CHAPTER II.

SUMMARY AND ANALYSIS OF RESULTS.

I.

GENERAL REVIEW.

The Twelfth Census marks the close of the first complete century of manufactures in the United States. It will thus become the most important statistical basis by which will be measured the future advancement of American industry.

1. *Comparisons with former Censuses.*—Table 1 presents what may be called a bird's-eye view of the progress of manufacturing and mechanical industries, as revealed by the decennial censuses from 1850 to 1900, inclusive, representing the development of the latter half of the nineteenth century.

TABLE I.—COMPARATIVE SUMMARY, 1850 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	DATE OF CENSUS.						PER CENT OF INCREASE.				
	1900[1]	1890	1880	1870	1860	1850	1890 to 1900	1880 to 1890	1870 to 1880	1860 to 1870	1850 to 1860
Number of establishments	512,339	355,415	253,852	252,148	140,433	123,025	44.2	40.0	0.7	79.6	14.1
Capital	$9,835,086,909	$6,525,156,486	$2,790,272,606	$2,118,208,769	$1,009,855,715	$533,245,351	50.7	133.9	31.7	109.8	89.4
Salaried officials, clerks, etc. number	397,174	[2]461,009	[3]	[3]	[3]	[3]	[4]13.8				
Salaries	$404,230,274	[2]$391,988,208	[3]	[3]	[3]	[3]	3.1				
Wage-earners, average number	5,316,802	4,251,613	2,732,595	2,053,996	1,311,246	957,059	25.1	55.6	33.0	56.6	37.0
Total wages	$2,328,691,254	$1,891,228,321	$947,953,795	$775,584,343	$378,878,966	$236,755,464	23.1	99.5	22.2	104.7	60.0
Men, 16 years and over	4,116,610	3,327,042	2,019,035	1,615,598	1,040,349	731,137	23.7	64.8	25.0	55.3	42.3
Wages	$2,021,349,508	$1,659,234,483	[3]	[3]	[3]	[3]	21.8				
Women, 16 years and over	1,031,609	808,686	531,630	323,770	270,897	225,922	28.4	51.2	64.2	19.5	19.9
Wages	$281,680,054	$215,367,976	[3]	[3]	[3]	[3]	30.8				
Children, under 16 years	168,583	120,885	181,921	114,628	[3]	[3]	39.5	[4]33.6	58.7		
Wages	$25,661,692	$16,625,862	[3]	[3]	[3]	[3]	54.3				
Miscellaneous expenses	$1,028,035,611	$631,225,035	[5]	[5]	[5]	[5]	62.9				
Cost of materials used	$7,348,144,755	$5,162,044,076	$3,396,823,549	$2,488,427,242	$1,031,005,092	$555,123,822	42.3	52.0	36.5	141.2	85.8
Value of products, including custom work and repairing	$13,014,287,498	$9,372,437,283	$5,369,579,191	$4,232,325,442	$1,885,861,676	$1,019,106,616	38.9	74.5	26.9	124.4	85.1

[1] Includes, for comparative purposes, 85 governmental establishments in the District of Columbia having products valued at $9,887,355, the statistics of such establishments for 1890 not being separable. (See Report on Manufactures, Part II, page 120.)
[2] Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See general Table 3, page 59.)
[3] Not reported separately.
[4] Decrease.
[5] Not reported.

The statistics of manufactures at the censuses prior to 1850 were too imperfect and fragmentary in character to warrant their presentation in such a table as a measure of industrial growth in the first half of the century. Even the figures shown in the table must be accepted with many qualifications as hereinafter noted.

In comparison with the figures of the census of 1850, the statistics of manufactures in 1900 show an increase in capital invested approximating seventeenfold; in the average number of wage-earners the increase was about four and one-half fold; in amount of wages paid about ninefold; and in gross value of products about twelvefold. The population of the country has in the same period increased two and one-quarter fold, and the products of agriculture from $1,600,000,000 to $4,739,118,752, or less than twofold. These comparisons are an approximate measure of the relative development of manufactures during the half century just completed.

The value of products of manufacturing and mechanical industries for 1900 was $13,014,287,498, an increase of $3,641,850,215, or 38.9 per cent, over the value shown in 1890, which was $9,372,437,283. The total value of products returned by the census of 1880 was $5,369,579,191, the increase from 1880 to 1890 being $4,002,858,092, or 74.5 per cent. While the increase during the decade ending with 1890 exceeded that for the last decade by $361,007,877, it should be borne in mind that the value of products for 1900 represents a relatively greater volume or quantity of products than is indicated by the value expressed in dollars.

Except where otherwise stated, the term "value of products" as used in this census report refers to the gross value. A constant duplication appears in this gross

value, owing to the fact that the finished products of many manufacturing establisments become the materials of other establishments, in which they are further utilized and again included in the value of products. At the present census, the cost of materials was so reported as to show separately the amount purchased in the raw state and that purchased in partly manufactured form. By deducting $4,633,804,967, the cost of partially manufactured materials, from $13,004,400,143, shown in General Table 3, page 61, as the gross total value of products, there remains as the net value of manufactured products, $8,370,595,176, which represents the original cost of materials, together with the value added by manufacture. A fuller discussion of gross and net products will be found on page lxxxix of this report.

For the sake of uniformity in comparison, the statistics for establishments reporting products valued at less than $500, and also the statistics for governmental establishments (with the exception of 85 in the District of Columbia) and educational, eleemosynary, and penal institutions, as reported at the Twelfth Census, are omitted from table i. On pages lxx and lxxi of this introduction will be found detailed statistics of governmental establishments and educational, eleemosynary, and penal institutions separately presented.

2. *All Establishments, 1900.*—Table II divides the industries between the hand trades and the manufactures proper. It also gives the statistics for governmental establishments, educational, eleemosynary, and penal institutions, and establishments with a product of less than $500; these establishments, for the reasons above stated, are omitted from all other tables except where their statistics are the subjects of special tables.

TABLE II.—SUMMARY FOR ALL ESTABLISHMENTS.

CLASSES.	Number of establishments.	Capital.	Proprietors and firm members.	WAGE-EARNERS. Average number.	WAGE-EARNERS. Total wages.	Miscellaneous expenses.	COST OF MATERIALS USED. Total.	Purchased in raw state.	Purchased in partially manufactured form.	Fuel, freight, etc.	Value of products, including custom work and repairing.
Total	640,194	$9,861,822,864	708,788	5,373,108	$2,324,453,993	$1,030,283,385	$7,364,951,954	$2,391,672,009	$4,650,247,399	$323,032,546	$13,062,883,769
Hand trades[1]	215,814	392,442,255	242,154	559,130	288,118,421	124,623,253	482,736,991	8,851,162	462,510,619	11,375,210	1,188,615,478
Governmental establishments	138						6,917,518	60,576	6,607,447	249,495	22,010,391
Educational, eleemosynary, and penal institutions	383						3,717,536	1,038,343	2,390,709	288,484	6,688,592
Establishments with a product of less than $500	127,419	44,388,065	136,127	64,702	2,120,116	2,527,607	8,903,249	1,432,148	7,444,276	26,825	29,784,643
All other establishments	296,440	9,424,992,644	330,457	4,749,276	2,034,215,456	903,132,525	6,862,676,660	2,380,289,780	4,171,294,348	311,092,532	11,820,784,665

[1] Includes bicycle and tricycle repairing, 6,331; blacksmithing and wheelwrighting, 51,791; boots and shoes, custom work and repairing, 23,574; carpentering, 21,332; clothing, men's, custom work and repairing, 22,214; clothing, women's, dressmaking, 14,485; dyeing and cleaning, 1,810; furniture, cabinetmaking, repairing, and upholstering, 6,164; lock and gun smithing, 2,103; masonry, brick and stone, 6,434; millinery, custom work, 16,153; painting, house, sign, etc., 15,300; paper hanging, 1,645; plastering and stuccowork, 1,902; plumbing and gas and steam fitting, 11,881; sewing machine repairing, 396; taxidermy, 147; typewriter repairing, 85; watch, clock, and jewelry repairing, 12,243.

II.

INDUSTRIAL CONDITIONS AT THE OPENING OF THE CENTURY.

1. *Hamilton's "Report on Manufactures."*—As a basis from which to measure the progress of the one hundred years, there is available a government paper, now become classic, which fairly represents the industrial situation in the United States shortly after the organization of the federal government, and just prior to the opening of the nineteenth century. This is the "Report on Manufactures," submitted to Congress in 1791, by Alexander Hamilton, Secretary of the Treasury, in obedience to an order of the House of Representatives. The report is largely composed of an elaborate argument upon the policy of encouraging manufactures in the United States, a policy "which was not long since deemed very questionable," but the expediency of which is stated to have been "pretty generally admitted" at the time the report was written.

Certain portions of Mr. Hamilton's report picture the condition of American manufacturing and mechanical industries at the opening of the century, and describe the undeveloped resources of the country, upon which Mr. Hamilton relied as insuring a rapid advance of manufactures in the future. He enumerated some 17 industries which had "grown up and flourished with a rapidity which surprises, affording an encouraging assurance of success in future attempts." These 17 industries were as follows:

1. Skins.—Tanned and tawed leather, dressed skins, shoes, boots, and slippers, harness and saddlery of all kinds, portmanteaus and trunks, leather breeches, gloves, muffs and tippets, parchment and glue.

2. Iron.—Bar and sheet iron, steel, nail rods and nails, implements of husbandry, stoves, pots and other household utensils, the steel and iron work of carriages, and for shipbuilding, anchors, scale beams and weights, and various tools of artificers, arms of different kinds; though the manufacture of these last has diminished for want of a demand.

3. Wood.—Ships, cabinet wares, and turnery, wool and cotton cards, and other machinery for manufactures and husbandry, mathematical instruments, coopers' wares of every kind.

4. Flax and hemp.—Cables, sail cloth, cordage, twine, and pack thread.

5. Bricks and coarse tiles and potters' wares.
6. Ardent spirits and malt liquors.
7. Writing and printing paper, sheathing and wrapping paper, pasteboard, fullers' or press papers, paper hangings.
8. Hats of fur and wool, and mixture of both, women's stuff and silk shoes.
9. Refined sugars.
10. Oils of animals and seeds, soap, spermaceti and tallow candles.
11. Copper and brass wires, particularly utensils for distillers, sugar refiners, and brewers; andirons and other articles for household use, philosophical apparatus.
12. Tinwares for most purposes of ordinary use.
13. Carriages of all kinds.
14. Snuff, chewing and smoking tobacco.
15. Starch and hair powder.
16. Lampblack and other painters' colors.
17. Gunpowder.

In addition to the industries above enumerated, which were carried on as regular trades in many localities, Mr. Hamilton went on to describe—

a vast scene of household manufacturing, which contributes more largely to the supply of the community than could be imagined without having made it an object of particular inquiry—

and he continues—

Great quantities of coarse cloths, coatings, serges and flannels, linsey woolseys; hosiery of wool, cotton, and thread; coarse fustians, jeans, and muslins; checked and striped cotton and linen goods; bed ticks, coverlets, and counterpanes; tow linens; coarse shirtings, sheetings, toweling, and table linen, and various mixtures of wool and cotton, and of cotton and flax, are made in the household way, and, in many instances, to an extent not only sufficient for the supply of the families in which they are made, but for sale, and even, in some cases, for exportation. It is computed in a number of districts that two-thirds, three-fourths, and even four-fifths of all the clothing of the inhabitants are made by themselves. The importance of so great a progress as appears to have been made in family manufactures within a few years, both in a moral and political view, renders the fact highly interesting. Neither does the above enumeration comprehend all the articles that are manufactured as regular trades. Many others occur, which are equally well established, but which, not being of equal importance, have been omitted. And there are many attempts, still in their infancy, which, though attended with very favorable appearances, could not have been properly comprised in an enumeration of manufactories already established. There are other articles, also, of great importance, which, though strictly speaking, manufactures, are omitted as being immediately connected with husbandry, such as flour, pot and pearl ashes, pitch, tar, turpentine, and the like.

The "manufactories carried on as regular trades," and included in Mr. Hamilton's category, comprised such as would naturally spring up in a new country to supply the immediate necessities of the inhabitants, together with those whose materials were most abundant and inviting. Agricultural implements and other tools of industry were made in quantities fully equal to the demand. Firearms were also made. The dressing of skins, especially tanning, had become an important industry, and was carried on both in establishments exclusively devoted to the purpose, and by many shoemakers and farmers as a subsidiary occupation. The number of brewers and distillers was remarkable, and nearly the entire domestic demand for beverages was supplied by home production. Sawmills, grist mills, brick kilns, wool-carding mills, and fulling mills existed in great number, but always on a small scale, supplying only local needs. The manufacture of paper, which had been a successful colonial industry, also supplied the domestic requirements, and several glass works existed. "Iron works have greatly increased in the United States," said Mr. Hamilton, "and are prosecuted with much more advantage than formerly." The shipbuilding industry was particularly well developed and widespread. In 1793 the tonnage of the United States exceeded that of every other nation except England.[1] In the main, however, the people had confined themselves to such manufactures as could not be imported to advantage. Foreign goods, chiefly textiles, were largely imported in exchange for agricultural products.

Such was the general condition of our manufactures at the opening of the nineteenth century. Although some progress in this direction had been made, the occupations of the people were chiefly agricultural;[2] commerce was becoming a factor of constantly increasing importance in the development of the industrial resources of the country, while manufactures occupied the third and subordinate position.

2. *Subsequent Growth.*—In 1810 Albert Gallatin, Secretary of the Treasury, in response to a resolution of the House of Representatives of June 7, 1809, made a report which is an admirable summary of the condition of American manufactures at that date.[3] Secretary Gallatin estimated that in 1809 the value of the products of American manufactures exceeded $120,000,000. Tench Coxe's estimate, based upon the returns obtained at the census of 1810, was $198,613,471, and the Treasury reports show that in 1811 American manufactures to the value of $3,039,000 were exported. The censuses immediately following throw little light upon the rate of growth, that

[1] The American Commercial Policy, by Ugo Rabbeno, London, 1895, page 141.

[2] In 1789 Franklin had estimated that the wealth and population employed in commercial and industrial undertakings represented only one-eighth of that employed in agriculture. Tench Coxe estimated that nine-tenths of the population were engaged in agricultural pursuits.

