of electrical industries additionally encompassed street railways and telephone and telegraph companies. The "street railways" category was expanded in 1922 to include motor buses and in 1932, trolley buses. The "telegraph" classification included only land telegraph and ocean cable systems for 1902, but the definition was enlarged for 1907 to take in wireless systems. These censuses of electrical industries were conducted quinquennially until they were discontinued after 1937. The censuses of water transportation were taken for 1906, 1916, and 1926, after which they were discontinued.

Other enumerations on special economic topics included a census of the express business for 1907 and a 1908 census of commercial fisheries conducted in close cooperation with the U.S. Bureau of Fisheries. In general, all of these censuses were taken as combination mail-out/mail-back and field canvass operations.

Censuses of Manufacturing and Mineral Industries, 1905 to 1920

The first quinquennial census of manufactures was taken in 1905, covering the year 1904. According to the provisions of the law, this census was confined to manufacturing establishments under the "factory system," excluding the neighborhood and household industries and hand trades⁸ which had been included in previous censuses of manufactures. To provide for comparability, the 1900 manufactures census results were retabulated under the new definition. When neighborhood and household industries and hand trades were excluded from the 1900 results, the number of manufacturing establishments was reduced from about 509,000 to approximately 205,000, and value of manufacture, from \$5.5 billion to \$4.6 billion.

The schedules for the 1905 census were the same as those used in 1900, and the 1905 bulletins and final reports contained the same basic tabulations (number of establishments, employment, capital invested, cost of manufactures and expenses, value of products, and value added by manufacture). Statistics were tabulated for 339 separate industries and for the usual geographic areas.

Data-collection procedures for the 1905 census had to be modified because, for the first time, the manufactures census was not conducted in conjunction with the population census field enumeration. A card index containing names and addresses of manufacturing establishments was constructed on the basis of 1900 census results, city directories, trade publications, State and local government lists, and similar sources. Then, in October 1904, "preliminary circulars" were sent to these establishments, asking that they answer a few questions (name and address, period of operation, and kind of business). Based on the results of this "precanvass," the card index was updated, and census questionnaires were mailed to the establishments in early December 1904. Then, beginning in January 1905, 835 canvassers (regular Census Bureau employees and temporary employees hired for the duration of the operation) conducted a field enumeration of companies which had not completed and returned their questionnaires. The report of the 1905 census indicates that although "many" questionnaires were returned by mail, "most" of the returns were secured in the field operation. (No specific figures on rates of return were given.)

Similar procedures were used in the 1910 census, which included mines and quarries in addition to manu-

⁸Examples of these industries include custom tailoring, carpentering, taxidermy, and, in general, contract work done for individual customers. Also excluded were establishments which produced products with an annual value of less than \$500.

facturing. Manufacturing establishments were given the opportunity to complete and mail in questionnaires, but, again, most returns were secured in the field by special census agents. A total of 1,227 special agents, plus about 100 regular Bureau employees, were assigned to canvass the factories, mines, and quarries. In a few sparsely settled areas, population census enumerators were also required to obtain the manufacturing and mining returns.

The coverage of the 1910 census differed from that of 1905 only in that reports were secured, for the first time, from custom sawmills and steam laundries. However, the number of industries for which a separate tabulation was published was reduced to 264, mainly as a result of consolidating some of the 1905 categories.

The Act authorizing the 1910 census also strengthened the confidentiality restrictions, particularly as they related to economic data, and it was the first law placing a restriction on the publication of census statistics. As a matter of administrative policy, responses on questionnaires for earlier economic censuses had been considered confidential, but the 1910 law specified that information furnished by business, manufacturing, and mining establishments "shall be used only for statistical purposes for which it is supplied. That no publication shall be made by the Census Office whereby the data furnished by any particular establishment can be identified, nor shall the Director of the Census permit anyone other than sworn employees of the Census Office to examine individual reports."

The Census Bureau acknowledged the importance of confidentiality by noting in the volume containing 1910 manufactures census results that "it is essential to the success of the manufactures census that every concern should be assured explicitly by law that its business will not be disclosed to competitors, to the general public, to state and local officials, or even to officials of the Federal Government outside of the Census Bureau. Only with such a pledge of confidential treatment can the Bureau of the Census expect manufacturers to furnish data promptly and accurately."

The 1915 manufactures census again combined a mail-out/mail-back enumeration with a field canvass by employees detailed from the permanent complement of the Census Bureau and by special agents. Data were tabulated for the year 1914 for 344 industries plus 271 industry subgroups. Plans called for the prompt publication of bulletins containing preliminary results, but when the United States entered World War I in April 1917, the preparation of these bulletins (and of the two volumes and the abstract containing final results) was delayed because of demands on the public printer for war-related work. The last of the bulletins was not issued until August 1918, just before the census volumes were published.

The 1920 decennial census included manufacturing and mining operations for the year 1919. For manufactures, the 1915 definitions and procedures remained in effect, with one exception: In addition to collecting data for establishments which had not returned questionnaires, the field enumerators were also asked to correct defective questionnaires (i.e., those with inconsistent or incomplete responses) which had been mailed back by respondents. A total of 358 industries and 98 industry

subgroups were covered, but data for seven industries had to be combined to avoid disclosure of data for individual firms. For the census of manufactures, three volumes and an abstract (plus the usual preliminary bulletins) were published.

For mining, statistics were published generally on geographic distribution of operations, lands controlled by mining operators, character of organization, scale of operations, and amount and kind of power used. One general questionnaire and several special questionnaires were utilized. The data were published in one volume, which contained a general report and analytical tables, and tabulations for States and selected mineral industries. The tables were arranged to facilitate comparisons with the mining statistics published annually by the U.S. Geological Survey.

