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DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

E. DANA DURAND, DIRECTOR
APPOINTED JUNE 16, 1909; RESIGNED JUNE 30, 1913

WM. J. HARRIS, DIRECTOR
APPOINTED JULY 1, 1913

THIRTEENTH CENSUS OF THE UNITED STATES
TAKEN IN THE YEAR 1910

VOLUME X

MANUFACTURES

1909

REPORTS FOR PRINCIPAL INDUSTRIES

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PREPARED UNDER THE SUPERVISION OF WILLIAM M. STEUART
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DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
WASHINGTON

ANNOUNCEMENT CONCERNING THIRTEENTH CENSUS REPORTS.

DECEMBER 1, 1913.

All of the volumes of the final census reports have been issued except Volume IV, *Occupation Statistics*, which will be completed at an early date.

The volumes numbered I to XI, constituting the complete reports of the census, are being issued in a very limited edition, intended chiefly for libraries, institutions, and special students of statistics.

A condensed report, entitled *Abstract of the Census*, has been printed in a much larger edition, intended for more general distribution, and prepared in such a way as to meet the need of most persons desiring information concerning the results of the census. It contains in tabular form all important census statistics for the United States as a whole and for each state and principal city, together with a brief text explaining the figures and their meaning. The *Abstract* therefore is a condensation of the complete census reports, both tables and text, and not merely a compilation of tables.

The *Abstract* is issued in special editions for each of the several states, each edition containing a supplement giving the detailed statistics for counties, cities, and other civil divisions of the state to which it relates, designed to meet the needs of persons resident in that state or especially interested in it. The supplement contains also both tables and text.

As a compact reference work of general and local interest the *Abstract* is more convenient for most persons than the voluminous final reports.

REPORTS OF THE THIRTEENTH CENSUS.

POPULATION:

- Volume I.—GENERAL REPORT AND ANALYSIS.
- Volume II.—REPORTS BY STATES, WITH STATISTICS FOR COUNTIES, CITIES, AND OTHER CIVIL DIVISIONS—ALABAMA TO MONTANA.
- Volume III.—REPORTS BY STATES, WITH STATISTICS FOR COUNTIES, CITIES, AND OTHER CIVIL DIVISIONS—NEBRASKA TO WYOMING; ALASKA, HAWAII, AND PORTO RICO.
- Volume IV.—OCCUPATION STATISTICS.

AGRICULTURE:

- Volume V.—GENERAL REPORT AND ANALYSIS.
- Volume VI.—REPORTS BY STATES, WITH STATISTICS FOR COUNTIES—ALABAMA TO MONTANA.
- Volume VII.—REPORTS BY STATES, WITH STATISTICS FOR COUNTIES—NEBRASKA TO WYOMING; ALASKA, HAWAII, AND PORTO RICO.

MANUFACTURES:

- Volume VIII.—GENERAL REPORT AND ANALYSIS.
- Volume IX.—REPORTS BY STATES, WITH STATISTICS FOR PRINCIPAL CITIES.
- Volume X.—REPORTS FOR PRINCIPAL INDUSTRIES.

MINING:

- Volume XI.—MINES AND QUARRIES.

ABSTRACT OF THE THIRTEENTH CENSUS.

LETTER OF TRANSMITTAL.

DEPARTMENT OF COMMERCE,
BUREAU OF THE CENSUS,
Washington, D. C., December 1, 1913.

SIR:

I have the honor to transmit herewith Volume X of the Reports of the Thirteenth Decennial Census, relating to manufactures.

The census of manufactures was taken in conformity with "An act authorizing the taking of the Thirteenth and subsequent Decennial Censuses," approved July 2, 1909. The statistics were collected during the year 1910, but relate in general to the year ending December 31, 1909. The field work was done for the most part by clerks detailed from the permanent force of the bureau and by special agents appointed expressly for the purpose of collecting statistics of manufactures and mines.

The results of the manufactures census are contained in three volumes, constituting Volumes VIII, IX, and X of the Reports of the Thirteenth Decennial Census. Volume VIII contains a summarization of the statistics by industries and by states, together with a general analysis and discussion. Volume IX contains a separate report on the manufactures of each state and territory, each such report having previously been issued as a bulletin. Volume X, the present volume, contains special reports or monographs relating to the leading individual industries, which are also published as a series of separate bulletins. This volume also presents statistics for the manufacturing industries in the 13 principal metropolitan districts of the country.

The collection and compilation of the statistics of manufactures and the preparation of the text of the present volume have been under the supervision of William M. Steuart, chief statistician for manufactures, in accordance with plans prepared by my predecessor, Hon. E. Dana Durand.

The chiefs of division under Mr. Steuart during the Thirteenth Census period were Joseph D. Lewis and Frank L. Sanford.

Respectfully,


Director.

HON. WILLIAM C. REDFIELD,
Secretary of Commerce.

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MANUFACTURES—REPORTS ON SELECTED INDUSTRIES.

INTRODUCTION AND DEFINITION OF TERMS.