[3] In concluding this report, Mr. Gallatin recommended that the law for taking the Third Census should be amended so as to require the marshals and their assistants to return an account of the several manufacturing establishments in their districts and divisions. In accordance with this recommendation, Congress passed, on May 1, 1810, an amendment to the census act, which authorized the Secretary of the Treasury to appropriate for this return $30,000 out of the sum of $150,000 set apart by the previous act for taking the census. Thus we owe it to Albert Gallatin that the United States began thus early, and before any other country, the taking of the census of manufactures—a practice which has continued uninterruptedly with the exception of the year 1830. The modest sum of $30,000, allowed for the manufacturing census, is stated by Mr. Bishop to have been more than adequate to meet its cost. This first industrial census was taken without even the formality of a schedule, or definite instructions to the marshals, and necessarily it forms no true measure of the industrial resources of the country at that time. The chief value of the statistics lies in the analysis of them made by Tench Coxe, who was appointed by the Secretary of the Treasury to digest the returns. Of the $198,613,471 reported as the value of the products, more than 22 per cent was estimated by Mr. Coxe.

of 1820 being so defective that Congress never authorized the publication of the figures. The enumeration of manufactures was omitted altogether from the census of 1830; and the census of 1840 made no attempt whatever to foot up the aggregate value of the products returned.[1] The census of 1850 fixed this value at $1,019,106,616 for that year—an increase of fivefold over Mr. Coxe's estimate for 1810. It is clear from the report of this census and from a great body of unofficial data available, that the country had made notable progress in nearly every line of manufactures, and laid the foundations deep and broad for subsequent development. But it may be noted that until nearly 1840, iron continued to be smelted by charcoal, the process differing little from that employed in colonial times, and not until the decade between 1830 and 1840 was puddling generally introduced in the United States. During this decade the iron rails used in the construction of railroads were obtained exclusively by importation; coke was not generally used in smelting until 1850; in 1860 our production of pig iron reached only 987,559 tons, in comparison with the 14,452,234 tons produced in 1900; steel rails were not manufactured in the United States until 1860; and the first Bessemer steel was produced here in 1864.

Not until the decade between 1860 and 1870 did it become apparent that the complete supply of staple products for the home market was within the capacity of domestic manufacture. During the Civil War, the great demand for manufactured supplies of every description, and the high protective duties on imports, necessitated by the revenue requirements of the Government, stimulated enterprise and production to an extent not known before or since. The census indicates that the value of manufactured products more than doubled in that decade, increasing from $1,885,861,676 in 1860 to $4,232,325,442 in 1870. The actual increase was, however, somewhat less, and the increase between 1870 and 1880 somewhat greater, than the figures indicate; since the values reported in 1870 were based upon a paper currency, while those of 1860 and 1880 were gold values. The increase from 1880 to 1890 was larger than in any preceding decade. The figures of the census of 1890 indicate a period of unprecedented industrial prosperity. The full effect of labor-saving devices had begun to be felt; great progress had been made in the utilization of

[1] As stated above, the manufacturing censuses prior to 1850 were so imperfectly taken and compiled that it is not possible to use them for comparative purposes in connection with the subsequent censuses. Certain of these showed no aggregates for the United States or for each industry; nevertheless, they gave much valuable information regarding the industrial conditions and progress of the country, which is now almost inaccessible to the public by reason of the scarcity of the official volumes. The annual report of the Secretary of the Treasury for 1855 presented a series of tables in which was attempted a summary of the results of the censuses of manufactures prior to that date. The results of an investigation made in 1832 by the Treasury Department in connection with pending tariff legislation were also included in this résumé, no census of manufactures having been taken in 1830. The tables thus compiled by the Secretary of the Treasury have never been republished, and it is deemed proper to reproduce those tables, covering the decades prior to 1850, in order that the present report may contain in summary form all the statistical data regarding manufactures which have been collected by the United States. The tables are believed to be the only attempt ever made to show the totals of the earlier manufacturing censuses. A part of the explanatory portion of the transmittal letter of Robert C. Morgan and W. A. Shannon, the compilers of the data, to Hon. James Guthrie, Secretary of the Treasury, is also reproduced.

TREASURY DEPARTMENT,
November 16, 1855.

SIR: In compliance with the instructions contained in your letter of March 8, 1855, referring to certain statistical tables on the subject of the tariff, the undersigned have the honor to submit the following report:

That in pursuing the duty assigned them, the censuses for the different decades were consulted, with but partial success, except for the years 1840 and 1850, which were full enough for all practical purposes.

The censuses of 1790 and 1800 seem to be nothing more than a mere enumeration of the population of the states for the purpose of determining the representative ratio in Congress. Those of 1810 and 1820 are but partially given, and, from the imperfect state of the returns, works bearing on the subject had to be consulted, from which much of the information presented has been obtained. From a like cause the census of 1830 is as imperfect as those of 1790 and 1800, and, but for returns made in compliance with a resolution of Congress, passed January 19, 1832, which includes but 10 states, there would be nothing to present for that year.

In the year 1840 more attention was given to the resources of the country, and the data presented enables us to make out, as we believe, nearly a full and complete exhibit of the manufactures.

Table A is an exhibit of the manufacturing products of the United States, for 1810, and has been made up with great care from the census of that year, compiled by Tench Coxe, esq., of Philadelphia, Pa., May 13, 1813. The returns are very imperfect, and a glance at the table will show that some states—Pennsylvania and Massachusetts, for instance—are more fully represented, in almost every branch of manufactures, than others. The manufactures of cotton and wool were generally produced in families at that time, and are so blended in the returns with those produced in mills, as to render it impossible to separate them.

Table B is a statement of the manufactures of the states and territories for 1820, as given by the census returns for that year. The manufactures of cotton, wool, and flax, were mostly in families, and are not given. The data relating to the iron interests, products of distilleries and breweries, and the product of the fisheries, are imperfect, and no information touching the same can be found further than that presented in the table. We visited New Bedford, Mass., to endeavor to find data of the whale fishery, but could find no reliable tables of the value of that important branch of the industry of an earlier date than 1833.

Table C.—By authority of a resolution passed by Congress January 19, 1832, the manufacturing statistics of the Eastern and Middle states were taken and published in two large octavo volumes. (See Executive Documents first session Twenty-second Congress, House Doc. No. 308.) From this work the information presented in this table has been carefully collected, but it does not fully represent the manufacturing products of any one state, except, perhaps, Massachusetts. All manufactures in families, and those on a small scale, are not embraced in the returns, while in some of the states many manufacturers declined answering the questions of the marshals. No further data can be found in addition to that presented.

Table D has been carefully prepared from the census of 1840, which is fuller than that of any previous year. The manufactures of the states and territories are generally given, but on reference to the table it will be seen that some of the states and territories are wanting, and no means have come to hand to supply this deficiency. The census is not uniform in the manner of giving the returns; many of the manufactures and agricultural products are stated in quantity, whilst others are given in value. To make the tables uniform, the prices current for the year had to be consulted and computations made in every case. The prices of maple and cane sugar, which are included in the manufactures, have been estimated, upon the authority of Professor Tucker, at 6 and 4 cents per pound, respectively. In cases where prices current did not show the value of any article, the books of long-established merchants were consulted. * * *

Table E is a recapitulation of Tables A, B, C, and D.

All of which is respectfully submitted.

We have the honor to be your obedient servants,

ROBERT C. MORGAN.
W. A. SHANNON.

Hon. JAMES GUTHRIE,
Secretary of the Treasury.

MEMORANDUM.

(Page li, Volume VII, Reports of the Twelfth Census.)

The figures in the table for 1810, taken from the report of the Secretary of the Treasury, 1855, were apparently obtained by adding Tench Coxe's total reported values of manufactures and his total values of articles classed by him as "of a doubtful nature or agricultural." Because of numerous errors in both reports, the aggregates thus obtained by combining Coxe's figures do not agree exactly, in the cases of most of the states and territories, with those given in the Treasury report. The greatest discrepancy is found in the case of Pennsylvania. For this state the addition of the state totals for the various kinds of products classed by Coxe as manufactured articles gives a total for all products of $32,171,529, which differs slightly from the amount given by Coxe in a summary table. This does not include, however, $10,877,575, representing the value of products erroneously listed by Coxe under the head of manufactured articles (Hemp to Mahogany, last two pages of manufactures list) but properly belonging in his table of articles of a doubtful or agricultural character.

The value of these articles was not included by Coxe in his manufactures total but was included in his total for articles of a doubtful or agricultural character. The total reported value of manufactures and of articles of a doubtful or agricultural character for Pennsylvania was $44,364,592, which exceeds the Treasury figure by more than $8,500,000. If, however, the $10,877,575 item be excluded from the calculation, Coxe's aggregate is brought down to $33,487,017, which, although more than $2,300,000 below the Treasury figure, still approaches it much more closely than does the aggregate in which the $10,877,575 item is included. It seems probable, therefore, that the Treasury compiler overlooked the value of these doubtful or agricultural articles erroneously listed with the manufactures of Pennsylvania.

In the cases of the other states the differences between the Treasury totals and the aggregates of Coxe's figures for manufactured articles and articles of a doubtful or agricultural nature are much smaller, and in a number of cases the two sets of figures agree exactly.

MEMORANDUM.

(Page xlix, Volume VII. Reports of the Twelfth Census.)

It is stated that "Tench Coxe's estimate, based upon the returns of the census of 1810, was $198,613,471.* * * ." This figure was obtained by adding $172,762,676, given by Coxe as his estimated total value of manufactures, and $25,850,795, given by him as his total value of "articles of a doubtful nature or agricultural."

Both these figures are incorrect. The correct total obtained by adding Coxe's estimated values of manufactures for the several states and territories is $172,671,977; and the correct total valhe of articles reported by him as of a doubtful nature or agricultural is $25,686,545.

the agricultural and mineral resources of the country; the vast West was just emerging from the frontier stage; capital was abundant, and at all points available for the extension and strengthening of every line of industry.

The decade covered by the present census shows a relatively small rate of progress, measured by percentages, but in many respects it was the most notable in our history. The absolute increase in gross value of products during the decade—$3,641,850,215—was nearly equal to that of the entire period up to and including the census of 1870. The decade will remain conspicuous in our manufacturing history for two things: The entrance of the United States into international trade in manufactures, in systematic competition with the chief exporting nations; and the reorganization of industry on broader lines, through industrial combination, which has placed many branches of manufacture on a new basis in relation to competition.

(FOOTNOTE.—Continued from page l.)

TABLE A.—*Statement showing the population and manufactures of the United States and territories for the year 1810.*

STATES AND TERRITORIES.	Population.	Manufactures of cotton and flax in families and otherwise.	Manufactures of wool in families and otherwise.	Manufactures of pig iron and castings.	Manufactures of wrought iron.	Breweries and distilleries.	Product of the fisheries.	Product of the salt manufactures.	Manufactures produced in families.	All other manufactures.	Total value of manufactures.
Columbia, District of	24,023	$52,000	$73,000	.....	.....	$17,400	.....	.....	.....	$788,250	$930,650
Connecticut	264,042	1,053,730	1,731,472	$46,180	$351,198	811,144	.....	.....	.....	1,864,958	5,858,682
Delaware	72,674	143,880	230,497	.....	195,420	23,096	.....	$2,050	.....	1,409,969	2,004,912
Georgia	252,433	2,129,023	22,305	.....	30,155	473,658	.....	.....	.....	113,763	2,768,904
Kentucky	406,511	554,134	1,815,909	1,000	44,260	740,242	.....	324,870	.....	1,826,965	5,307,380
Louisiana	76,556	106,544	36,780	.....	244,000	157,025	.....	6,110	.....	1,592,807	2,143,266
Maine, District of	228,705	580,027	743,242	.....	21,929	107,200	.....	.....	.....	660,706	2,113,104
Maryland	380,546	1,013,320	480,753	249,653	491,058	539,840	.....	3,769	.....	5,101,468	8,879,861
Massachusetts	472,040	2,128,176	2,074,410	154,700	2,078,542	1,714,776	$463,320	92,895	.....	9,630,692	18,337,511
New Hampshire	214,360	880,208	1,635,209	.....	170,350	74,450	.....	.....	.....	374,810	3,135,027
New Jersey	245,555	910,233	851,582	861,932	526,511	632,354	.....	.....	.....	1,530,676	5,313,288
New York	959,049	2,153,613	6,332,819	362,020	497,875	2,026,561	.....	.....	.....	3,206,250	14,569,138
North Carolina	555,500	747,285	2,323,961	135,160	554,950	758,005	.....	8,800	.....	800,260	5,328,421
Ohio	230,760	887,053	132,920	109,090	74,123	585,892	.....	24,000	.....	477,152	2,290,230
Pennsylvania	810,091	3,060,772	3,421,055	1,301,343	4,492,478	4,365,503	.....	1,000	.....	19,175,630	35,817,781
Rhode Island	77,031	844,591	740,359	3,970	56,770	848,240	.....	600	.....	523,232	3,017,762
South Carolina	415,115	1,619,068	95,554	.....	90,227	297,061	.....	.....	.....	114,302	2,216,212
Tennessee	261,727	1,329,066	412,522	98,097	263,327	400,900	.....	.....	.....	243,789	2,747,701
Vermont	217,713	1,238,699	1,385,152	122,000	272,059	129,964	.....	.....	.....	1,007,540	5,055,414
Virginia	974,622	4,203,221	1,033,781	171,312	538,854	1,735,577	.....	704,000	.....	8,419,351	16,806,096
Illinois territory	12,282	54,028	.....	.....	.....	8,670	.....	.....	.....	55,160	117,853
Indiana territory	24,520	129,985	29,067	.....	4,000	22,280	.....	.....	.....	79,608	264,890
Michigan territory	4,762	1,098	6,172	.....	.....	14,172	.....	.....	.....	31,076	52,518
Mississippi territory	40,352	257,248	10,267	.....	.....	.....	.....	.....	.....	46,790	314,305
Missouri territory	20,845	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	7,239,814	26,076,997	25,608,788	3,616,457	10,998,086	16,483,960	463,320	1,163,094	.....	60,975,204	145,385,906

Increase per cent in population for this decade, 36.45.
The manufactures of cotton and wool were generally produced in families.
The value of dried and pickled fish exported in the year 1810 was $1,127,000. (See Pitkin's Statistics, edition of 1835, page 40.)