Wartime Data Needs and Biennial Censuses of Manufactures

The mobilization of economic resources for World War I led to substantial expansion of American industry. Production of metals and minerals in general (and iron, steel, and chemicals in particular) increased dramatically. The war emergency accelerated the decline of laissez faire and the trend toward Government regulation of the private sector. Various Federal boards and agencies with extraordinary economic powers (such as the War Industries Board and the War Labor Board) were established for the duration of the war, and the Government took over operation of the railroads. The demands of the war effort and postwar demobilization and reconversion forced the Government to make decisions traditionally reserved for the private sector. (For example, the War Industries Board had authority to determine priorities of production and distribution, regulate production of civilian goods, and fix prices of raw materials.) The temporary organizations compiled detailed statistics to assist them in making decisions and evaluating progress, but, in many cases, lack of information still handicapped their efforts. Economic controls were removed beginning almost immediately after the Armistice was signed, and the laissez faire philosophy regained popularity in the 1920's, with the return to "normalcy." However, the Government's interest in economic affairs (and its data needs) continued at a relatively high level.

Congress demonstrated these needs when, in the Act providing for the decennial census of 1920, it directed the "collection for the years 1921, 1923, 1925, 1927, and for every tenth year after these years, the statistics of the products of manufacturing industries." Since the decennial censuses would cover the years 1929, 1939, etc., censuses of manufactures were thus authorized on a biennial basis.

The reason for compiling these data, as indicated in the report of the 1921 census, was to "show (1) the absolute and relative magnitude of the various branches of industry, and their growth and decline, and (2) the industrial importance, and the increase or decrease in industrial importance, of individual States and large cities." Statistics were to be collected which would "throw light upon certain matters of economic and sociological importance," such as the size of establishments and hours of labor.

To reduce the expense of the biennial censuses and expedite processing and publication of results, two primary actions were implemented for the 1921 census. First, certain items which had been included in the quinquennial censuses of manufactures were omitted. These items included capital invested, age and sex distribution of employees, rent and taxes, primary horsepower used, and kind and quantity of fuel used in manufacturing. Secondly, only limited statistics on number of wage earners and value of product were collected from manufacturing establishments reporting products valued at less than \$5,000 for 1921. (In the quinquennial censuses, data had been obtained from establishments with annual production valued at more than \$500.) For 1921, about 22 percent of the establishments had products valued at less than \$5,000, but these plants accounted for less than 1 percent of the wage earners and total production.

Data were collected for 1921 on 348 separate industries, 98 of which were subdivided to show greater detail. Statistics were compiled on number of proprietors or firm members, number of salaried employees, number of wage earners, amounts paid in salaries and wages and for contract work, cost of materials, and value of product.

In planning this first biennial census of manufactures, Census Bureau officials consulted extensively with the National Association of Manufacturers, committees from civic associations (such as chambers of commerce), representatives of important trade associations, and statisticians in Government and the private sector. Assistance from these sources was obtained in developing questionnaires, publicizing the census, and generally encouraging industry's acceptance of the project.

The canvass was a combination mail-out/mail-back operation and field enumeration. More than half of the questionnaires were returned by mail. Preliminary summary reports of census results were issued as press releases, each relating to a particular industry or group of industries. A total of 287 press releases were prepared during the period July 1922 to May 1923, and a final press summary was released in July 1923. Printed bulletins with final results were prepared for the industries, and a summary bulletin presented statistics for the United States, by industries, and for all industries combined by State. All data were then consolidated into a one-volume report published in November 1923.

The procedures and coverage of the 1923 census were virtually the same as those of 1921. The mail-out/mail-back operation was more successful, due in part to the cooperation of chambers of commerce. In many large cities, chamber of commerce representatives, sworn in as census agents, took complete charge of the canvass. Approximately 65 percent of the returns were received by mail, and by June 1924 almost 95 percent of the establishments had been canvassed by mail or in the field. Data were collected and tabulated for 333 industries, of which 87 were subdivided to provide greater detail. As in the 1921 census, preliminary statistics were first published in press releases (of which there were 290), then final data were assembled in industry bulletins and a final one-volume report published in January 1926.

For the 1925 census, 324 industries were covered, and about 75 percent of the returns were received by mail, again with the close cooperation of the chambers of commerce and other professional groups. A total of 254 press releases of preliminary results were prepared, plus the usual industry bulletins and the one-volume final report released in December 1927. For the 1927 census, manufacturers of confectionery and ice cream and fabricators of sheet-iron had to complete questionnaires only if they produced products with an annual value of \$20,000 or more. (This was in recognition of the fact that many of these smaller firms were primarily engaged in retail trade, not manufacturing.) Overall, the census encompassed 335 industries, and approximately 65 percent of the returns were received by mail. The press release-industry bulletin-final volume publication procedure was again followed, with the final volume published in April 1930.

Economic Censuses and the Great Depression

The 1930 Decennial Census was conducted during the initial phases of the Great Depression, the beginning of which was marked by the stock market crash of October 1929. Even before the crash and the start of the depression, some thoughtful economists and Government officials were investigating ways to achieve and preserve economic stability. Despite stringent budgets, the National Bureau of Economic Research and other public and private agencies undertook research projects which were frequently handicapped by lack of data, particularly in the areas of business and commerce.

In the Act authorizing the 1930 census, Congress provided for a census of construction industries, a census of distribution (which included retail and wholesale distribution and special topics), and a census of hotels. These were in addition to the censuses of manufactures and mineral industries traditionally included in the decennial censuses. All of these censuses were to encompass activities for the year 1929.

The construction census was initiated in response to the post-World War I boom in this sector of the economy. In 1920, less than 850,000 workers were employed in contract construction, and total private construction for that year was valued at \$5.4 billion. By 1928 (the last full year before the start of the depression), more than 1.6 million workers were employed in this field, and total private construction was valued at \$9.2 billion.