INTRODUCTION.

The statistics of manufactures for certain selected industries were published as separate bulletins as rapidly as the statistics were compiled. These bulletins are now collected in the present volume, forming Volume X of the reports of the Thirteenth Census. The figures in this volume may differ in some unimportant details from those given in the bulletins, for the reason that certain minor errors discovered in the bulletins as first published have been corrected.

The text of the report for each industry summarizes the general results of the census inquiry, presenting a series of special tables in which the most important figures printed in the general tables are given in convenient form.

At the end of the report for each industry are two general tables, as follows: First, a comparative presentation for 1909, 1904, and 1899 of the number of establishments and of persons engaged in the industry, primary power, capital, salaries and wages, cost of materials, value of products, and value added by manufacture, followed by a table giving statistics in detail by states for 1909.

DEFINITION OF TERMS.

In connection with the reports for the individual industries the explanations of the use of terms and the methods of compilation given in the paragraphs following should be borne in mind.

Scope of census: Factory industries.—Census statistics of manufactures are compiled primarily for the purpose of showing the absolute and relative magnitude of the different branches of industry covered and their growth or decline. Incidentally, the effort is made to present data throwing light upon character of ownership, size of establishments, and similar subjects. When use is made of the data for these purposes, it is imperative that due attention should be given to the limitations of the figures, particularly in any attempt to derive from them figures purporting to show average wages, cost of production, or profits. These limitations are fully discussed in the general report on manufactures for the United States as a whole (Volume VIII of Thirteenth Census Reports) and need not be repeated here.

The census of 1909, like that of 1904, was confined by law to manufacturing establishments conducted under what is known as the factory system, excluding the neighborhood, household, and hand industries. Where statistics for 1899 are given, they have been reduced to a comparable basis by eliminating the latter classes of industries. The census did not cover establishments which were idle during the entire year, or had a value of products of less than \$500, or the manufacturing done in educational, eleemosynary, and penal institutions, or in governmental establishments, except those of the Federal Government. Reports were secured for establishments operated by the Federal Government, and the statistics for such establishments are presented in the reports for the industries for which they were reported, though they are not included in the industry totals.

Period covered.—The returns relate to the calendar year 1909, or the business year which corresponds most nearly to that calendar year, and cover a year's operations, except for establishments which began or discontinued business during the year.

The establishment.—The term "establishment" comprises the factories, mills, or plants which are under a common ownership or control and for which one set of books of account is kept.

If, however, the plants constituting an establishment as thus defined were not all located within the same state, separate reports were secured in order that the figures for each plant might be included in the statistics for the state in which it was located. In some instances separate reports were secured for each of the different industries carried on in the same establishment.

Classification by industries.—The establishments were assigned to the several classes of industries according to their products of chief value. The value of products reported for a given industry may thus, on the one hand, include minor products very different from those covered by the industry designation, and, on the other hand, may not include the total product covered by this designation, because some part of this product may be made in establishments in which it is not the product of chief value.

Influence of increased prices.—In comparing figures for cost of materials, value of products, and value added by manufacture in 1909 with the corresponding figures for earlier censuses, account should be taken of the general increase in the prices of commodities during recent years. To the extent to which this factor has been influential the figures fail to afford an exact measure of the increase in the volume of business.

Persons engaged in manufacturing industries.—At the censuses of 1899, 1904, and 1909 the following general classes of persons engaged in manufacturing industries were distinguished: (1) Proprietors and firm members, (2) salaried officers of corporations, (3) superintendents and managers, (4) clerks, and (5) wage earners. In the reports for the censuses of 1904 and 1899 these five classes were shown according to the three main groups: (1) Proprietors and firm members, (2) salaried officials, clerks, etc., and (3) wage earners. The second group included the three classes of salaried officers of corporations, superintendents and managers, and clerks. In certain tables relating exclusively to the present census a somewhat different grouping is employed—that into (1) proprietors and officials, (2) clerks, and (3) wage earners. The first group includes proprietors and firm members, salaried officers of corporations, and superintendents and managers. In comparative tables covering the censuses of 1899 and 1904 it is of course necessary to group the figures for 1909 according to the classification that was employed in the earlier censuses.

At this census the number of persons engaged in the industries, segregated by sex, and, in the case of wage earners, also by age (whether under 16 or 16 and over), was reported for December 15, or the nearest representative day. The 15th of December was selected as representing for most industries normal conditions of employment, but where conditions were exceptional, and particularly in the case of certain seasonal industries, such as canning and preserving, the December date could not be accepted as typical and an earlier date had to be chosen.

In the case of employees other than wage earners the number thus reported for December 15, or other representative day, has been treated as equivalent to the average for the year, since the number of employees of this class does not vary much from month to month in a given industry. In the case of wage earners the average is obtained in the manner explained in the next paragraph.