TABLE B.—*Statement showing the population and manufactures of the United States and territories for the year 1820.*

STATES AND TERRITORIES.	Population: Census of 1820.	Manufactures of cotton.	Manufactures of wool.	Manufactures of pig iron and castings.	Manufactures of wrought iron.	Breweries and distilleries.	Product of the fisheries.	Product of salt manufactures.	Manufactures produced in families.	All other manufactures.	Total value of manufactures.
Alabama	127,901	.....	$5,292	.....	$15,620	$4,650	.....	.....	.....	$75,645	$101,207
Columbia, District of	33,039	.....	.....	.....	5,000	.....	.....	.....	.....	699,620	704,620
Connecticut	275,202	$443,268	289,083	.....	296,260	297,136	.....	.....	.....	1,087,282	2,413,029
Delaware	72,749	151,266	106,300	$30,000	30,000	.....	.....	$1,425	.....	999,900	1,318,891
Georgia	340,987	101,232	19,500	.....	69,036	46,039	.....	.....	.....	371,944	607,751
Indiana	147,178	5,400	3,750	.....	3,000	69,736	.....	.....	.....	315,928	397,814
Kentucky	564,317	197,925	523,149	130,000	138,800	112,000	.....	188,840	.....	1,006,012	2,296,726
Louisiana	153,407	.....	6,200	.....	10,000	63,800	.....	.....	.....	192,500	272,500
Maine	298,335	35,750	22,425	.....	65,200	163,700	.....	.....	.....	199,398	486,473
Maryland	407,350	274,081	210,300	93,000	449,080	267,040	.....	.....	.....	3,733,885	5,027,386
Massachusetts	523,287	735,512	294,850	77,500	423,610	101,871	.....	95,496	.....	794,895	2,523,614
Mississippi	75,448	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Missouri	66,586	.....	6,700	.....	18,421	47,537	.....	58,000	.....	166,785	297,443
New Hampshire	244,161	154,547	51,672	40,500	18,340	43,250	.....	.....	.....	439,650	747,959
New Jersey	277,575	190,915	177,409	76,300	188,997	143,057	.....	.....	.....	398,461	1,175,139
New York	1,372,812	738,140	956,147	342,400	472,158	1,632,543	.....	669,041	.....	4,981,643	9,792,072
North Carolina	638,829	17,222	39,468	.....	53,510	62,980	.....	13,350	.....	258,868	445,398
Ohio	581,434	51,315	689,292	413,350	491,707	479,511	.....	129,126	.....	3,036,126	5,290,427
Pennsylvania	1,049,458	555,673	333,371	563,810	1,156,266	476,516	.....	100,000	.....	3,709,583	6,895,219
Rhode Island	83,059	988,157	124,909	.....	19,032	302,500	.....	750	.....	181,873	1,617,221
South Carolina	502,741	4,666	.....	.....	42,000	2,200	.....	.....	.....	119,800	168,666
Tennessee	422,813	125,256	127,052	184,916	246,755	313,509	.....	18,912	.....	1,335,727	2,352,127
Vermont	235,764	49,882	198,659	85,400	33,340	63,314	.....	.....	.....	459,758	890,353
Virginia	1,065,379	14,000	198,020	193,100	393,417	162,737	.....	575,500	.....	5,149,925	6,686,699
Arkansas territory	14,273	.....	900	.....	120	.....	.....	.....	.....	55,388	56,408
Illinois territory	55,211	.....	9,120	.....	.....	18,700	.....	1,873	.....	71,285	100,983
Michigan territory	8,896	.....	19,500	.....	1,000	2,160	.....	.....	.....	77,800	100,460
Total	9,638,131	[1]4,884,157	[1]4,413,068	2,280,276	4,640,669	4,876,486	.....	1,852,258	.....	29,919,621	52,766,530

[1] The manufactures of cotton, wool, and flax for this decade were mostly in families, and are not given in the census of 1820.

Increase in population for this decade, 33.13 per cent.
The iron interests are only partially represented in the above table, the returns being imperfect.
The product of breweries and distilleries but partially given in the census.
The value of dried and pickled fish exported in the year 1820 was $1,502,000. (See Pitkin's Statistics, edition of 1835, page 40.)

III.

THE DEVELOPMENT OF THE FACTORY SYSTEM.

The factory system of manufacture, so called, in contrast to domestic and shop manufacture, had practically no existence in the United States at the opening of the nineteenth century, although its development in England, particularly in the textile industries, had been rapid during the last quarter of the eighteenth century. During or just prior to that period, the great basic

(FOOTNOTE.—Continued from page li.)

TABLE C.—*Statement showing the population and manufactures of the United States and territories for the year 1830.*

STATES AND TERRITORIES.	Population: Census for 1830.	Manufactures of cotton.	Manufactures of wool.	Manufactures of pig iron and castings.	Manufactures of wrought iron.	Breweries and distilleries.	Product of the fisheries.	Product of the salt manufactures.	Manufactures produced in families.	All other manufactures.	Total value of manufactures.
Alabama	309,527										
Columbia, District of	39,834										
Connecticut	297,675	$1,853,296	$1,576,975	$136,762	$500,000	$35,700	$108,149			$3,842,171	$8,053,053
Delaware[1]	76,748	310,000	120,000		160,000			$5,000		1,396,000	1,991,000
Georgia	516,823										
Illinois	157,445										
Indiana	343,031										
Kentucky	687,917										
Louisiana	215,739										
Maine	399,455	612,636	481,856	54,500	608,500	229,985		240,625		4,815,671	7,043,773
Maryland	447,040										
Massachusetts	610,408	7,754,803	7,312,836	1,437,147	8,360,102	3,068,523	3,532,609	205,776		31,071,828	62,743,624
Mississippi	136,621										
Missouri	140,455										
New Hampshire	269,328	2,447,634	842,375	52,891	364,284	80,300		750		1,890,265	5,678,499
New Jersey	320,823	1,879,180	728,000	412,941	642,238						3,662,359
New York	1,918,608	2,706,920	1,297,003	751,807	1,989,790			302,807			7,048,327
North Carolina	737,987										
Ohio	937,903										
Pennsylvania	1,348,233	2,099,715	1,323,070	1,643,702	3,762,847			180,215		[2]2,322,898	11,331,947
Rhode Island	97,199	2,645,081	322,151	139,973	200,000					[2]277,900	3,585,105
South Carolina	581,185										
Tennessee	681,904										
Vermont	280,652	225,550	523,900	127,680	149,490	20,300				460,859	1,507,779
Virginia	1,211,405										
Arkansas Territory	30,388										
Florida Territory	34,730										
Michigan Territory	31,639										
Naval service	5,318										
Total	12,866,020	22,534,815	14,528,166	4,757,403	16,737,251	3,434,808	3,640,758	935,173		46,077,092	112,645,466

[1] In this state many of the manufacturers declined answering the queries; consequently the returns are defective.
[2] The manufactures of leather, paper, glass, and the maple sugar produced in the county of Somerset are included in the above amount. All manufactures in families and those on a small scale are not given.
[3] In this state there are several hundred blacksmiths' and other shops where a variety of articles are manufactured for the use of cotton and woolen mills, the product of which is not given.
Increase per cent in population for this decade, 33.49.

TABLE D.—*Statement showing the population and manufactures of the United States and territories for the year 1840.*

STATES AND TERRITORIES.	Population: Census of 1840.	Manufactures of cotton.	Manufactures of wool.	Manufactures of pig iron.	Manufactures of iron, castings.	Manufactures of iron, wrought.	Breweries and distilleries.	Product of the fisheries.	Product of the salt manufactures.	Manufactures produced in families.	All other manufactures.	Total value of manufactures.
Alabama	590,756	$17,547		$750	$27,700	$4,875	$24,382			$1,656,119	$3,234,498	$4,975,871
Arkansas	97,574		$129		1,240		7,132		$1,740	489,750	2,114,898	2,614,889
Columbia, Dis. of	43,712				68,000		26,370	$87,400		1,500	1,416,660	1,599,930
Connecticut	309,978	2,715,964	2,491,312	162,375	1,733,044	235,495	58,291	907,723	300	226,162	12,523,856	21,057,523
Delaware	78,085	332,272	104,700	425	10,700	29,185	5,925	181,285	232	62,116	1,982,228	2,709,068
Georgia	691,392	304,342	300	12,350	5,350		34,221	584		1,467,630	3,496,330	5,324,307
Illinois	476,183		9,540	3,950	41,200		432,500		4,000	993,567	6,536,825	8,021,582
Indiana	685,866	135,400	58,867	20,250	14,580	1,300	510,778	1,192	1,280	1,289,802	7,346,137	9,379,586
Kentucky	779,828	329,380	151,246	730,150	164,080	236,405	508,381		43,939	2,622,462	8,435,915	13,221,958
Louisiana	352,411	18,900		35,000		88,790	77,450			65,190	11,093,053	11,378,383
Maine	501,793	970,397	412,366	153,050	56,512		54,000	1,280,713	10,000	804,397	10,788,782	14,525,217
Maryland	470,019	1,150,580	235,900	221,900	312,900	513,500	223,096	225,773	240	176,050	10,449,097	13,509,636
Massachusetts	737,699	16,553,423	7,082,898	233,300	1,798,758	390,260	1,461,786	6,483,996	75,319	231,942	39,466,205	73,777,837
Michigan	212,267		9,734	15,025	57,900		137,500			113,955	3,564,562	3,898,676
Mississippi	375,651	1,744			36,900		870			682,945	2,839,911	3,562,370
Missouri	383,702		13,750	4,500	60,300	7,670	198,464		2,630	1,149,544	4,514,901	5,946,759
New Hampshire	284,574	4,142,304	795,784	33,000	136,334	8,125	18,336	92,811	240	538,303	4,758,076	10,523,313
New Jersey	373,306	2,086,104	440,710	227,850	405,955	466,115	121,141	124,140	100	201,625	15,447,756	19,571,496
New York	2,428,921	3,640,237	3,587,337	727,200	2,512,792	3,490,045	4,141,798	1,316,072	573,577	4,636,547	71,264,589	95,840,194
North Carolina	753,419	438,900	3,900	24,200	16,050	62,595	286,649	251,792	899	1,413,242	4,786,340	7,234,567
Ohio	1,519,467	139,378	685,757	880,900	784,401	485,290	1,922,354	10,525	59,470	1,853,937	24,636,389	31,458,401
Pennsylvania	1,724,033	5,013,007	2,319,061	2,459,875	1,262,670	5,670,860	3,599,698	35,360	109,895	1,303,093	42,721,441	64,494,960
Rhode Island	108,830	7,116,792	842,172	103,150	147,550		244,290	659,312		51,180	4,642,851	13,807,297
South Carolina	594,398	359,000	1,000	31,250		75,725	27,618	1,275	450	930,703	4,211,802	5,638,823
Tennessee	829,210	325,719	14,290	403,213	100,870	628,745	299,784			2,886,661	3,858,162	8,517,394
Vermont	291,948	113,000	1,331,953	168,575	24,900	42,575	2,865			674,548	4,565,566	6,923,982
Virginia	1,239,797	440,063	147,792	470,262	128,256	382,590	238,690	95,173	349,124	2,441,672	15,984,986	20,684,608
Florida territory	54,477		800					218,219	2,400	20,205	678,456	915,080
Iowa territory	43,112				[4]4,000		1,164			25,966	452,570	483,700
Wisconsin territory	30,945			75	3,500		4,371	27,663		12,567	1,632,632	1,680,808
Naval service territory	6,100											
Total	17,069,453	46,350,453	20,696,999	7,172,575	9,916,442	12,820,145	14,674,804	11,996,008	1,235,835	29,023,380	329,391,574	483,278,215

Increase per cent in population for this decade, 32.67. Salt estimated at 20 cents per bushel. Sugar estimated at 6 cents per pound; except Louisiana at 4 cents. The product of mills and molasses has been included in the manufactures.

inventions for automatic textile manufacture were put in practical operation in England. These, together with the invention of the steam engine, which occurred at about the same time, rapidly withdrew manufacturing industries from the household and the shop, and concentrated them in the factory, where large bodies of men and women worked for stipulated wages under skilled direction, thus accomplishing what is commonly called the industrial revolution, and inaugurating the factory system of manufacture.

This system obtained its first foothold in the United States during the period of embargo and the War of 1812. The manufacture of cotton and wool passed rapidly from the household to the mill; but the methods of domestic and neighborhood industry continued to predominate, even in these industries, down to and including the decade between 1820 and 1830; and it was not until about 1840 that the factory method of manufacture extended itself widely to miscellaneous industries, and began rapidly to force from the market the handmade products with which every community had hitherto chiefly supplied itself. It seems probable that until about the year 1850, the bulk of general manufacturing done in the United States was carried on in the shop and the household, by the labor of the family or individual proprietors, with apprentice assistants, as contrasted with the present system of factory labor, compensated by wages, and assisted by power.

The census of 1850 is therefore the proper starting point for the comparative statistics of manufactures, although it is not possible to make any analysis of the figures returned by that census, which will determine with certainty the proportion of manufactures produced in factories, in distinction from the products of the household and of the neighborhood shop. Since the date of that census, the relative value of the manufactured products of the shop and the household has steadily decreased, until, at the Twelfth Census, it represents but an insignificant part, say one-thirteenth, of the total value of products.

It is not to be inferred, however, that no notable ventures in the direction of large factory production had been made in the United States prior to 1850. The city of Lowell, in Massachusetts, was founded in 1823, and from the start was preeminently a mill city. The Middlesex Mills were started there in 1830, with a capital of $500,000, which was soon increased to $1,000,000; the Lowell carpet mills were organized in 1828; and the Merrimac, the Hamilton, and other large cotton corporations were organized before 1830. The city of Lawrence was founded in 1845, starting with the great Bay State Mills, a wool-manufacturing corporation with $1,000,000 capital. This was followed in 1853 by the Pacific Mills, with $2,000,000 capital, which produced according to the census of 1860, 11,000,000 yards of dress goods. The number of cotton spindles in operation in Massachusetts was, in round numbers, 340,000 in 1830, 624,000 in 1840, 1,288,000 in 1850, and 1,688,500 in 1860,[1] showing the rapid development of cotton manufacture then in progress. The organization of great corporations in iron and steel, in foundry products of every variety, in leather, and in other industries, dates from the decade ending with 1860, or even earlier.

[1] Tariff History of the United States, by F. W. Taussig, Ph. D. 1892, page 141.

(FOOTNOTE.—Continued from page lii.)

TABLE E.—*Recapitulation of Tables A, B, C, and D.*

STATES AND TERRITORIES.	Decades.	Population.	Increase per cent in population.	Manufactures of cotton.	Manufactures of wool.	Manufactures of pig iron.	Manufactures of iron castings.	Manufactures of wrought iron.	Breweries and distilleries.
Seventeen	1790	3,929,827							
Twenty-one	1800	5,305,925	35.02						
Twenty-five	1810	7,239,814	36.45	$26,076,997	$25,608,788	$3,616,457	Included in pig iron.	$10,998,086	$16,483,960
Twenty-seven	1820	9,638,131	33.13	4,834,157	4,413,068	2,230,276	Included in pig iron.	4,640,669	4,876,486
Twenty-eight	1830	12,866,020	33.49	22,534,815	14,528,166	4,757,403	Included in pig iron.	16,737,251	8,434,808
Thirty	1840	17,069,453	32.67	46,350,453	20,696,999	7,172,575	$9,916,442	11,820,146	14,674,804

STATES AND TERRITORIES.	Product of the fisheries.	Product of the salt manufactures.	Manufactures produced in families.	All other manufactures.	Total value of manufactures.	Remarks.
Seventeen						The enumeration of the inhabitants only is given for this decade.
Twenty-one						The enumeration of the inhabitants only is given for this decade.
Twenty-five	$463,320	$1,163,094	Included in cotton and wool.	$60,975,204	$145,385,906	Statistics defective.
Twenty-seven		1,852,258	Included in cotton and wool.	29,919,621	52,766,535	Statistics defective.
Twenty-eight	3,640,758	935,173	Included in cotton and wool.	46,077,092	112,645,466	But ten states represented.
Thirty	11,996,008	1,235,835	$29,023,380	329,891,574	483,278,215	Full.