In planning this first census of construction industries, the Census Bureau worked closely with an advisory committee representing national contractors' associations and individual construction companies. This cooperative effort produced one basic questionnaire designed to collect information on (1) organization of the establishment, (2) number of salaried employees and total salaries paid, (3) number of skilled and unskilled workmen employed, (4) total annual wages, (5) length of working day and week, (6) expenses of equipment, operations, and overhead, (7) total value of year's business (with various breakdowns), and (8) value of materials and building equipment installed.

The questionnaire was to be completed by all persons and establishments engaged in construction business of any kind (except industrial concerns, public utilities,

municipalities, or common carriers which maintained construction crews for the repair or maintenance of their own property). However, detailed statistics were to be compiled only for establishments which reported gross business of at least \$25,000 during calendar year 1929.

The decision was made to conduct the construction census as a mail-out/mail-back operation. In order to mail the questionnaires to the right companies at the right addresses, a directory was prepared on the basis of lists of names and addresses provided by contractors' associations, private statistical agencies, builders' exchanges, chambers of commerce, and other business and trade associations. Letters were sent to city officials and postmasters, asking that they provide names and addresses of known construction establishments in their jurisdictions. Census Bureau clerks obtained additional names from classified telephone directories, city directories, and other sources. Ultimately, the directory encompassed about 160,000 unduplicated names and addresses.

In March 1930, questionnaires, form letters signed by the Director of the Census and the Secretary of Commerce, and postage-free return envelopes were mailed. Companies were given 15 days to complete their reports, and two followups were conducted in which reminder letters were mailed to nonrespondents. In cities with populations of at least 100,000, nonrespondents were contacted personally by enumerators conducting the field canvass for the population census. Ultimately, about 144,000 construction census questionnaires were received, of which only about 31,000 were from companies which reported annual business of at least \$25,000. Clerks checked each questionnaire for completeness and consistency and, when possible, made necessary corrections. When an apparent error or discrepancy could not be corrected on the basis of other reported information, the Census Bureau contacted the respondent by mail to point out the problem and ask that the item be reconsidered.

A card system of mechanical tabulation was used in compiling construction census results (and, in fact, virtually all 1930 census data), but a series of clerical cross checks and reviews by experienced statisticians was implemented to assure maximum accuracy and consistency. The results were published in December 1932 in a bound volume containing 13 uniform tables for the United States as a whole and for each State and the District of Columbia. Eleven of these tables include statistics for establishments with annual business of at least \$25,000, and the other two tables contain basic statistics (e.g., number of establishments and volume of business) for companies with annual business of less than \$25,000.

The 1930 census of distribution was conducted entirely as a field operation, using procedures which had been tested and refined in an 11-city canvass in 1926. The retail census covered operations of all retail stores and "all establishments doing business in a retail manner." Thus, in addition to retail stores per se, it encompassed restaurants and some semi-service businesses, such as garages, which sell merchandise in addition to their services. Retail establishments were classified on the basis of the following types of operation: Single-store establishments, two-store in-

dependents, three-store independents, local branch systems, local chains, sectional chains, national chains, and miscellaneous types of operation.

Enumerators personally visited each of the approximately 1.5 million stores to obtain answers to questions on one of the six report forms designed for this operation. In cities with populations of at least 10,000, special enumerators were hired exclusively for the census of distribution. In smaller cities and rural areas, the population census canvassers also were assigned to visit retail outlets. Statistics were compiled on number of stores, personnel, payroll, stocks, sales, operating expenses, seasonal employment characteristics, credit business, receipts from sale of meals and automotive services, value of returned goods and allowances, and type of organization. Preliminary results were published in the form of press releases, and, in February 1933, a one-volume final report was published, including a summary of data by States, counties, and incorporated places and separate tables for each State.

The same field enumeration procedures were used for the approximately 168,000 wholesale establishments, for which four questionnaires were designed. The wholesale trade classification embraced all establishments engaged in purchase, sale, or distribution of goods on a conventional wholesale basis, plus other special categories such as cash-and-carry wholesalers, drop shippers (middlemen who secure orders from buyers and have merchandise shipped directly from the manufacturer to the buyer), manufacturers' sales branches, and cooperative marketing associations. For the purposes of this census, the wholesale field covered virtually all merchandising establishments not in the retail group.

Data were generally compiled on number of establishments, number of employees, salaries and wages, stock, net sales, credit sales, sales to ultimate consumers, and sales to industrial consumers. These statistics were tabulated by kind of business (chemical products wholesaler, drug wholesaler, etc.), by geographic area (division and State), and by type of organization (proprietorship, partnership, etc.). Special tabulations were arranged to yield wholesale statistics for cities with populations of at least 100,000, where almost half of the establishments were located. Preliminary results were published as press bulletins, and the final bound volume was released in December 1933.

The census of hotels, which included only hotels with at least 25 guest rooms, was originally planned as a mail-out/mail-back operation. A directory of names and addresses of about 27,000 hotels was developed, and report forms were mailed in February 1930. Because of changes in ownership, duplications, and classification problems, it was necessary to conduct a field canvass to supplement the mail operation, using population census enumerators. Ultimately, statistics were compiled for approximately 15,500 hotels (70 percent of which returned questionnaires by mail, while the other 30 percent were enumerated in the field operation). Tabulations were published on number of hotels, number of rooms, seating capacity of dining rooms, receipts, employment, salaries and wages, and number of proprietors and firm members. These data were classified by plan of operation (American, European, and mixed), type of occupancy (transient, permanent, or mixed), and geographic division and State.

The procedures, coverage, and publication program for the 1930 manufactures census closely resembled those of the biennial censuses conducted for 1921, 1923, 1925, and 1927.⁹ At the recommendation of a special advisory committee appointed by the Secretary of Commerce, some slight changes were made in the questions on cost of materials and value of products. A total of 165 questionnaires were prepared to canvass 238 industries, and the number of questions common to all questionnaires was increased from 8 to 12.