In addition to the more detailed report by sex and age of the number of wage earners on December 15, or other representative day, a report was obtained of the number employed on the 15th of each month, without distinction of sex or age. From these figures the average number of wage earners for the year has been calculated by dividing the sum of the numbers

reported each month by 12. The average thus obtained represents the number of wage earners that would be required to perform the work done if all were employed constantly during the entire year. Accordingly, the importance of any industry as an employer of labor is believed to be measured more accurately by this average than by the number employed at any one time or on a given day.

The totals by sex and age for the wage earners reported for the representative day for some seasonal industries, such as canning and preserving, are misleading, because the distribution of the wage earners by sex and age is materially different from that in most industries of more regular operation. In order to determine as nearly as possible the sex and age distribution of the average number of wage earners for a given industry, the per cent distribution by sex and age of the wage earners for December 15, or the nearest representative day, has been calculated from the actual numbers reported for that date. The percentages thus obtained have been applied to the average number of wage earners for the year in the industry, to determine the average number of men, women, and children employed.

In 1899 and 1904 the schedule called for the average number of wage earners of each sex 16 years of age and over, and the average number under 16 years of age without distinction of sex, for each month, and these monthly statements were combined in an annual average. Comparatively few manufacturing concerns, however, keep their books in such way as to show readily the average number of men, women, and children employed each month. These monthly returns by sex and age were, in fact, largely estimates. It was believed that a more accurate and reliable sex and age distribution could be secured by taking as a basis of estimate the actual numbers employed on a single day.

Prevailing hours of labor.—The census made no attempt to ascertain the number of employees working a given number of hours per week. The inquiry called merely for the prevailing practice followed in each establishment. Occasional variations in hours in an establishment from one part of the year to another were disregarded, and no attention was paid to the fact that a limited number of employees might have hours differing from those of the majority. In the tables all the wage earners of each establishment are counted in the class within which the establishment itself falls. In most establishments, however, all or practically all the employees work the same number of hours, so that these figures give a substantially correct representation of the hours of labor in manufacturing industries.

Capital.—For reasons stated in reports of prior censuses the statistics of capital secured by the census canvass are so defective as to be of little value, except

as indicating very general conditions. The instructions on the schedule for securing capital were as follows:

The answer should show the total amount of capital, both owned and borrowed, on the last day of the business year reported. All the items of fixed and live capital may be taken at the amounts carried on the books. If land or buildings are rented, that fact should be stated and no value given. If a part of the land or buildings is owned, the remainder being rented, that fact should be so stated and only the value of the owned property given. Do not include securities and loans representing investments in other enterprises.

Materials.—The statistics as to cost of materials relate to the materials used during the year, which may be more or less than the materials purchased during the year. The term "materials" includes fuel, rent of power and heat, mill supplies, and containers, as well as materials forming a constituent part of the product. Under the head of "Fuel" is included all fuel used, whether for heat, light, or power, or for the process of manufacture.

Expenses.—Under "Expenses" are included all items of expense incident to the year's business, except interest, whether on bonds or other forms of indebtedness, and allowances for depreciation.

Value of products.—The amounts given under this head represent the selling value or price at the factory of all products manufactured during the year, which may differ from the value of the products sold. Amounts received for work on materials furnished by others are included.

Value added by manufacture.—The value of products is not a satisfactory measure of either the absolute or the relative importance of a given industry, because only a part of this value is actually created by the manufacturing processes carried on in the industry itself. Another part of it, and often by far the larger part, represents the value of the materials used, which are the products of agriculture or mining or of other manufacturing industries. For many purposes, therefore, the best measure of the importance of different classes of industry is the value created by the manufacturing operations carried on within the industry. This value is obtained by deducting the cost of the

materials used from the value of the products. The figure thus obtained is termed in the census reports "value added by manufacture."

There is a further statistical advantage which "value added by manufacture" has over gross value of products. In combining the value of products for all industries the value of products produced by one establishment and used as materials in another is duplicated, and the total, therefore, gives a greatly exaggerated idea of the wealth created. No such duplication is involved in the total "value added by manufacture."

Cost of manufacture and profits.—Census data do not show the entire cost of manufacture, and consequently can not be used to show profits. No account has been taken of interest and depreciation. Even if the amount of profit could be determined by deducting the expenses from the value of the products, the rate of profit on the investment could not properly be calculated, because of the very defective character of the returns regarding capital.

Primary horsepower.—This item represents the total primary power generated by the manufacturing establishments plus the amount of power, principally electric, rented by them from other concerns. It does not cover the electric power developed by the primary power of the establishments themselves, the inclusion of which would evidently result in duplication.

Laundries.—The census of 1909 was the first to include statistics of laundries. The reports are confined to establishments using mechanical power. The data are presented separately and are not included in the general total for manufacturing industries, since their inclusion would interfere with comparisons with prior censuses.

Custom sawmills and gristmills.—In order to make the statistics for 1909 comparable with those for 1904, the data for these mills have been excluded from all the tables presenting general statistics. Statistics for such establishments, however, are given in connection with the reports on lumber and timber products and flour mill and gristmill products, respectively.