IV.

MANUFACTURES AND AGRICULTURE.

Down to 1880, or to some time between 1880 and 1890, agriculture was the principal source of wealth in the United States. At the last census the value of farm products was exceeded by that of manufactured products. An exact showing of the relative importance of the two sources of national wealth at prior censuses is impossible, owing to the conditions under which the statistics were compiled. The Eleventh Census, which placed the value of farm products at $2,460,107,454, did not include the value of live stock on the farms, or the value of stock sold for slaughter during the census year. Mr. J. R. Dodge, formerly statistician of the Department of Agriculture, taking into account these deficiencies of the census of 1890, and allowing for other deficiencies, has placed the value of farm products for 1890 at $3,289,000,000. On the other hand, the duplications which occur in the statistics of manufactures, have tended greatly to exaggerate the intrinsic addition to the wealth of the country contributed by manufacturing processes. By deducting from the gross value of products in 1890, the value of all the materials consumed in manufacture, the census report figured a net value of $4,210,393,207, which, though considerably less than the net value would have been, if computed by the method used at this census, yet exceeds the highest estimate of the value of the products of the farm for that year.

At the census of 1900, the value of farm products is shown to have been $4,739,118,752. In this total there occur certain duplications which the Report on Agriculture eliminates, leaving a residue of $3,764,177,706 as the actual net value of farm products in the census year. The net value of the products of manufacture, as computed at this census is $8,370,595,176, a sum more than double the value of the net products of the farm. If from this net value is eliminated everything in the way of crude materials contributed by the farm, the forest, the mine, and the sea, there is still left a value of $5,981,454,234; and on this basis, it appears that the contribution of manufactures and the mechanical arts to the wealth of the country exceeds the contribution of agriculture by more than a billion dollars. The figures indicate that rapid as has been the development of agricultural interests, manufactures have advanced even more rapidly.

This conclusion is strengthened by a consideration of the statistics of occupations as presented at the several censuses. No reliable comparisons can be made for censuses prior to 1880, and allowances must always be made whenever such figures are used. Only comparisons of the most general character can be made, for the groups are broad and not entirely uniform for the different censuses, while inclusion in a class was irrespective of the length of time engaged, and many persons were probably included whose employment in the given class was merely nominal or temporary. Table III, quoted from pages cxxxiii and cxxxiv of the report on Population, Part II, shows the statistics of the number of persons employed in the different classes of occupations at the censuses of 1880, 1890, and 1900.

TABLE III.—*Number of persons, 10 years and over, engaged in gainful occupations: 1880, 1890, and 1900.*

CLASSES OF OCCUPATIONS.	1900[1]		1890		1880	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
All occupations	29,074,117	100.0	22,735,661	100.0	17,392,099	100.0
Agricultural pursuits	10,381,765	35.7	8,565,926	37.7	7,718,875	44.3
Professional service	1,258,739	4.3	944,333	4.1	603,202	3.5
Domestic and personal service	5,580,657	19.2	4,220,812	18.6	3,423,815	19.7
Trade and transportation	4,766,964	16.4	3,326,122	14.6	1,866,481	10.7
Manufacturing and mechanical pursuits	7,085,992	24.4	5,678,468	25.0	3,784,726	21.8
Fishing	68,177	0.2	60,162	0.3	41,352	0.3
Mining and quarrying[2]	581,221	2.0	387,248	1.7	249,397	1.4
Manufacturing and mechanical pursuits proper	6,436,594	22.2	5,231,058	23.0	3,493,977	20.1

[1] Does not include outlying possessions.
[2] Includes officials of mining and quarrying companies.

The table shows that of the 29,074,117 persons employed in 1900 in all occupations, 10,381,765 were engaged in agricultural pursuits and 7,085,992 in manufacturing. During the twenty years shown the number engaged in agricultural pursuits increased 34.6 per cent, while the number engaged in manufacturing increased 87.2 per cent. In this connection, it is interesting to note that while the occupation table shows 7,085,992 persons to have been engaged in manufacturing in 1900, the greatest number employed at any one time, as given on page 59 of the Report on Manufactures, Part I, was 7,069,144, and the average number during the year was 5,308,406.

The number 5,308,406, however, represents only the average number of persons reported as wage-earners, in establishments such as are considered throughout this report, as comparable with those reported at former censuses, while the numbers given in the population table of occupations include all persons, regardless of the length of time engaged or character of their connection with the given occupation. These differences render comparisons between the reports impracticable. If to the 5,308,406 persons shown in General Table 3, there be added 708,738 proprietors and firm members (shown in table II) 64,702 employees of establishments with less than $500 products (shown in the same table), there is obtained the number 6,081,846. This does not include the persons employed in governmental establishments, nor in educational, eleemosynary, and penal institutions.

V.

RANK OF THE UNITED STATES AS A MANUFACTURING NATION.

It is difficult to make a satisfactory statistical statement of the relative rank of the United States among the manufacturing nations during the half century covered by the statistics of table I. The United States was the first country in the world to attempt a census of manufactures, and it remains the only country which presents at regular intervals an official statement of the progress and condition of manufacturing industries. Although various European countries, notably Germany, France, and Austria, have undertaken partial industrial censuses, none has attempted to measure the quantity or value of manufactured products. Great Britain, through her board of trade, makes an annual report of the number of persons employed in the industries covered by her factory laws. The United States alone shows at stated periods the capital invested in manufactures, the number of persons employed, the wages paid, the cost of materials consumed, and the value of products.

Information regarding the details of manufactures in other countries must, therefore, be taken from unofficial sources. The statistics of exports and imports of manufactured articles, as officially returned, are the basis upon which estimates of this character are founded. Attempts to measure statistically the value of the manufactured products of the several nations were regularly made by the late Michael G. Mulhall, of England, in the several editions of his Dictionary of Statistics, and in his volume entitled "Industries and Wealth of Nations" (1896). In the absence of official information, Mr. Mulhall's estimates have been generally accepted, with necessary qualifications, by those who find it necessary to use such figures for comparative purposes; and it is probable that they sufficiently approximate the facts to permit a fair judgment of the relative value of the manufactured products of the various countries at the dates named.

The "Industries and Wealth of Nations" contains the following table, showing Mr. Mulhall's estimates of the yearly value of the manufactures in the countries named at the dates indicated. In reproducing Mr. Mulhall's table, pounds sterling have been converted into dollars, on the United States Treasury basis of $4.866 to the pound.

TABLE IV.—*Manufactures in the United States and foreign countries.*

	MILLIONS OF DOLLARS.			
	1820	1840	1860	1894
United Kingdom	1,411	1,883	2,808	4,263
France	1,168	1,606	2,092	2,900
Germany	900	1,484	1,995	3,357
Austria	511	852	1,129	1,596
Other states	1,654	2,516	3,455	5,236
Europe	5,644	8,341	11,479	17,352
United States	268	467	1,907	9,498
Total	5,912	8,808	13,386	26,850

According to this table the United States held in 1860 the fourth rank among the manufacturing nations, being surpassed by Great Britain, France, and Germany, in the order named. Mr. Mulhall's estimates for 1894 lift the United States from the fourth to the first rank, and place Germany ahead of France.

It is plain from the figures in the table that Mr. Mulhall made no allowance for the duplication of products, which appears in the statistics of the United States census, as elsewhere explained. The true amount for comparison with his statistics of other nations is the net value of products, which in 1900 was $8,370,595,176. This value is nearly double that assigned by Mr. Mulhall to the manufactured products of Great Britain in 1894. Mr. Mulhall declares that—

> The United States produce about one-third of the manufactured total of nations, as they do also of grain and wheat, while their population is less than one-sixth. * * * American manufactures have multiplied just twentyfold since 1840, while those of Europe have only doubled. Nearly all American manufactures are produced by machinery, while in Europe more than one-half is handwork.

In presenting this table, Mr. Mulhall qualifies it by the statement that—

> The value of American manufactures is artificially raised by protective tariffs fully 33 per cent over the real value; the latter amounts, therefore, in 1894, to about 1,464 millions sterling, or the value conjointly of British and French manufactures.

Without pausing to consider Mr. Mulhall's statement regarding the effect of protective duties in artificially raising the value of manufactured commodities, the figures he reaches, after allowing for the full possible effect of such duties, make the value of the manufactured product of the United States equal to that of the manufactures of England and France combined.

Mr. Mulhall's estimates for the manufactures of European countries are based upon the value of the exports of the several countries. The exports from the United Kingdom, of manufactured articles of every description, were valued in 1894 at £219,000,000, or $1,065,750,000, and Mr. Mulhall has multiplied this total by 4, on the assumption that the exports constituted one-fourth of the total manufactured products of the kingdom. In 1900 the total value of manufactured exports of the United Kingdom was £277,045,208, or $1,348,101,982, and according to the same computation the value of manufactured products in that year was $5,392,407,728, or $2,978,187,448 less than the net value returned by the United States census in that year.

The approximate accuracy of this estimate of the manufacturing rank of the United States and Great Britain is confirmed by a consideration of the annual report of the chief inspector of factories and workshops of the United Kingdom for the year 1900. From the figures there shown it can be deduced that in the United States nearly 1,000,000 more persons were employed in 1900 in manufactories than were similarly employed in Great Britain, in 1899.

Another noteworthy comparison made by Mr. Mul-

hall was of the output per employee. He estimated £107, or about $500, for Great Britain in 1894 and £270, or about $1,300, for the United States, the latter being nearly three times the English average. In 1900, the census shows an average product per wage-earner of $2,450, nearly five times Mr. Mulhall's estimate for Great Britain.

VI.

MANUFACTURING ADVANTAGES OF THE UNITED STATES.

This rapid rise of the United States to the first position among manufacturing nations is attributable to certain distinct causes, natural and otherwise, five of which may be definitely formulated as follows:

1. Agricultural resources.
2. Mineral resources.
3. Highly developed transportation facilities.
4. Freedom of trade between states and territories.
5. Freedom from inherited and over-conservative ideas.

A study of these causes affords an explanation of the great development of manufacturing in the United States in the past, as well as an indication of its possibilities in the future.

1. *Agricultural Resources.*—Most obvious among the natural advantages of the United States is its possession of every variety of soil, and every climate, except the tropical. There is thus an abundance of food supplies of almost every form for the consumption of the people, and abundant raw agricultural materials for the use of manufactures. Both food supplies and agricultural materials for manufacture are cheaper, more abundant, and more varied in the United States than in any other manufacturing country. As a consequence, the manufacturing development of the country has extended to nearly every form of industry which ministers to the comfort and necessities of man. In many localities the character of the manufactures has been determined largely by climatic conditions and by the character of products to which the soil of such localities is especially adapted.

In the production of cotton, the leading textile staple, the United States is preeminent, furnishing 86.1 per cent of the world's production of cotton in 1899–1900. This is shown by table v, which states the production of cotton in the leading countries of the world from 1890–91 to 1899–1900.

TABLE V.—*Production of cotton in 500-pound bales for the United States, and other countries: 1890–1891 to 1899–1900.*[1]

	Total.	United States.	Other countries.
1899–1900	10,612,000	9,137,000	1,475,000
1898–99	12,987,000	11,078,000	1,909,000
1897–98	12,743,000	10,890,000	1,853,000
1896–97	10,670,000	8,435,000	2,235,000
1895–96	8,901,000	6,912,000	1,989,000
1894–95	11,298,000	9,640,000	1,658,000
1893–94	9,324,000	7,136,000	2,188,000
1892–93	8,607,000	6,435,000	2,172,000
1891–92	10,552,000	8,640,000	1,912,000
1890–91	10,127,000	8,137,000	1,990,000

[1] Cotton crop supplement to the Commercial and Financial Chronicle (New York), September, 1901.

The forests of the United States furnish practically all the material required for the extensive wood-working industries of the country, and lumber valued at more than $30,000,000 is now exported annually. The only foreign sources upon which the United States relies for additional supplies of lumber are Canada, the West Indies, and Central and South America, the last two furnishing mahogany, rosewood, Spanish cedar, etc., required in the manufacture of pianos and fine furniture.

2. *Mineral Resources.*—In the second place, the United States produces nearly every mineral required for manufacturing industries. In most of these the supplies appear to be sufficient for years to come, and are obtainable at prices which compare favorably with prices in other parts of the world.

Coal, the basis of modern manufactures, exists in great abundance, and the fields are so widely distributed throughout the country as to afford easy transportation, by rail or water, to the chief distributing points and manufacturing centers. The total production of coal in the United States in 1899 was 175,428,300 metric tons of bituminous coal, valued at $167,935,304, and 54,825,776 metric tons of anthracite coal, valued at $88,142,130.[1] Reference should be made also to the extensive supplies of natural gas, a fuel which is utilized chiefly in manufacturing. In 1899 the estimated value of natural gas was $20,024,873.[2] It is impossible to ascertain from the census reports the actual consumption of coal in manufacturing, but the reported cost of all fuel consumed in manufacturing during the census year was $205,320,632. The coal production of the United States is now larger than that of any other country, having passed the production of Great Britain for the first time in 1899. The world's estimated production of coal for 1890 and 1899 is shown in table VI.

TABLE VI.—*World's production of coal in metric tons,*[1] *by countries: 1890 and 1899.*[2]

COUNTRIES.	1899	1890
All countries	720,220,758	511,482,074
United States	230,254,076	143,167,843
Great Britain	223,689,796	184,580,765
Germany	135,824,427	89,290,834
Austria-Hungary	38,739,000	27,504,032
France	32,863,000	26,083,118
Belgium	21,917,740	20,365,960
Russia	13,104,000	6,016,525
Japan		2,653,000
All other countries	23,828,719	11,819,997

[1] Tons of 2,204 pounds.
[2] United States Geological Survey: Mineral Resources, 1900, page 316, et seq.

It appears from table VI that the production of coal in the United States has increased 60.8 per cent since 1890. In that year its production constituted 28 per cent of the world's estimated production as compared with 32 per cent in 1899.

[1] United States Geological Survey: Mineral Resources, 1899, Metallic Products, Coal, and Coke, page 331.
[2] Ibid., page 11.

A supply of iron ore is equally important to the manufacturing development of a country. Table VII shows that in this mineral, as in production of coal, the United States leads all countries.