The scope of the 1930 census of mines and quarries differed considerably from that of the 1920 census. Petroleum and natural gas industries, which were canvassed in 1920, were not included in 1930, but coverage of sand and gravel, glass-sand, and molding-sand industries was added, and there were a number of consolidations and reclassifications of industries. However, the questions, data-collection methods, and publication program were basically unchanged.

Several special reports on economic topics were included in the 1930 census publication program. For example, reports were prepared on distribution of sales of manufacturing plants, products of manufacturing industries, materials used in manufacturing, and location of industrial plants. In addition, statistics on unemployment were collected as an adjunct to the population census. With the addition of the censuses of distribution, construction industries, and hotels, the continuation of the manufactures and mineral industries census, and the coverage of special topics, the 1930 Decennial Census was, by large measure, more extensive than any previous economic census in the United States.

Budget reductions handicap 1931 and 1933 manufactures censuses.--Government policies in the early stages of the depression included efforts to improve public confidence in the Nation's economic structure by reducing Federal expenditures and balancing the budget. As a result of the retrenchments, the Census Bureau's funding and personnel authorizations for the 1931 and 1933 biennial censuses of manufactures were decreased. The 1931 census included 310 industries, but some questions (e.g., inquiries on salaried employees, power equipment, and coal consumption) were discontinued. Questionnaires were mailed in January 1932, and about 60 percent were returned by mail. Telephone followups were conducted by officials of local chambers of commerce and, in large industrial centers, by Census Bureau field office employees. Funding was inadequate to provide for a large crew of canvassers, so the number of field followups was limited. Budget restrictions also delayed the publication of census results.

Lack of funds and personnel also handicapped the 1933 census. The number of special questionnaires was reduced, and greater use was made of the general questionnaire and a short form was designed for smaller establishments. Again, the mail-out/mail-back enumeration method was utilized, with telephone followups, and about 75 percent of the questionnaires were returned by mail. However, the volume containing final census results warned data users that the smaller field force available

for personal followups had resulted in "some incompleteness of coverage."

Economic censuses in the "New Deal."--President Franklin D. Roosevelt's "New Deal" policies, beginning in March 1933, provided emergency relief measures, some of which directly involved economic census projects. The first example of this was the 1933 business census, which encompassed retail distribution, wholesale distribution, and a new category, "Services, Amusements, and Hotels." The service classification consisted of personal services (such as barber shops and beauty parlors), mechanical repair services (such as radio repair shops), and miscellaneous services (such as parking lots). Data were collected exclusively in a field canvass, which was funded by the Civil Works Administration as part of its emergency project to provide temporary employment for 4 million workers during the winter of 1933-34.

The 1935 censuses were further augmented to include a greatly expanded business census (including a census of construction) in addition to the biennial census of manufactures. Again, the field enumeration method was revitalized as a public works project to provide jobs for the unemployed, this time funded by the Works Progress Administration (WPA).

The scope of the 1935 manufactures census was expanded to provide for about the same level of detail as in the 1930 census. Although a mailing list was developed and questionnaires were mailed in January 1936, the companies were instructed to hold their questionnaires until enumerators visited their establishments in a door-to-door canvass in all cities, towns, and villages. The field workers were directed to canvass every manufacturing concern, even those which had not received questionnaires by mail.

The 1935 business census included retail trade, wholesale trade, the contract construction industry, and service industries (personal services, business services, repair and custom services, and miscellaneous services), for which data were collected in an extensive field operation. In addition, there was a miscellaneous business category consisting of many types of establishments not canvassed in any previous census. The miscellaneous category included:

1. Advertising agencies (questionnaires were mailed, but there was extensive field followup).
2. Radio broadcasting stations (mailout of questionnaires and one followup letter, plus field followup).
3. Real estate agencies (field enumeration exclusively).
4. Insurance companies (mailout, plus field followup).
5. Banks (data collected by mail by the Federal Reserve Board, Comptroller of the Currency, and Federal Deposit Insurance Corporation, plus field followup supervised by the Census Bureau).
6. Financial institutions other than banks, such as stock brokerage firms and finance companies (field enumeration exclusively).
7. Hotel and tourist courts (field enumeration exclusively).
8. Places of amusement (field enumeration exclusively).

⁹One major difference in coverage was that whereas the first four biennial censuses of manufacturing included only firms reporting annual production valued at \$5,000, this cutoff was reduced to \$500 for the 1930 census.

9. Transportation--motor buses and trucks for hire--and warehousing (field enumeration exclusively).
10. Nonprofit organizations, office building management firms, and miscellaneous businesses (field enumeration exclusively).

The announced goal of the 1935 census was to canvass "every recognizable place of business" to provide for the "first factual appraisal ever available on the effects of a serious business depression." A mass of data was collected, some of which was tabulated at a special Census Bureau branch in Philadelphia, where the unemployment rate was higher than in Washington. Final business census results were published in 14 volumes (three each for retail trade, wholesale trade, service trades, and construction, one for transportation and warehousing, and one for the miscellaneous topics), plus a series of special reports. A one-volume report of the census of manufactures was also prepared. The sheer scope and complexity of the operation, the limited time available for planning, and the difficulty in supervising the large contingent of field workers and clerks inevitably resulted in misclassifications, undercounting, tabulation difficulties, and other problems. However, the 1935 census not only yielded some valuable data for the New Deal economic planners, but also helped to ease the critical unemployment situation.

For 1937, only the biennial census of manufactures was conducted, and the operation was funded through regular census appropriations rather than as an emergency public works project. Although the number of special questionnaires was reduced, the amount of detail concerning products was greater than in any previous census. For example, questions were added concerning finished-product inventories and work-in-progress inventories. A total of 351 industries were canvassed, using one general questionnaire, 143 special questionnaires, and one administrative questionnaire.

A mailing list was derived from 1935 census files, trade directories, license lists, and other sources. Questionnaires were mailed in January 1938, and two followup letters were dispatched to nonrespondents in February and March. Census Bureau field employees conducted personal followup during the period April-June 1938, after which a final attempt was made to obtain outstanding questionnaires by mail. Results were published first as press releases with preliminary data, then as pamphlets with final results, and ultimately as a volume published in December 1939.

Censuses of business, manufactures, and mineral industries, covering activities for the year 1939, were taken as part of the 1940 Decennial Census. The business census, conducted exclusively as a field canvass, included retail trade, wholesale trade, service industries, and construction industries. Most of the classifications in the 1935 miscellaneous business category (e.g., banks, advertising agencies, and radio stations) were not canvassed in 1940. Coverage of places of amusement and hotels and tourist courts was shifted to the service industry group.

The 1935 retail classifications were substantially modified for 1940, and a special table on "reconciliation of classifications" was published to facilitate comparability of 1935 and 1940 tabulations. The scope of the

census of service trades was also altered, both by the addition of the miscellaneous business classifications and by internal adjustments. Users of the data were advised that, because of the numerous additions and deletions, "comparisons of aggregates" for 1935 and 1940 were not recommended. For the construction industries, the size cutoff for tabulation of detailed statistics in previous censuses (annual business of at least \$25,000) was eliminated. For the wholesale trade category, the scope remained essentially the same as in previous censuses.

The coverage of the census of manufactures also remained approximately the same as that of 1937, but the enumeration method was shifted from a mail-out/mail-back operation with field followup to a canvass conducted exclusively in the field.¹⁰ A new inquiry on capital expenditures for plant and equipment was included, and the question on personnel required detailed breakdowns for various categories of nonmanufacturing employees and by sex of manufacturing and nonmanufacturing workers.

The census of mineral industries did involve a mail canvass, and most returns were received by mail. The mail enumeration of the bituminous coal industry was conducted with the close cooperation of the Bituminous Coal Division of the U.S. Department of the Interior, with questionnaires being distributed and collected through field offices of the Interior Department.

In addition to the usual press releases and pamphlets, economic statistics compiled in the 1940 census were assembled in 10 volumes (five for the census of business, three for the census of manufactures, and two for the census of mineral industries). The final tabulation stages and the preparation of planned special reports were interrupted by U.S. entry into World War II. Some of the special reports (e.g., special subject reports in the retail area) were abandoned, and the last of the volumes was not published until June 1943.

The War and Postwar Developments: Economic Censuses Discontinued, Resumed, and Rescheduled

During World War II, the periodic economic censuses were discontinued in favor of war-related current surveys. Numerous surveys were taken to provide statistics for the Office of Price Administration, the War Manpower Commission, the Office of Defense Transportation, and other agencies in charge of defense efforts.

The first economic census to be taken after World War II was the 1947 manufactures census, which was taken in accordance with the provisions of the prewar law authorizing biennial censuses on this topic. The 1947 census was conducted almost entirely as a mail-out/mail-back operation,¹¹ and, since there had been

¹⁰A total of 6,400 field enumerators were employed for the censuses of business, manufactures, and mineral industries, but no breakdown is available for the separate censuses, particularly since some of these canvassers worked on several censuses.

¹¹Approximately 15,000 sawmills, which had highly mobile and sporadic operations, were canvassed in the field.

no census since 1940, considerable effort had to be devoted to developing an adequate mailing list. The starting point for this mailing register was the 1940 list, supplemented by listings provided by other agencies (particularly the war agencies) and trade associations. Then, the updated register was matched against a master file compiled by the Bureau of Old-Age and Survivors Insurance of the Social Security Administration. This master file contained names and addresses of companies with one or more paid employees which were required to make payments to the Social Security Trust Fund for their workers. (The Social Security Act was passed in 1935, but because of challenges of its constitutionality and the war emergency, 1947 marked the first time that this list was available to the Census Bureau.) Because the master file consisted only of firms with employees, statistics for nonemployers were not collected in the 1947 census (and the cutoff point--\$5,000 of annual product--used in previous manufactures censuses was eliminated).

The combined lists, consisting of almost 1 million names, were "purged" to remove duplicates, and, during the period August-December 1947, a prec canvass was conducted to further refine the register. Approximately 525,000 companies were mailed short questionnaires which contained inquiries on company name and address, corporation affiliation, manufacturing process used, types of products, and number of employees. Information reported during this prec canvass was used to remove from the register additional duplicates, nonmanufacturing companies, firms which had gone out of business, and other companies not to be included in the census.

During the period January-March 1948, about 325,000 census questionnaires were mailed. A total of 200 types of questionnaires were utilized to collect statistics on 435 manufacturing industries. Nonrespondents and companies whose answers were deemed incomplete or inadequate were telephoned or visited by employees of Census Bureau field offices. After additional duplicates and out-of-business and out-of-scope firms were culled from the file, statistics were tabulated for approximately 141,000 manufacturing establishments.

Another innovation for the 1947 census was that the classification of these industries was based on the 1945 Standard Industrial Classification Manual.¹² (In previous censuses, the Census Bureau had developed its own classification, after consultation with specialists in Government and the private sector.) Also, data were tabulated and published for "standard metropolitan areas." This category, also developed under the aegis of the Bureau of the Budget, included 147 "integrated economic units with a large volume of daily travel and communication between central city and outlying parts of the area."

As in the past, results of the 1947 census were released first as preliminary reports, then as final reports, and

finally assembled in volumes. Three volumes were published (general summary, statistics by industry, and statistics by State).

For the first time in a census of manufactures, a systematic attempt was made to assess the adequacy of the coverage of the 1947 census (i.e., the degree to which establishments which should have been canvassed were actually covered). Sample field surveys were taken in representative areas of the country by experienced enumerators, working under carefully controlled conditions. These surveys indicated that approximately 98 percent of all employees of in-scope manufacturing firms had been included in the census tabulations--only 2 percent had been missed.