TABLE VII.—*World's production of iron ore, in metric tons,*[1] *by countries: 1890 and 1899.*[2]

COUNTRIES.	1899	1890
Total	79,003,522	57,098,278
United States	25,086,346	16,297,975
Great Britain	14,697,540	14,005,861
France	4,985,702	2,579,465
Germany and Luxemburg	17,989,635	[3]11,406,132
Belgium	201,445	[4]202,431
Spain	9,397,733	5,783,742
Sweden	2,435,200	941,241
Italy	236,549	[4]173,489
Austria-Hungary	3,293,003	2,200,000
Canada	67,711	69,429
India	61,717	[5]
Algeria	550,941	[5]
All other countries		[6]3,433,513

[1] Tons of 2,204 pounds.
[2] United States Geological Survey, Mineral Resources, 1900, page 91; 1890, page 22.
[3] For 1887.
[4] For 1889.
[5] Not reported separately.
[6] Including Russia (1888) and Cuba (1890).

It appears from table VII that the production of iron ore in the United States increased 53.9 per cent between 1890 and 1899, constituting 28.5 per cent of the world's estimated production in 1890 and 31.8 per cent in 1899. The stimulus these supplies of the ore have given to the manufacture of iron is seen in the remarkable advance in this industry during the last two decades. The United States passed Great Britain between 1880 and 1890, becoming the leading pig-iron producing country in the world. Between 1890 and 1899 the increase in production in the United States was 4,418,000 tons, while in Great Britain it was 1,401,105 tons. The pig-iron production of the United States in 1899 was 13,620,703 tons, or 34.1 per cent of the world's production.

A special advantage connected with the abundance of coal and iron ores in the United States is the fact that deposits of these minerals, together with deposits of limestone, which is used for fluxing the iron ore, are frequently found in the same locality, thus greatly facilitating their use in manufactures.

In the production of crude copper the advance of the United States to the front rank has been even more rapid and remarkable. Statistics of the world's output in 1850 place the copper production of all countries in that year at 52,250 tons, to which quantity Chile contributed 14,300 tons, Great Britain, 11,800 tons, Russia, 6,000 tons, Japan, 3,000 tons, and the United States only 650 tons. In 1899 the world's output of copper was estimated at 463,303 long tons, of which quantity the United States produced 253,870 long tons, or nearly four hundred times its production in 1850. The production in 1899 constituted 54.8 per cent of the world's estimated production, as given in table VIII, placing the United States first in this field also.

TABLE VIII.—*World's production of copper, in long tons, 1890 and 1899.*[1]

	1899	1890
Total	463,303	272,620
Europe	92,993	79,952
North America	282,636	124,711
South America	32,730	33,960
Africa	6,490	6,570
Asia	27,560	17,972
Australasia	20,894	9,455

[1] United States Geological Survey, Mineral Resources, 1900, page 186.

Of the 253,870 tons of copper produced in the United States in 1899, 123,413 tons were exported, leaving for home consumption a total of 130,457 tons. This extraordinary development in the production of crude copper was due to the increase in the world's demand for copper, arising largely from the rapid development of the electrical industries. Partly because of the abundant supplies of crude copper, the United States has now taken first rank among the nations in the manufacture of copper goods.

There is also an abundance of most of the minor metals. The production of lead increased from 143,630 short tons in 1890 to 210,500 short tons in 1899; zinc production increased from 63,683 short tons in 1890 to 129,051 short tons in 1899; quicksilver from 22,926 flasks (of 76½ pounds avoirdupois net) in 1890 to 30,454 flasks in 1899; and aluminum from 61,281 pounds (including aluminum alloys) in 1890 to 5,200,000 pounds in 1899. There have been corresponding increases in the production of practically all the nonmetallic minerals consumed in manufactures.

On the other hand, the United States relies in constantly decreasing degree upon the ores of other countries. Where these are imported it is chiefly in the form of pigs and bars. The principal imports of this character for consumption during the fiscal year 1899, were 67,362,207 pounds of tin in bars, blocks, pigs, etc., valued at $11,843,357; 9,237,064 pounds of lead-bearing ores of all kinds valued at $185,872; 4,760.5 pounds of platinum in ingots, bars, etc., valued at $951,154; 21,028 tons of nickel ore and matte, valued at $1,183,924; and 48,017 tons of copper ores, valued at $608,399.[1]

[1] Regarding the manufactured copper which is imported notwithstanding the large excess of domestic production of copper over the domestic consumption of that metal, Mr. Charles Kirchhoff, expert special agent of the Census Office, for the smelting and refining of lead, copper, and zinc, writes as follows: "There has been built up in the United States, particularly along the Atlantic seaboard, a very important copper smelting and refining industry, which has been able to attract a good deal of cupriferous material from all over the world. The copper ores which are imported come chiefly from Eutis mines, in Quebec, and from mines in Newfoundland. The regulus imported is partly Mexican, some of it also having come from Australia and from South America. The old copper is chiefly from Cuba, being scrap from the destroyed sugar estates. A very large share of the plates and bars is converter material in the form of blister copper which comes to this country from Mexico and Canada, the matte being blown at the Mexican and Canadian smelting works, and shipped to this country, to our electrolytic refineries, where the copper is refined and the gold and silver separated. At times, also, Chile bars long stored in London have been shipped to this country for refining and marketing. Besides, particularly during the year 1901, considerable quantities of foreign refined copper were sold to consumers in this country who were unwilling to pay the high prices demanded by the American producers."

3. *Transportation Facilities.*—Another important advantage possessed by manufacturers in the United States is the unusual facilities for transportation, particularly in the more thickly settled sections, where manufacturing industries predominate. Over 18,000 miles of navigable rivers not only facilitate transportation directly but cause competition with railroads, and thus make possible the cheap marketing of products. The coastwise trade of the United States exceeds that of any other country. It includes steamship lines to and from New York, Boston, Philadelphia, Baltimore, and other points, and between several of these cities and Charleston, Richmond, Savannah, Jacksonville, New Orleans, Galveston, and other Southern ports.

In recent years navigation on the great lakes has become a most important factor in the internal traffic of the country. These lakes, with the Sault Ste. Marie and Canadian canals around the rapids of the St. Marys river, the St. Clair river, the Detroit river, and the Welland canal, allow unbroken navigation between Duluth and the eastern end of Lake Ontario, a distance of 1,000 miles.

The development of freight traffic over this route has been so great during the past decade, that in 1899 it had become the greatest internal waterway in the world, having a ton mileage equal to nearly 40 per cent of that of the entire railroad system of the United States. In 1899 more than five times as many vessels passed through the United States and Canadian canals at Sault Ste. Marie as through the Suez canal.[1] In the value of manufactured products the 8 states which touch the waterways of the lake system rank first, second, third, fifth, eighth, ninth, tenth, and thirteenth, the aggregate value of products being $7,461,225,086, or 57.4 per cent of the total for the United States. This route thus borders upon the great manufacturing belt of the country. At its head are situated the most extensive mines of iron and copper and the largest hard wood forests in North America. The average cost of transportation on the great lakes is now about six-tenths of a mill per ton mile.[2]

The railroad systems of the United States were constructed with great rapidity between 1860 and 1880, and their mileage now exceeds that of all of Europe combined. In 1899 the total mileage of the United States was 189,295 miles, as against 172,621 in Europe, constituting 39.4 per cent of the entire railroad system of the world. These comparative statistics are not, however, an accurate index of the relative transportation facilities, because of the greater distances which separate the important railroad centers of the United States, and the sparsity of the population in many sections, compared with the density of population in the principal countries of Europe. Notwithstanding these disadvantages, the railroad systems of the United States are so highly organized and so efficiently managed that the transportation of freight by rail is cheaper than in any other country. There have been extraordinary reductions in freight rates during the past thirty years. The average rates per ton mile on the trunk railroads of the country have declined from about 2 cents to 6 mills, and on two of them to 3.6 mills.[3] In 1868 the freight on wheat from Chicago to New York by rail was 42.6 cents per bushel, compared with 11.55 cents per bushel in 1898. In 1877 the cost of sending 100 pounds of wheat from St. Louis to New York was 41 cents, as compared with 22.3 cents in 1898.[4]

4. *Freedom of Interstate Commerce.*—These exceptional transportation facilities are utilized in the interchange of products between states and territories covering an area of 2,970,230 square miles of land surface, possessing a population of 75,994,575, and not separated by any commercial barrier. The mainland of the United States is the largest area in the civilized world which is thus unrestricted by customs, excises, or national prejudice, and its population possesses, because of its great collective wealth, a larger consuming capacity than that of any other nation.[5] Statements of this character are confirmed by statistics for 1900 which show that the value of agricultural products was $4,739,118,752, of manufactured products $13,004,400,143, and of mining products $1,067,605,587, a total of $18,811,124,482, which was all consumed at home, except the sum of $1,370,763,571, representing the value of all articles of domestic merchandise exported in the year 1900. As a partial offset to this deduction there may be added the imports of merchandise in the same year, the value of which was $849,941,184.

5. *Freedom from Tradition.*—Another advantage which has contributed to the rapid development of manufactures in the United States is the comparative freedom from inherited and over-conservative ideas. This country entered upon its industrial development

[1] A Text Book of Commercial Geography, by C. C. Adams, page 152.

[2] Ibid., page 149.

[3] A Text Book of Commercial Geography, by C. C. Adams, page 149.

[4] United States Statistical Abstract, 1898, page 360.

[5] "At the same time trade was left absolutely free between all the states of the Union, no one of them being permitted to levy any tax on exports or imports beyond what might be necessary for its inspection laws. Still further to enforce this needful provision the power to regulate commerce between the states was given to the general government. The effect of these provisions was to insure to the United States a freedom of trade beyond that enjoyed by any other nation. Fifty-five millions of American people (in 1884), over an area nearly as large as the entire continent of Europe, carry on their exchanges by ocean, by lakes, by river, by rail, without the exactions of the taxgatherer, without the detention of the customhouse, without even the recognition of state lines. In these great channels the domestic exchanges represent an annual value perhaps twenty-five times as great as the total of exports and imports. It is the enjoyment of free trade and protection at the same time which has contributed to the unexampled development and marvelous prosperity of the United States." *Twenty Years in Congress*, by James G. Blaine.

unfettered by the old order of things, and with a tendency on the part of the people to seek the best and quickest way to accomplish every object.

In all of the European countries in which manufacturing is an important industry, the transition from the household to the factory system was hampered by guilds, elaborate national and local restrictions, and by the natural reluctance with which a people accustomed for generations to fixed methods of work, in which they had acquired a large degree of skill, abandoned those methods for new ones. It was natural for the artisan classes to resist strenuously the introduction of machinery into the industries by which they obtained their livelihood. It was natural also, that in spite of the superior advantages of machine methods, hand processes of manufacture should still continue side by side with them, in many industries in which machine work had long since usurped the whole field in the United States. This inherited and intuitive adherence to old-fashioned methods is illustrated by the silk industry in France, where the handloom still predominates over the power loom; and by the tin plate industry in Wales, where, until recently, hand methods of production were still in force.

In the United States the tendency of the artisan class to abandon the slow hand processes has been as strong as the tendency elsewhere has been to adhere to them. Moreover, there has developed among the laboring classes in the United States a mobility such as is unknown elsewhere in the world. This has made it possible to attract to any point in the country the skilled labor required to develop any branch of industry.

In this summary of the advantages of the United States as a manufacturing nation, no allusion has been made to the influence of national legislation upon material development. Nor is it necessary to refer in a statistical report to the character of the American people, to their social, educational, and political environment, to their skill and efficiency as tool users, to the quality and productivity of the machines and tools they employ, or to the effective organization of business for economizing all productive and distributive forces. These are subjects which belong rather to economic study than to a statistical presentation of facts upon which the conclusions of economists are based. Nevertheless, there can be no complete understanding of the remarkable development of the United States during the nineteenth century unless all these things are taken into consideration. More particularly is this true in respect to the use of tools, machinery, and labor-saving devices of all kinds. It is the judgment of foreign commentators upon American development that in the adaptation of machinery to all branches of industry, this country displays a facility greater than is shown anywhere else; that the number and variety of labor-saving machines employed here is larger than in any other manufacturing country; and that in many industries the subdivision of labor has reached a minuteness and a degree of perfection not elsewhere equaled.[1]

At the census of 1880 the system of interchangeable mechanism, so called, which is distinctively and peculiarly American in its origin, was made the subject of a special and exhaustive report, compiled under the direction of Prof. W. P. Trowbridge, of New York. In transmitting this report Professor Trowbridge said:

> The general growth of the "interchangeable system" in manufacturing has had an influence in the development of manufacturing, agricultural, and other industries which but few have heretofore appreciated. It may not be too much to say that, in some respects, this system has been one of the chief influences in the rapid increase in the national wealth. Two of the great industries, which constitute the basis of this wealth—agriculture and manufactures—depend now largely upon the existence of this remarkable feature in manufacturing, which has reached its highest development in this country. The growth of the system is due to the inventive characteristics of our people, and their peculiar habit of seeking the best and most simple mechanical methods of accomplishing results by machinery, untrammeled by traditions or hereditary habits and customs.

These phases of our manufacturing development are so notable that it has been deemed wise to present, as a part of this report, a special study of the development of United States patents, in so far as these relate to the manufactures of the country. The report appears in Part IV of the Report on Manufactures.

VII.

INDUSTRIAL CONDITIONS IN 1890 AND 1900.

The census of 1900 was taken at a time of special activity and productivity in manufactures, and thus its record is of a volume of industry at almost high-water mark. The same general conditions existed during the census of 1890, in a degree less marked, perhaps, but so nearly identical that comparison between the statistics of the two censuses can be safely and satisfactorily made. There is, perhaps, no decade covered by previous censuses in which the conditions were so nearly alike at the beginning and at the end of the decade. This may be shown by brief reference to the business situation at the time of each census.

[1] The Journal of the British Board of Trade, for December 20, 1900, prints a report by Mr. Seymour Bell, British commercial agent at Washington, D. C., on the use of labor-saving devices in American factories. Mr. Bell states that "anyone visiting American factories can not but be struck by three things which are very conspicuous. They are: (a) The way in which machinery is used, and all sorts of devices are employed in order to save, wherever possible, manual labor; (b) the division of labor; and (c) the methods employed for handling large quantities of material. Probably in no country in the world is the principle of division of labor carried out to a greater extent, or with greater success, than it is in the United States. That the results obtained justify the theory is too evident, everywhere, to be disputed. It is only necessary to visit, for instance, a musical instrument factory, and see the thousands of instruments that are being made, and the millions of small pieces being handled which are necessary to complete them; or, again, a boot factory where some 400 hands are turning out as many as 3,000 pairs of boots and shoes a day."

The year 1889 was highly prosperous, passing all previous years in the volume of business done. The bank clearings exceeded those of 1879 by nearly 13 billion dollars. The agricultural crops were the largest in the history of the country. This was particularly true of cotton, corn, wheat, and oats. These large crops stimulated business in all directions, and for the first time the gross traffic earnings of railroads passed the billion-dollar point. Foreign commerce, too, was active. The statistics of the commerce of that year show an excess in the value of imports over the value of exports.