In June 1948, Congress passed a new census law (Public Law 671), which revised the time frame for the economic censuses. This law authorized the Director of the Census Bureau to conduct "censuses of manufacturers, of mineral industries, and of other businesses, including the distributive trades, service establishments, and transportation...in the year 1949 and every fifth year thereafter, and each census shall relate to the year immediately preceding the taking thereof." The law further specified that, because a manufactures census had been conducted for 1947, none would be taken in 1949.

The first application of this law was for the 1948 business census, which included retail trade, wholesale trade, and service trades.¹³ The approximately 3 million business establishments included in this census were classified on the basis of the Standard Industrial Classification system.

The canvass was conducted entirely in the field during the period May-November 1948, after the country had been divided into 37,000 enumeration districts and 308 temporary field offices had been established. The first phase of the project was a "listing operation" during which enumerators systematically canvassed each business establishment to secure basic information (name of business and proprietor, type of business, whether it was part of a multiunit company, etc.) which was then used to prepare a listing book for each enumeration district. The field workers were instructed to "list all recognizable businesses (except medical, dental, and law offices, government offices, and also farms)." For most single-unit establishments, the enumerators conducting this listing operation left the appropriate questionnaire with instructions that it be completed and returned to the census office by mail. (Twelve report forms were used in the census, including five for service establishments, five for wholesale companies, and two for retail stores.) For multiunit companies, the questionnaires for all establishments were completed at the firm's central office, unless the management specifically requested other arrangements.

The second phase was the data-collection/coding-entire operation. Most companies did complete and

¹²The Standard Industrial Classification System was developed by a committee of statisticians serving under the auspices of the Bureau of the Budget. The first SIC manual was published in 1941, and a revised edition was published in 1945.

¹³The law authorized censuses of mineral industries and transportation in 1949, but Congress did not appropriate funds for these censuses, and they were not taken. Although contract construction firms had been included in the prewar business censuses, they were not covered for 1948.

return their questionnaires without further contact and were "checked in" in the listing books for each enumeration district. Nonrespondents were mailed reminder letters, and those who still did not respond were revisited by field workers. Questionnaires were carefully coded and edited in the field offices so that firms whose questionnaires were incomplete or below established quality standards could be telephoned or visited by field workers. Before the temporary offices closed, several coverage checks were implemented, including matching operations with Social Security Administration lists and comparisons of county totals with those of neighboring counties or counties with similar economic characteristics.

After the field canvass had been completed, the Census Bureau conducted a post-enumeration survey in which 2,500 representative small areas were reenumerated. This survey revealed undercoverage of 8.2 percent of service establishments, 5.5 percent of wholesale establishments, and 3.6 percent of retail establishments. In general, the undercoverage involved failure to list and canvass small businesses, particularly those with no employees.

As usual, preliminary results were published first, then final reports which were later assembled in bound volumes (three for retail trade, two for wholesale trade, and two for service trades). In addition to the usual tabulations (receipts, sales, payroll, number of establishments, etc.), there were special tabulations on sales of retail stores by merchandise line and sales of wholesale outlets by commodity line. Statistics were presented for 147 standard metropolitan areas, in addition to States, counties, and cities.

The 1954 Budget Crisis

The provisions of Public Law 671 authorized the Census Bureau to conduct censuses of business, manufactures, and mineral industries in 1954, covering calendar year 1953. Congress appropriated funds for planning and preparatory operations in fiscal years 1952 and 1953 but disallowed the fiscal year 1954 budget request for the actual taking of the censuses. Instead, funds were provided only for limited special surveys of manufactures and business. (For example, for calendar year 1953, only about 50,000 of the Nation's 275,000 manufacturing establishments were canvassed in the special manufactures survey, and even less was done in the business area.)

There was considerable opposition in Government and in the business and academic communities to the elimination of the full-scale economic censuses. Trade associations, economic and marketing research agencies, community planners, professional organizations, and individual data users expressed desire to have these censuses resumed. In October 1953, the Secretary of Commerce appointed an Intensive Review Committee to survey the Census Bureau's programs from the standpoint of their importance in the functioning of the American economy. This Committee, which consisted of professors, business executives, economists, and other specialists not affiliated with the Census Bureau, submitted its report to the Secretary in March 1954. Among other things, the report strongly recommended that economic censuses be resumed.

Congress responded to this recommendation with dispatch and, in June 1954, Public Law 467 was enacted, providing that "the censuses of manufacturing, of mineral industries, and of other business, including the distributive trades and service establishments, directed to be taken in the year 1954 relating to the year 1953, shall be taken instead in the year 1955, relating to the year 1954."

Postwar Developments in Economic Census Taking: The Computer, and "Administrative Records"

Beginning with the 1954 Economic Censuses, the availability of increasingly sophisticated electronic computers has facilitated the introduction of new methods of collecting and processing data.¹⁴ The first large-scale computer, which was designed and built especially for the Census Bureau, was acquired in 1951 and was first used in tabulating 1950 census data. In the economic census area, the 1954 censuses marked the initial utilization of computers.

The 1954 business census also marked the Bureau's first attempt since 1890 to compile census-type statistics from "administrative records" (in this case, tax returns or social security records). Nonemployers in retail trade and service trades were not required to complete census questionnaires; instead, selected data items (such as employment, payroll, and sales) for retail nonemployers with 1954 sales of at least \$2,500, and for service nonemployers with 1954 receipts of at least \$1,000, were derived from the 1954 income tax returns filed with the U.S. Internal Revenue Service. (Just prior to the 1954 censuses, and after consultations between IRS and the Census Bureau, the Federal income tax forms were revised to include limited information to distinguish physical location from mailing address and to determine whether a firm's activities were within the scope of the census.) Retail and service nonemployers with sales and receipts below the cutoff points were not included in the census, and employers were enumerated via the mail-out/mail-back procedure. Nonemployers, although large in number, accounted for only about 10 percent of retail sales volume and service receipts in 1954. Experience had also demonstrated that these small firms were the ones most likely to be missed in an enumeration.

Since nonemployers were not included in the wholesale trade portion of the business census or in the censuses of manufactures and mineral industries, mail-out/mail-back enumeration methods were used exclusively in these areas. However, administrative records were employed extensively in developing the mailing lists. The starting point was the IRS list of all employers who made one or more quarterly payments to the Social Security Trust Fund under the Federal Insurance Contributions Act (FICA). Since this list did not contain kind-of-business codes necessary to determine which questionnaire should be mailed to a particular establishment, it was necessary to match it with various lists containing kind-of-

¹⁴Mechanical punchcard tabulation was first used in the 1890 census, and the automatic card-punching machine was introduced in 1909. By 1950, more than a thousand general and special punchcard processing machines were being used in census work.

business classifications (e.g., the employer master file maintained by the Social Security Administration). The names on these lists could usually be linked through use of the employer identification number assigned to each case by SSA, and the matching was performed mechanically on punchcard collating equipment. In order to secure accurate and up-to-date information on establishments of multiunit companies and to correct and consolidate the IRS list, the Census Bureau conducted a prec canvass in the fall of 1954. Multiunit companies were asked to complete and return report forms on which they listed their establishments with corresponding information about name and address, employment, type of activity, etc.

Census questionnaires were mailed early in 1955. In the census of manufactures, 192 different questionnaires, each tailored to a particular industry or group of industries, were used to compile statistics for 450 industries defined under the Standard Industrial Classification system. Each type of questionnaire contained common items (e.g., employment, payroll, manhours, and cost of materials), but different questions on such subjects as product mix and raw materials were designed to suit the characteristics of each industry. The mailing list was prepared using the process described above and, for large companies, the mailing register for the 1953 Annual Survey of Manufactures (an annual survey of manufacturing concerns with at least 100 employees).

The questionnaires were distributed and returned by mail. Followup letters were sent to nonrespondents, and those who still did not respond were contacted by telephone or visited by employees of Census Bureau field offices. The mailout and followups involving large companies (generally those with at least six employees) were under the direct control of the Census Bureau's Washington headquarters. Bureau field offices controlled mailout and followups for the smaller companies. Coverage control procedures basically involved ensuring that establishments on the mailing list did complete and return report forms.

Similar methods were implemented in conducting the mail-out/mail-back canvass of the "mail universe" portion of the business census and the census of mineral industries. For mining companies, the mailing list was supplemented with information provided by the Bureau of Mines, the Federal Power Commission, and the Defense Department's Petroleum Administration. Bureau of Mines field employees also collected a limited number of report forms at mine sites. In total, questionnaires were completed by approximately 280,000 manufacturing establishments, 1.8 million business establishments, and 32,000 mining establishments. Data for more than a million small companies were derived from the tax returns, resulting in an estimated savings of \$3 million in census funds.

The computers were used extensively for editing and tabulating data. Offset printing copy for many of the census reports was prepared on electronic high-speed printers directly from the magnetic tape output of the computer operations. Imputation of missing items was made feasible by use of the computer to derive "imputation ratios." Census operations required the full-time use of the Bureau's two computers plus additional rented time on two other computers. The availability

of the computer (and the adoption of the general procedure of having all report forms for multiunit firms completed at company headquarters) also enabled the Census Bureau to initiate its first "enterprise statistics program." This involved regrouping data for establishments under common ownership or control to prepare tabulations showing various economic characteristics of the companies ("enterprises") that owned or controlled these establishments.

As in past censuses, 1954 census results were published in preliminary bulletins, final reports, and bound volumes. In addition to the usual summary reports, industry and subject reports, and area reports, special tabulations were published for "central business districts," newly defined geographic entities encompassing the downtown business areas of large cities.

The 1958 Economic Censuses followed basically similar procedures, and the scope, coverage, report forms, and tabulations closely resembled those of 1954. Again, data for retail and service nonemployers in the "nonmail universe" were extracted from income tax returns, and the other establishments (the "mail universe") were canvassed in a mail-out/mail-back operation. Innovations for the 1958 censuses included:

1. The use of more sophisticated "second generation" computers. Processing operations performed by computers were greatly expanded to include mailing list controls, more extensive editing, certain kinds of coding, and other operations which had been performed manually or with punchcard equipment in previous censuses.
2. The establishment of a census operations office in Jeffersonville, Ind. (where personnel and office space were more readily available), to perform the extensive preparatory operations and mass clerical procedures--preparation of mailing packages, mailout, receipt, check-in, clerical editing and coding, and card punching. For example, the Jeffersonville office received prints of microfilmed tax returns from IRS district offices and performed the editing, coding, and card punching, after which the cards were forwarded to Bureau headquarters for conversion to electronic tape for computer processing.
3. The introduction of a new geographical area for the business census, the major retail center (outlying business districts, such as shopping centers, in standard metropolitan areas with central business districts).
4. The taking of economic censuses for the first time in Guam and the Virgin Islands. (Economic censuses were conducted in Puerto Rico beginning with a census of manufactures for 1909. The first census of business there was for 1939.)