The development of manufacturing in the decade that followed was retarded by a period of pronounced business depression, first manifested in the second quarter of 1893, and extending into 1896. This depression was accompanied by the largest number of failures with the heaviest liabilities ever known. These failures affected banking institutions with the greatest severity, particularly those of the West and South. The gradual restoration of business confidence began in 1896, and 1897 was a year of recovery. Large and remunerative agricultural crops from 1896 to 1899 accelerated this recovery, and an increased demand for all varieties of products infused unusual activity into manufacturing enterprises. The approach of the census year found the capacity of every line of manufacture tested to the utmost.

The number of miles of railroad in operation in the country increased during the decade 16.6 per cent, and the amount of freight carried one mile in 1899 was 126,991,703,110 tons, against 68,677,276,992 tons in 1889,[1] an increase of 84.9 per cent. The bank clearings for the year 1899 aggregated $88,828,672,533, exceeding the total reported for 1889 by 66 per cent. The number of commercial failures was small, amounting in 1899 to only 0.81 per cent of all concerns engaged in business and to 0.92 per cent in 1900. The showing for 1899 in this respect was the most favorable since the year 1881, when the percentage was 0.71.[2]

During the period of business depression referred to, the volume of production in many of the great industries was reduced far below the normal. How far this business depression affected the natural growth of industry, it is impossible to estimate. While it lasted, it retarded the investment of capital in new enterprises, and materially reduced the earnings of capital already invested. It also affected the earnings of labor, for in nearly every line of employment and in all parts of the country there occurred reductions in the prevailing rates of wages. As normal business conditions returned, wages were gradually restored.

It was because of these business conditions that a question was inserted in the manufacturing schedule asking each establishment to make a return of the value of its products in the year preceding the census year. It was hoped by means of this question to elicit statistics which would throw light upon an important phase of our industrial development—the variation in production between two consecutive years as affected by the varying economic conditions. The results secured from this inquiry are not such as can be accepted with entire confidence, since a considerable proportion of the manufacturers neglected to reply to the question, and others plainly did not understand its object and significance. So far as it is possible to utilize these returns they show the following results for the manufacturing industries as a whole, and for certain specific industries:

TABLE IX.—*Comparison of products: 1899–1900.*

INDUSTRIES.	Total number of establishments.	Number reporting comparison.	VALUE OF PRODUCTS.	
			Census year.	Preceding business year.
All industries	512,254	356,424	$10,239,209,151	$8,681,271,212
Agricultural implements	715	518	92,772,476	77,202,840
Bags, other than paper	78	65	17,786,812	15,203,565
Bicycles and tricycles	312	236	27,039,436	27,045,264
Boots and shoes, factory product	1,600	1,411	253,152,430	228,305,842
Bread and other bakery product	14,917	12,233	158,373,666	130,055,877
Brick and tile	5,423	4,034	41,995,158	36,275,574
Carpets and rugs, other than rag	133	114	46,885,929	40,191,460
Carriages and wagons	7,632	5,859	101,995,079	88,871,748
Cars, steam and street railroad, and repairs	1,489	1,374	309,590,686	247,617,192
Clothing, men's, factory product	5,731	4,911	253,002,494	227,414,226
Clothing, women's, factory product	2,701	2,007	139,108,582	120,309,617
Cotton goods	973	602	241,797,279	201,875,820
Electrical apparatus and supplies	580	417	83,860,937	57,845,428
Flouring and grist mill products	25,258	13,030	389,203,162	371,357,354
Foundry and machine-shop products	9,324	7,167	566,641,432	441,380,104
Furniture, factory product	1,814	1,480	111,683,341	95,471,037
Iron and steel	668	358	551,771,779	358,927,863
Lead, smelting and refining	39	10	101,318,816	71,924,085
Leather, tanned, curried, and finished	1,306	1,178	183,660,634	165,421,989
Liquors, malt	1,509	1,211	216,203,898	198,543,002
Petroleum, refining	67	64	123,179,856	97,200,074
Printing and publishing, newspapers and periodicals	15,305	11,002	195,575,301	177,563,659
Shipbuilding	1,116	939	67,906,235	42,608,740
Silk and silk goods	483	378	101,474,146	90,107,761
Slaughtering	921	727	737,183,413	683,263,317
Sugar and molasses, refining	832	700	146,692,995	104,084,000
Tobacco, cigars and cigarettes	14,539	11,722	137,854,376	124,703,947
Woolen goods	1,035	861	109,712,214	95,443,073
Worsted goods	186	145	113,635,037	85,483,346
All other industries	395,568	271,671	4,613,001,552	3,979,573,408

Of the 512,254 establishments reporting in 1900, 356,424, or 69.6 per cent, made reply to the question asking for this comparison of products. Of the 155,830 establishments which neglected to answer, there were 3 classes. Some probably overlooked the question or did not understand it; some, undoubtedly, were idle during that year and had no answer to make; while 44,705 were new establishments which began operations during the census year.

Those establishments reporting this comparison produced during the census year products valued at

[1] Statistical Abstract of the United States, U. S. Treasury Department, 1900.
[2] Dun's Review, New York.

$10,239,209,151, or 78.7 per cent of the $13,004,400,143 reported for all establishments; and the increase over the $8,681,271,212 reported for the same establishments for the preceding business year was 17.9 per cent.

VIII.

COMPARISONS WITH PREVIOUS CENSUSES.

The census of manufactures has many important uses, chief among which is the *measure of growth* afforded by a comparison of the statistics for industries, for states, for cities, and for counties, from decade to decade. It is not always possible to make these comparisons, however, with exactness, by reason of repeated changes which have taken place from census to census in the form of inquiries contained in the schedules, in the industries canvassed, and in the methods of compilation. Such comparisons are practically impossible between the censuses prior to that of 1850, and in these reports only incidental use has been made of the statistics they contain. From 1850 down to the census of 1890, the inexactness of such comparisons continues to be marked. It is believed that the comparisons between the censuses of 1890 and 1900 are more exact than has ever before been the case; but even between these two censuses there are certain important differences in the forms of inquiry, or the methods of handling the statistics in compilation, to which careful attention should be paid.

The degree to which the statistics of the various censuses are incomparable is fully discussed in subsequent sections of this report, and only a summary of the subject is given at this point.

1. *Capital.*—In the inquiry concerning capital, comparisons have no real statistical value prior to the census of 1890. The form of the inquiry regarding capital, at all censuses down to and including 1880, was so vague and general in its character that it can not be assumed that any true proportion exists between the statistics on this subject, as elicited prior to 1890. At the census of 1880, the question read: "Capital (real and personal) invested in the business." At the census of 1890, live capital—i. e., cash on hand, bills receivable, unsettled ledger accounts, raw materials, stock in process of manufacture, finished products on hand, and other sundries—was for the first time included as a separate and distinct item of capital, and the capital invested in realty was divided between land, buildings, and machinery. The form of this inquiry at 1890 and 1900 was so similar that comparison may be safely made.

2. *Salaried Officials.*—No comparison of the statistics of the number and salaries of salaried officials of any character can be made between the reports of any census. Not until the census of 1890 did the census begin to differentiate sharply between salaried officials, i. e., employees engaged at a fixed compensation per annum, and the wage-earning class, i. e., employees paid by the hour, the day, the week, or the piece, for work performed and only for such work. Prior to 1890 such salaried officials, if returned at all, were returned with the wage-earners proper. At the census of 1890 the number and salaries of proprietors and firm members actively engaged in the business, or in supervision, were reported, combined with clerks and other officials. Where proprietors and firm members were reported without salaries, the amount that would ordinarily be paid for similar services was estimated. At the census of 1900 the number only of proprietors and firm members actively engaged in industry or in supervision was ascertained, and no salaries were reported for this class, salaries, as a matter of fact, being rarely paid in such cases, proprietors and firm members depending upon the earnings of the business for their compensation.

3. *Employees and Wages.*—At the censuses of 1850 and 1860, the inquiries regarding employees and wages called for "the average number of hands employed; male; female;" and "the average monthly cost of male labor," and "the average monthly cost of female labor." At the census of 1870 the average number of hands employed was called for, divided between "Males above 16 years, females, above 15 years, and children and youth," and the "total amount paid in wages during the year" was first called for. The inquiries at the census of 1880 were like those of 1870, though more extended for some of the selected industries.

At the census of 1890 the average number of persons employed during the entire year was called for, and also the average number employed at stated weekly rates of pay; and the average number was computed for the actual time the establishments were reported as being in operation. At the census of 1900 the greatest and least numbers of employees were reported, and also the average number employed during each month of the year. The average number of wage-earners (men, women, and children) employed during the entire year was computed in the Census Office by using 12, the number of calendar months, as a divisor into the total of the average numbers reported for each month. This difference in the method of ascertaining the average number of wage-earners during the entire year has resulted in a variation in the average number as between the two censuses, and should be considered in making comparisons.

Furthermore, the schedules for 1890 included in the wage-earning class "overseers, and foremen or superintendents (not general superintendents or managers)," while the census of 1900 separates from the wage-earning class such salaried employees as general superintendents, clerks, and salesmen. It is possible and probable that this change in the form of the question has resulted in eliminating from the wage-earners, as reported by the present census, many high-salaried

employees included in that group for the census of 1890. It is believed that the form of inquiry and the method of computation adopted in 1900 are an improvement upon those of 1890; but it is obvious that comparisons between the results of any of the censuses, under these heads, can not be exact.

4. *Miscellaneous Expenses.*—The item of miscellaneous expenses was not shown in any census prior to that of 1890. Comparison between the totals reported under this item of inquiry in the various industries can be safely made between the two censuses, notwithstanding some slight changes in the grouping of the items on the schedule.

5. *Materials.*—The same statement is true regarding comparison with the items of materials used in manufacture. With the exception of the schedules on which a few selected industries were reported at the census of 1880, the question concerning materials was as follows: "Value of materials used (including mill supplies and fuel)." At the census of 1890 the schedule contained separate questions as to the kind, quantity, and cost of the principal materials, and the cost of "mill supplies," "fuel," and "all other materials." The amounts paid for rent of power and heat were also included under this head in 1890. It is probable that some of the items included in the cost of materials at the census of 1880 were included in "miscellaneous expenses" at the inquiries of 1890 and 1900.

6. *Products.*—The statistics of products are comparable from the census of 1870, when the inquiry regarding the value of products first included the value of jobbing and repairing as an element in the productive value.

IX.

THE ESTABLISHMENT AS A UNIT.

In the statistics of manufactures, the establishment is taken as the basic unit, as the individual is taken in population, or the farm in agriculture.

1. *Definition.*—The term "establishment" as employed at this census is defined as representing one or more mills owned or controlled by one individual, firm, or corporation, located either in the same city or town, or in the same county, and engaged in the same industry. Where mills are situated in different cities or towns, or different counties, they are necessarily treated as separate establishments, even though they may be under the same ownership.

In many cases separate reports were received from different plants of a single company, although located in the same city or town, which it was impossible to identify in order to unite the statistics. In other cases corporations engaged in some one general line of industry had several plants each devoted to a distinct process; as where a blast furnace, a rolling mill, and a tin dipping plant were operated by a single company, in which case it was necessary, in order to show the statistics for the separate branches of the industry, to secure a return for each plant as a separate establishment. Thus the term "establishment" as used in these reports is sometimes indefinite, and the total number of establishments can not be accepted as the actual number either of individuals, corporations, or firms carrying on independent manufacturing enterprises, or of buildings or groups of buildings.

2. *Examples.*—The term does not always signify the same thing, but may signify several different things among which there is no similarity. Thus, the 512,254 establishments, the reports of which were tabulated in this census, include cobbler shops, where one man works at his bench repairing shoes, and great iron and steel plants, or textile mills, in which 5,000 persons or more may be employed. A unit inclusive of things so radically different is of little value and renders worthless for statistical purposes calculations involving its use. Unfortunately this is a difficulty inherent in manufacturing statistics, a difficulty for which it is impossible to find a remedy, and which has a tendency to increase as industry develops and becomes more concentrated.

Another difficulty in collecting exact statistics of manufacturing establishments is the absence of a settled definition of the word and the necessity of adapting definition to circumstances. For example, a successful corporation engaged in the manufacture of cotton, duplicates its plant, calling the second building Mill No. 2; perhaps it will add a third mill, and a fourth, all being located in the same mill yard, making the same goods, and under the same management. The schedule returned by this company will indicate the existence of but one establishment; and in fact there is but one establishment, carrying on its business in four mill buildings. The Census Office must count these four buildings as one establishment, although they would have been considered as four, had each mill been under separate ownership. But if it should happen that one of the several mills of a plant is located just over the boundary line in another state, or another county (a not uncommon circumstance), the Census Office is obliged to take cognizance of the fact, and, in order that it may properly distribute the industries by geographic divisions, it must make two or more mills out of the aggregation of mill buildings—one for each state or county.

The department store may be cited as an illustration of the lack of significance attaching to the establishment unit. From one such store the Census Office received through its special agent reports on thirty-two separate schedules, each representing a distinct branch of manufacturing industry regularly carried on by the one

establishment. Until classified, these returns were necessarily kept separate; but when classified they were then combined and tabulated as one "establishment" in accordance with the fact.

3. *Consolidation of Schedules at Twelfth Census.*—Thousands of similar instances occurred, where two or more separate and distinct industries were carried on under the same roof by the same individual. The most notable example of this kind was in the case of establishments devoted to different industries at different seasons of the year—at one period sawing lumber, at another grinding grain, at another ginning cotton or carding wool, or both. Establishments of this description exist throughout the country, notably in the Southern states, at distances remote from centers of population. They are a survival of the days of neighborhood manufacture, but they constitute an important feature of the local economy of the regions where they exist, and are likely to survive, in lessening number perhaps, for many years. For each of the three or four industries thus existing in a single building, the enumerators returned, in many instances, a separate schedule. In such cases the separate schedules were combined and regarded as the report of a single establishment, being classified according to the predominant industry as determined by a comparison of the value of product, in each industry. The products of the subsidiary or lesser branch or branches of the establishment were treated as by-products.

This method of treating combined industries resulted in lessening the total number of returns through loss by consolidation of approximately 8,000 schedules.

That the combination of cotton ginning, lumber sawing, and grist milling, or of one of them with either of the others, was most strongly in evidence in the Southern states is shown by the fact that of the total loss of such schedules resulting from consolidation, 6,882, or 86.0 per cent, were in that section, distributed as follows: Alabama, 1,001; Arkansas, 678; Delaware, 2; Florida, 68; Georgia, 752; Kentucky, 137; Louisiana, 152; Mississippi, 839; North Carolina, 919; South Carolina, 996; Tennessee, 403; Texas, 802; Virginia, 133.