The 1963 Economic Censuses were expanded to include censuses of transportation and commercial fisheries. Transportation censuses were authorized in 1948, when Congress passed Public Law 671 (which was incorporated into Title 13, United States Code, when the statutes were codified in 1954). However, funds to take a census were

not appropriated until 1963. The transportation census consisted of:

1. A Passenger Transportation Survey, which produced statistics showing national and regional passenger patterns for 1963 and their relationship to socioeconomic and geographic factors. Data were collected in four quarterly personal interviews with a probability sample of about 6,000 households.
2. A Truck Inventory and Use Survey, which yielded data concerning the Nation's truck resources, such as number of trucks classified by physical characteristics, occupational use, measures of intensity of vehicle utilization, and geographic distribution of vehicles. Questionnaires were mailed to a sample of about 100,000 trucks and truck-tractors selected from State motor vehicle registration records.
3. A Commodity Transportation Survey, in which data were compiled concerning the physical and geographic distribution of commodities shipped by the manufacturing sector of the national economy. The basic information was derived from a probability sample of bills of lading or other shipping records at a probability sample of manufacturing plants.
4. A Motor Carrier Survey which supplied statistics concerning for-hire carriers not subject to economic regulations by the Interstate Commerce Commission. This involved a complete mail-out/mail-back enumeration of bus companies and public warehouses which also operated trucking services, plus a mail-out/mail-back enumeration of a probability sample of trucking firms.

The census of commercial fisheries, resumed at the recommendation of the Interior Department's Bureau of Commercial Fisheries after a 55-year hiatus, involved a mail canvass of commercial fishing operators reporting employment to the Social Security Administration. The questionnaire contained inquiries on employment, payroll, receipts, characteristics of vessels, and landed catch. For nonemployers, a sample of income tax records was used to compile limited statistics. Because the mailing list was later revealed to be incomplete, a supplemental vessel survey was conducted for 1964.

The 1963 censuses of business, manufactures, and mineral industries closely resembled their 1958 counterparts. The main differences involved introduction of "third generation" computer systems and the expanded use of electronic equipment, including:

1. Implementation of computer-performed geographic coding of establishment addresses.
2. Substitution of magnetic tape for punchcards in developing the census mailing lists from IRS lists.
3. Development of automated procedures to control mailout and followup operations.
4. Use of a high-speed telephone-transmission system to expedite transfer of mass data from the Jeffersonville punching unit to the computer facility at Census Bureau headquarters.

5. Development of a computerized system for work and progress reporting for census operations.
6. Implementation of computer-programmed news stories for release of census results and automated mailing to news media.

Again, selected items of information, such as value of receipts and sales, were obtained from tax returns for nonemployers, and administrative records were also used in assembling mailing lists and obtaining industry classifications for employer firms to be included in the mail canvass. In total, about 3 million firms were asked to complete questionnaires, and statistics for approximately 1.5 million establishments were derived from administrative records.

For 1967,¹⁵ the scope of the economic censuses was significantly increased. Major elements of this expansion consisted of:

1. Reinstitution of a census of construction industries (the first since 1939).
2. Expansion of coverage of the service trade portion of the business census to include architects and engineers, law firms, and travel agents.
3. A 50-percent increase in coverage of the Commodity Transportation Survey component of the transportation census.

The 1967 Economic Censuses thus included censuses of business, manufactures, mineral industries, construction industries, commercial fisheries, and transportation.

The use of administrative records was expanded and refined for the 1967 censuses. This mainly involved using administrative records in lieu of census questionnaires to compile statistics for selected single-unit "small employers" (firms with small employment during 1967), in addition to the nonemployers in retail, service, and construction trades.

In the census of business, payroll cutoffs were established for different kinds of businesses to determine which firms would be excused from completing questionnaires. The "number-of-employee" equivalent of the payroll cutoff was generally in the range of one to three employees. The size cutoff for manufacturing firms was 10 employees, and for mineral industries establishments, five employees. Thus, data for more than 1 million small employer establishments, canvassed by mail in previous censuses, were compiled from tax returns in the 1967 censuses. In total, 1.9 million establishments were asked to complete questionnaires, and administrative records were used for 2.9 million establishments.

Various new techniques for handling mass data were devised for the 1967 censuses, and new computers and auxiliary electronic equipment were utilized. Other significant changes in processing methods included the

¹⁵Title 13 of the U.S. Code (the law under which the economic censuses are taken) was modified in 1964, so that the period covered by the economic censuses will be the years ending in "2" and "7" instead of "3" and "8". This revision was introduced to distribute more evenly the staff and computer workload generated by the economic and demographic censuses.

expansion of the geographic coding file to facilitate computer coding of establishments located in small cities; development of specifications and computer programs to perform complementary disclosure analysis (to ensure that data for individual establishments were not disclosed); and extended use of computer editing to replace operations previously performed manually.

The general plan for the 1972 Economic Censuses¹⁶ was that the type and amount of data collected would be basically the same as in the 1967 censuses. Efforts were directed toward improving certain elements of the 1967 operation which, according to Census Bureau executives and consultants, had sometimes delayed the timely publication of census results. The objectives were to (1) expedite the receipt and processing of administrative records of IRS and SSA, (2) increase the efficiency of the geographic coding system whereby geographic identification is assigned to all establishments included in the censuses, and (3) provide for better management of computer programming and other computer operations. The prime objective was to accelerate the release of the statistics to the public so that key

¹⁶The 1972 Economic Censuses are underway at the time of this writing. A detailed Procedural History of these censuses is expected to be published in 1976.

publication series would be issued during the latter part of calendar 1973 and final results would be in print by the end of calendar year 1974 (considerably sooner after the enumeration than in the 1967 censuses).

With the advent of computer technology in the 1950's and 1960's, management of economic censuses has shifted in emphasis, from direction of a large-scale clerical operation to administration of a multi-discipline project involving systems analysis, operations research, and management engineering, in addition to statistics and economics. The census administrators must not only coordinate the efforts of computer specialists and subject-matter analysts within the Census Bureau, but, with the increasing use of administrative records of other agencies, they must also synchronize the inter-agency aspects of census operations (e.g., dovetailing the receipt of data files from other agencies with the census processing and publication schedules).

To meet these needs, the Bureau has hired and trained large numbers of systems analysts, computer programmers, and methods, procedures, and quality control specialists, established a reputation for leadership in developing new and improved data-processing methods and machinery, and attempted to design its organizational structure for maximum efficiency.

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