It is not to be assumed that these figures reflect, even indirectly, the full extent to which industries are operated conjointly in the South, or that the total for the whole country, 8,000 returns, offer even an indirect basis for judging of the full amount of such production in the country at large. In many instances the census enumerators, following instructions, made but one return for the different industries which were thus carried on within a single plant, and all these cases would have to be added to those in which separate schedules were made out for the different industries if the attempt were made to show the full extent of this primitive sort of production. Although it probably exists throughout the United States in considerably larger proportions than might be judged from the figures given above, the Census Office has made no attempt to obtain complete statistics regarding the phenomenon.

It would have been possible, therefore, to increase indefinitely the number of establishments reporting by counting as an establishment each single mill controlled by one person, firm, or corporation, or by counting as a unit each separate industry carried on in the same building by the same individual.

4. *Subdivision of Schedules at Ninth Census, and Creation of Fictitious Establishments.*—The census of 1870 followed the method of counting as an establishment each separate branch of industry, whether conducted independently or in connection with other manufacturing operations. Thus, "leather tanned" and "leather curried" being considered separate industries, 2,741 fictitious establishments grew out of the effort to show the separation of these industries. The total number of establishments which were thus added by the separation of combined industries was 3,871.

Francis A. Walker, superintendent of the Ninth Census, in his remarks on the tables of Manufacturing Industries, says: "There are a few cases of duplication not embraced in these tables, where the union of two industrial operations beneath one roof, or under a single management, or by virtue of their common use of steam or water-power, is so clearly accidental and arbitrary that no notice has been taken of the duplication. For example, where a mill is returned as a 'grist and saw mill,' there has been no hesitation in separating the two parts of the business, and assigning each to its appropriate place in the statistics of industries. The fact that the power for the two operations is furnished by the same wheel is not regarded as sufficient to create a community of industrial character, even to the extent of requiring a record of the separations thus effected."[1]

Except for the census of 1870, it is impossible to discover from the census tables themselves or from the text accompanying them how the problem was handled up to 1890. In the absence of a permanent census office, there is neither record nor tradition to indicate. Probably no uniform rule has prevailed. The Eleventh Census followed the rule of combination wherever the circumstances warranted, and thus is, in this respect, more nearly comparable with the present than are the earlier censuses.

5. *Comparison of Establishments.*—No figures are available to show the number of manufacturing establishments prior to 1850. The number reported at each census, from 1850 to 1900, inclusive, with the percent-

[1] Ninth Census, 1870: Industry and Wealth, page 383.

age of increase from decade to decade, is shown in the following table:

TABLE X.—*Establishments, 1850 to 1900.*

CENSUS.	Establishments.	Per cent of increase.
1850	123,025	.....
1860	140,433	14.1
1870	252,148	79.6
1880	253,852	0.7
1890	355,415	40.0
1900	512,254	44.1

As in most of the tables of this report, the figures for 1900, in the above table, contain only the establishments comparable with those included at previous censuses, and especially at the census of 1890, excluding those with a product less than $500 in value, governmental establishments, and educational, eleemosynary, and penal institutions. The remarkable difference between the rate of increase in the decade 1860 to 1870, and that in the decade 1870 to 1880, taken in connection with the known duplication of establishments which has just been explained, confirms the belief that the method of counting establishments at that census was a departure from the methods used at those which preceded and followed it. The conclusion seems warranted that at the early censuses the definition of the unit "establishment" was left to the discretion of the enumerator; that at the census of 1870 there was adopted an arbitrary subdivision of actual establishments according to processes and products, and at recent censuses approximately the actual establishment was used as the basis of enumeration.

The census of 1900 contains reports from 640,194 "establishments," after making all the consolidations above referred to, in contrast with the 355,415 establishments whose reports were tabulated in 1890—an apparent increase of 80.1 per cent. That the greater part of this increase is merely apparent will be seen from the following considerations:

I. In 1900 reports are included from 127,419 establishments with products valued at less than $500 per annum. All such establishments were excluded from the census of 1890. They were included in 1900 because no warrant could be found in the wording of the law for drawing this arbitrary line.

II. In 1900 reports are included from 11,369 cotton ginneries in the South, whereas the census of 1890 contained reports for but 1,637 such establishments. Special efforts were made to get these returns in 1900, while in 1890 the private ginneries were regarded as adjuncts of the farm or plantation and returned only on the agricultural schedule.

III. A larger number of cities and towns were withdrawn from the enumerators in 1900 than in 1890, and committed to the charge of special agents for the collection of statistics of manufactures only. These special agents understood their duties better than did the enumerators, and had more time in which to do their work. Thus another portion of the increase in the number of establishments reporting is accounted for. This portion is an increase due rather to the defective canvass of 1890, than to an actual increase that has occurred in the interim.

These facts are enumerated in order to guard against fallacious conclusions that might otherwise be drawn from the very large percentage of increase in the number of establishments shown in the two decades, 44.1 per cent for the decade ending in 1900 and 40.0 per cent in 1890, after deducting from the figures for 1900 all establishments with less than $500 product, and the other classes of establishments not taken in 1890.

6. *Deductions from Statistics of Establishments.*—It is obviously impossible to determine from the census data how the actual number of establishments engaged in productive industry in the United States has been affected by the consolidation of industries and the concentration of employment in large mills and factories. Everyday observation shows us that the smaller establishments in many lines of industry tend to disappear before the superior competitive facilities of larger enterprises. Abandoned mill sites are common on streams which were once relatively valuable waterpowers, but which have gradually shrunk until they can be depended upon for only a portion of the year. This is especially true of saw and grist mills. On the other hand, new factories are constantly under construction in communities advantageously located for manufacturing purposes, and small plants are as numerous as large ones. New industries or establishments devoted to some special branch of an old industry are constantly coming into existence. Practical experience leads many manufacturers to erect new buildings, constructed in accordance with modern ideas of economical arrangement, rather than to attempt to repair and refurnish old mills and factories long disused and more or less dismantled. A constant shifting of industries from undesirable localities into places that offer better facilities of one kind or another is in progress throughout the country, as one phase of the steady readjustment of industry which is taking place. The statistics will indicate to the student many localities which have been thus affected, some of them favorably, others unfavorably. In these figures are found no very definite indications whether or not in this national readjustment the number of independent establishments of productive industry tends to increase in any fixed ratio with the general increase in population and wealth. That the number of establishments is increasing, and increasing in every state of the Union, is apparent, but there is no warrant in these figures for an attempt to fix a definite percentage of increase.

X.

DATE OF ESTABLISHMENT—STABILITY OF MANUFACTURING ENTERPRISE.

The Twelfth Census undertook to obtain a record of the age of manufacturing establishments. It was felt that information of the most important character might be elicited in this field of inquiry. The statistics, if properly secured, would have thrown much light upon the stability of our manufacturing establishments, a matter regarding which there is now little information beyond the general knowledge that a constant change is going on—long-established factories disappearing from one cause or another, new factories springing up, changes in ownership, or in character of organization, constantly occurring.

The three questions on the schedule which were intended to elicit this information read as follows:

Date when the establishment commenced operations.
Date when present management commenced operations.
Character of organization, whether individual, corporation, or other form.

Table XI presents, by groups of industries, the total number of establishments reported and the number started either as new establishments or under new forms of organization or acquired by new owners during the census year.

TABLE XI.—*Total number of establishments and number started during the census year, by industry groups: 1900.*

GROUPS.	Total number of establishments.	ESTABLISHMENTS STARTED DURING CENSUS YEAR.	
		Number.	Per cent of total number.
United States	512,254	44,705	8.7
Food and kindred products	61,302	5,008	8.2
Textiles	30,048	2,451	8.2
Iron and steel and their products	13,896	1,103	7.9
Lumber and its remanufacture	47,079	8,811	18.7
Leather and its finished products	16,989	1,228	7.2
Paper and printing	26,747	1,742	6.5
Liquors and beverages	7,861	627	8.0
Chemicals and allied products	5,444	459	8.4
Clay, glass, and stone products	14,809	1,095	7.4
Metal and metal products other than iron and steel	16,305	1,098	6.7
Tobacco	15,252	1,460	9.6
Vehicles for land transportation	10,113	463	4.6
Shipbuilding	1,116	100	9.0
Miscellaneous industries	29,479	2,875	9.8
Hand trades	215,814	16,185	7.5

Upon examination of the answers to these questions, preparatory to the tabulation of the returns, it was found that in a number of instances the special agents and enumerators had not exercised care in obtaining the information. A large proportion of the establishments had undergone a change in the form of organization since their original establishment, but in answer to the first inquiry the date when the present management commenced operations was given. Thus mills started in the year 1850 by a single individual or a firm, and becoming a corporation in the year 1900, were often reported as having been founded in the latter year, and no method presented itself whereby the error thus arising in the statistics could be traced and rectified. The one important fact which can be saved from the tabulation of these particular returns is that of the 512,254 establishments reporting, 44,705, or 8.7 per cent, were started either as new establishments or under new forms of organization, or acquired by new owners, during the census year. These figures indicate the extent to which new blood is constantly being infused into the management of our manufacturing industries.

Some slight measure of the amount of capital invested in manufacturing which is lost from year to year is revealed by the statistics of idle establishments, which are elsewhere presented in this report, but these statistics indicate only a very small proportion of the amount of capital which is thus invested and which thus eats itself up. In any consideration of the success which has attended manufacturing enterprise in the United States, and of the general profits of manufacturing, to which these figures appear to testify, some account must be taken of the enormous capital which is annually and irretrievably lost in the struggle for the survival of the fittest.

The cotton manufacture is generally regarded as the most stable and thoroughly organized of our great industries, but it appears from the census returns that in the single state of Massachusetts 21 mills, with an aggregate of 154,016 spindles, and 1 mill with 180 looms, which reported to the census of 1890, were not in existence when the census of 1900 was taken. Seven of these mills, with 47,680 spindles, were dismantled and their machinery sold; 13 mills, with 101,156 spindles, stood idle in 1900, or had been turned to other manufacturing purposes. One mill was burned and not rebuilt; and 1 was consolidated with a neighborhood mill under new corporate organization. In addition to these cotton mills there were 15 mills manufacturing cotton small wares, which went out of existence during the decade. Such a record indicates that unprofitable operation is constantly in progress side by side with more successful enterprise. In this particular industry the advance in machinery has been so rapid that it is calculated that a cotton mill must practically renew its machinery once in every ten years if it would keep its plant in a condition that will permit profitable production, in competition with other establishments manufacturing the same class of goods, with the latest pattern of machinery, the most modern labor-saving devices, the most effective methods of management, and facilities for the largest production at the lowest labor cost.

XI.

CHARACTER OF ORGANIZATION.

General Table 8 divides the manufacturing and mechanical industries in the United States in accordance with the character of organization, and table XII is a summary of the general table.

TABLE XII.—ESTABLISHMENTS AND PRODUCTS CLASSIFIED BY CHARACTER OF ORGANIZATION, BY GROUPS OF INDUSTRIES: 1900.

[In this table values have been omitted wherever they disclosed the products of individual establishments.]

GROUPS OF INDUSTRIES.	CHARACTER OF ORGANIZATION.									
	Total.		Individual.		Firm and limited partnership.		Incorporated company.		Cooperative and miscellaneous.	
	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.
All industries	512,254	$13,004,400,143	372,703	$2,674,497,008	96,715	$2,565,360,839	40,743	$7,733,582,531	2,093	$30,959,765
Food and kindred products	61,302	2,277,702,010	42,578	444,246,312	11,906	394,392,019	5,025	1,414,098,944	1,798	24,964,735
Textiles	30,048	1,637,484,484	18,701	262,342,066	8,084	547,349,114	3,245	827,705,447	18	87,857
Iron and steel and their products	13,896	1,793,490,908	5,717	107,343,147	3,329	177,415,968	4,843	1,508,493,141	7	238,652
Lumber and its remanufactures	47,079	1,030,906,579	28,470	265,836,256	13,906	256,128,769	4,675	508,383,813	28	557,741
Leather and its finished products	16,989	583,731,046	12,906	----------	2,990	208,571,042	1,091	257,808,524	2	----------
Paper and printing	26,747	606,317,768	16,392	127,110,593	5,682	106,880,198	4,490	368,923,042	183	3,453,940
Liquors and beverages	7,861	425,504,167	5,063	69,353,112	1,463	----------	1,333	305,129,467	2	----------
Chemicals and allied products	5,444	552,891,877	2,085	----------	1,152	60,181,725	2,206	450,102,084	1	----------
Clay, glass, and stone products	14,809	293,564,235	8,761	69,147,764	3,891	66,327,320	2,132	157,336,458	25	752,693
Metals and metal products other than iron and steel	16,305	748,795,464	10,666	----------	4,167	88,143,271	1,470	578,172,577	2	----------
Tobacco	15,252	283,076,546	12,803	79,919,991	2,085	74,456,334	358	128,478,983	6	221,238
Vehicles for land transportation	10,113	508,649,129	5,750	43,223,011	2,079	----------	2,283	430,855,922	1	----------
Shipbuilding	1,116	74,578,158	748	12,592,136	217	6,414,398	151	55,571,624	----------	----------
Miscellaneous industries	29,479	1,004,092,294	18,545	173,848,128	6,174	188,153,370	4,750	641,875,764	10	215,032
Hand trades	215,814	1,183,615,478	183,523	777,274,319	29,590	305,612,005	2,691	100,646,741	10	82,413

1. *Individual Ownership.*—It appears that of the four forms of organization differentiated in the table, that of the single employer represents 372,703 establishments out of 512,254 reporting, or 72.8 per cent of the whole. This is the system in which the single proprietor establishes and conducts a manufacturing or mechanical business on his individual responsibility, contributing the required capital, owning or renting the land and buildings utilized, and employing wage-earners, or doing all the work himself. It is the most natural and the most primitive form of business organization; but notwithstanding the large proportion of establishments in which it appears still to predominate, its relative unimportance is shown by the fact that this great number of establishments produced only $2,674,497,008, or 20.6 per cent of the total value of products returned, being an average of $7,176 to each establishment. Of the 372,703 establishments embraced in this group, 183,523, or nearly half, were establishments engaged in the hand trades.

2. *Partnership.*—The second form of organization represented in the table is the firm or partnership, in which two or more persons divide the work of business management, and jointly assume the risks. The members of the firm or the partners divide profits or losses in certain proportions agreed upon or in accordance with relative investments of capital, and are jointly and severally liable for all the debts of the firm or partnership to the full extent of their resources. Under this form of organization there were 96,715 establishments reported; or 18.9 per cent of the total. Their products were valued at $2,565,360,839, or 19.7 per cent of the total. Although there were no statistics collected in 1890 with which to compare the totals above shown, it is clear that the relative importance of this form of organization in the conduct of manufacturing enterprises is rapidly diminishing.

3. *The Corporation.*—The third form of organization represented in the table is the modern business corporation. This is a joint-stock company, with capital divided into shares, which are transferable at the option of individual shareholders. These corporations either obtain a charter by special act of a state legislature or become incorporated under general corporation acts. Many of the earlier joint-stock companies, however, were not incorporated, and were, therefore, merely a form of partnership.

The important and predominating position of the corporation in American manufactures at the present time is revealed by the statistics. While only 40,743 of the 512,254 establishments reporting were organized into corporations, they nevertheless produced $7,733,582,531, or 59.5 per cent of the total gross value of products. The facilities offered by the laws of several states for the establishment of business corporations, and the advantages of conducting business under this method of organization, are largely responsible for the rapid development of our manufacturing industries. The corporate form of organization permits the gathering together of capital beyond the resources of the private individual, distributes it among many holders where this is desired, and limits the liability of each holder to the amount of money actually invested in the stock of the company. Thus these organizations comprise nearly all the great manufacturing enterprises of the country.

An examination of the accompanying tables will furnish statistical proof of this statement. The four great industries producing articles of food, textiles, iron and steel, and lumber, are largely controlled by corporate capital, and the same may be said concerning the lesser

manufacturing industries. The hand trades are, however, still chiefly carried on by the single proprietor. Although these latter, in their nature, are outside the necessity of large capitalization, it was found that out of a total of 215,814 hand-trade establishments, 2,691, with an average annual production of $37,401, were operated under some corporate form, as a matter of convenience or business prudence.

The wholesale slaughtering and meat packing industry is now carried on almost wholly by large incorporated establishments. This has been due to the trade necessity of centralizing slaughtering at a few points convenient both to a large supply and to transportation facilities for quick delivery to the principal distributing markets in the United States and in foreign countries, and the advantage of locating and supporting agencies in these markets.

About 89.9 per cent of the value of cotton mill products is made by incorporated establishments. These constitute 72.8 per cent of the total number engaged in the industry. Very few cotton mills are now carried on without a charter of incorporation. The same form of organization appears in the manufacture of worsted goods, and to a less extent in the manufacture of woolen goods. The manufacture of worsted goods is carried on with a more expensive equipment than is necessary in the case of woolen goods. The latter industry is more suitable for the employment of small capital under individual attention. In the silk manufacturing industry 27.3 per cent of the establishments was owned by individuals, 31.9 per cent by firms or partnerships, and 40.8 per cent by incorporated companies. Very much the same conditions exist in the hosiery and knit goods business, 38.3 per cent of the mills being owned by individuals in 1900, and 27.4 per cent by firms or partnerships.

In the iron and steel industry, in 1900, the value of the products of all kinds amounted to $1,793,490,908, of which $1,508,493,141, or 84.1 per cent, was the value of the products of incorporated companies, made by 4,843 establishments, or 34.9 per cent of the total number. Of the 13,896 establishments in the industry, 668, classified as "iron and steel," produced 44.8 per cent of the total products; 586 of these, or 87.7 per cent, were incorporated, and produced 93.6 per cent of the total for that branch of the industry. This latter fact shows that the manufacture of iron and steel has reached proportions beyond the control of individual and partnership ownership.

In the lumber industry, in 1900, over one-half of the value of products was made in individual and partnership establishments. This applies quite generally to the industry in all its branches, for it has not yet attained a development which makes incorporation a matter of paramount importance.

The leather industry, including the manufacture of boots and shoes, has also remained largely under private ownership. Of the 16,989 establishments existing in 1900, 12,906 were owned by individuals. The nature of the industry still permits of this, although it is rapidly changing, the industry assuming larger proportions which require the employment of accumulated capital under a single and delegated management. The saddlery and harness branch of this industry is distributed among many individual establishments, which furnish over a half of the value of its production. Of the 16,989 establishments in the leather industry as a whole, 12,934 were engaged in the manufacture of saddlery and harness.

The manufacture of paper and wood pulp was chiefly carried on in 1900 by 484 corporations, which furnished products valued at $105,378,995 out of a total produced by 763 establishments, and valued at $127,326,162. Of the 15,305 establishments engaged in the printing and publishing of newspapers and periodicals in 1900, 9,759 were owned by individuals, 2,994 by partnerships, and 2,378 by incorporations. These latter furnished 58.1 per cent of the total value of products.

In the liquor and beverage industry, 71.7 per cent of the value of products reported in 1900 was reported by corporations. This applied very generally to all branches of the industry except bottling and the mineral and soda water manufacture. In these, individual ownership was the most important form of organization. The manufacture of malt and distilled liquors was under the control of corporations to the extent of 79.9 per cent of its value of products.

The chemical industry, in its various branches, was largely capitalized, in 1900, under some form of corporation; 81.4 per cent of the total value of its products being reported by corporations. This form of organization was common in the refining of petroleum, and in the manufacture of cotton-seed oil fertilizers, explosives, paints, and chemicals proper. The manufacture of perfumery, cosmetics, and patent medicines was still very largely carried on by individuals and firms. These branches included 42.1 per cent of the total number of establishments engaged in the chemical industry.

The clay, glass, and stone industries are largely under individual and firm ownership. This is particularly true of the brick and tile manufacture, and such trades as china decorating, glass cutting, staining, and ornamenting, marble and stonework, and the making of monuments and tombstones. Nearly all the glass made, in 1900, was produced by corporations, and, to a less extent, the same is true of the manufacture of pottery, terra cotta, and fire-clay products, as well as lime and cement products.

In the manufacture of metal products, other than iron and steel, corporate production predominated. This is plainly seen in the smelting and refining industries. Thirty-three of the 39 establishments en-

gaged in smelting and refining lead were corporations. These reported 99.7 per cent of the total value of products. Twenty-six corporations of the 31 establishments engaged in the smelting and refining of zinc reported 92.0 per cent of the total value of products. Forty-three corporations of the 47 establishments engaged in the smelting and refining of copper reported 96.9 per cent of the total value of products. The smaller manufactures and trades, as jewelry making, electroplating, tinsmithing, and the reducing and refining of gold and silver, not from the ore, were very largely in the hands of individuals and firms.

The tobacco industry in 1900 was conducted chiefly by individuals and partnerships, and particularly was this the case with the manufacture of cigars and cigarettes, where the value of the product for these classes of establishments was 77.1 per cent of total. The manufacture of chewing and smoking tobacco and snuff was very largely carried on by corporations, their establishments producing 85.9 per cent of the value of the products of this branch of the industry.

The manufacture of vehicles for land transportation was carried on chiefly by corporations in all its branches except carriages and wagons, the chief of these branches being the manufacture of steam and street railroad cars.

Iron and steel shipbuilding was carried on almost wholly by corporations, while 63.4 per cent of wooden ship and boat building was done by individuals and firms, 43.7 per cent being done by individuals and 19.7 by firms.

The production of the following miscellaneous industries was chiefly that of corporations: Agricultural implements, ammunition, coke, electrical apparatus and supplies, enameling and enameled goods, fireworks, gas, illuminating and heating, manufactured ice, lead pencils, phonographs and graphophones, photographic materials, rubber and elastic goods, soda water apparatus, washing machines and clothes wringers, and windmills.

4. *Miscellaneous Ownership.*—The table shows only 2,093 establishments reporting their form of organization as different from the three forms above considered. These establishments produced $30,959,765, or only 0.2 per cent of the gross value of products.

The small number indicates the infinitesimal part which cooperation, either on the English (Rochdale) system or any other system, plays in the manufacturing industries of the United States. There are some striking instances of success in this form of organization in certain industries, the most notable being in the manufacture of butter, cheese, and condensed milk, which single industry reported 1,765 out of the 2,093 establishments of this class, and a product of $24,337,561, or 78.6 per cent of the total. Eight cooperative associations were shown in cotton ginning and 19 in the canning and preserving of fruits and vegetables. These establishments are generally organizations of farmers who combine for the purpose of handling the produce of their farms. There were 7 cooperative associations in the glass industry, with products valued at $545,319. The special report on the glass industry in the Report on Manufactures, Part III, contains the following statement in regard to this form of organization:

> The five companies of a "miscellaneous" character were all cooperative and engaged in the manufacture of window glass, most of them having been established within the census year, and were financially supported by the glass workers' union, which loaned money proportioned on the pot capacity of each plant. There were 2 establishments of this character reported in the pressed and blown ware and bottle and jar branch of the industry. It should be stated, in this connection, that there were in the glass industry in addition 9 incorporated establishments of a cooperative character operating under charters, which in all the tables are included under the head of corporations. They are in all essential particulars cooperative associations. This movement toward cooperation arose from the desire to secure more work during the year, the capacity of the factories having been for some time so much in excess of current consumption, that the "run" of the factories had been getting less each year, averaging about six months where it was formerly ten. The past record of cooperation in the window-glass industry of the United States has been unsatisfactory, all going well as long as the market conditions were good, but financial ruin usually appearing with any depression in the trade. The indications at present are very favorable for cooperative manufacture, and it will probably spread very rapidly in the industry in the near future. The greatest impetus it receives comes from the scarcity of workmen, which is leading manufacturers to organize companies in which a large share of the stock is held by the workmen, who are thus less likely to be tempted away by offers from other manufacturers. Along with these quasi cooperative companies, many real cooperative companies, composed entirely of the men in the factory, are being established, especially among the Belgian workmen, who form a considerable proportion of the entire working force.

It should be explained that all returns from manufacturing establishments of a cooperative character, which were incorporated under state laws, were treated as corporations and so tabulated.

Other establishments included among the miscellaneous forms of organization are several "communities," so called; a number of societies, churches, and colleges, which for the most part were engaged in the publication of periodicals devoted to their own interests. Under these miscellaneous forms of organization, there were 174 establishments, showing a product of $3,102,785, engaged in printing and publishing newspapers.

XII.

MANUFACTURING IN GOVERNMENTAL ESTABLISHMENTS.

The Twelfth Census made a canvass of the governmental institutions engaged in manufacturing operations. These establishments have been overlooked in previous censuses, except in isolated instances, and in order to preserve as far as possible the general comparability of the statistics, the returns are not included in the general statistics of manufactures at this census. Reports were received from 138 establishments of this

class; the cost of materials used was $6,917,518; and the value of products was $22,010,391. Of these 138 establishments, represented in table XIII, 120 were owned and operated by the United States government; and 18 by state or municipal governments, the latter including 6 paving establishments, 3 engaged in printing and publishing, 3 foundry and machine shops, 2 blacksmithing establishments, and 1 each producing boots and shoes, iron and steel, and marble work. It is probable that many manufacturing establishments belonging to state or municipal governments were missed by the enumerators.

The manufacturing carried on in state, municipal, and United States plants, was for the purpose of supplying the needs of the governments operating them, and not for sale.

The most important governmental establishments were those maintained by the National Government for the repairing of ships, and the making of armament and munitions of war. The United States government printing office, and the several national mints, are also included in these returns.

XIII.

MANUFACTURING IN EDUCATIONAL, ELEEMOSYNARY, AND PENAL INSTITUTIONS.

The Twelfth Census presents the statistics of manufacturing and mechanical industries as carried on in educational, eleemosynary, and penal institutions. Scattering returns from establishments of this character have been secured at previous censuses and incorporated in the general statistics. In 1900, for the first time, an effort was made to secure returns from all institutions of this character in which productive industry is carried on. The returns, however, fall far short of representing all these establishments, particularly those in which the manufacturing is confined to the production of supplies for the use of the institutions themselves, and is, therefore, small in volume.

In presenting these statistics they are kept entirely distinct from those of general manufactures, and no use of them has been made in the comparative tables. It seems proper to maintain this segregation because of the entirely different conditions under which this branch of industry is carried on. The capital employed is not private capital, and is engaged in manufacturing not primarily for the purpose of profit, but rather as a feature of the discipline of the institutions and with a view to the regular employment of the inmates at productive occupations. The labor thus employed is not free labor and is not, as a rule, employed at a fixed wage, so that the conditions surrounding this form of industrial activity are entirely different from those generally prevailing in manufactures. It is often the case, however, that products of institutional industry are thrown upon the market in competition with the products of free labor, and the competition thus arising has been the subject of much agitation and discussion, which has resulted in special legislation in many states of the Union.

The returns from educational, eleemosynary, and penal institutions, represent 383 establishments. These establishments used materials costing $3,717,536, and the total value of the products was $6,688,592, representing only five one hundredths of 1 per cent of the gross value of the products for the whole country.

That the returns from penal institutions at the Twelfth Census, showing products of only $4,188,573, were extremely defective, may be inferred from the fact that the United States Department of Labor has made two special reports upon the subject of convict labor, which present very different results from those secured by the Census Office. In a report made in 1885–86, covering all the penal institutions in the country, returns were secured showing the value of the products to be $28,753,999; which, however, included farming, gardening, etc., mining, labor on public ways and public works, and stone breaking to the value of $5,062,917.[1] In the second report, that of 1896, the inquiry was confined to convict labor in institutions of the grade of state penitentiaries; and the value of the goods produced and work done in those institutions at that time was reported at $19,042,472, as compared with $24,271,078 in 1885 for the same grade of institutions.[2] It thus appears that the penal institutions of grades lower than the state penitentiary were of comparatively little consequence in respect to the value of their products; and also that the returns at the Twelfth Census, from penal institutions of all grades, represented only a fraction of the total product of all the establishments of this character in the country. It is very doubtful if greater accuracy and completeness has been attained in the reports from the eleemosynary and educational institutions. Nevertheless, a summary of the results secured, is presented in the following tables, and the suggestion is made that, with the facilities of a permanent census office, it will be possible at future censuses to continue and extend these statistics, relating to a form of industrialism which is of great and growing importance. A study of the tables will indicate the diversified character of the manufacturing and mechanical industries which are carried on in these institutions.

[1] Report of the United States Commissioner of Labor, 1886, page 116.

[2] Bulletin of the United States Department of Labor, July, 1896, page 470.

TABLE XIII.—GOVERNMENTAL ESTABLISHMENTS.

INDUSTRIES.	Number of establishments.	COST OF MATERIALS USED.				Value of products.
		Total.	Purchased in raw state.	Purchased in partially manufactured form.	Fuel, freight, etc.	
Total	138	$6,917,518	$60,576	$6,607,447	$249,495	$22,010,391
Ammunition	1	1,020	.....	1,020	.....	6,720
Blacksmithing and wheelwrighting	11	5,567	.....	4,749	818	23,401
Bookbinding and blank book making	2	767	.....	722	45	10,101
Boots and shoes, custom work and repairing	1	50	.....	50	.....	150
Boxes, wooden packing	1	2,455	.....	2,440	15	4,855
Carpentering	25	71,715	1,350	69,191	1,174	203,233
Clothing, men's, custom work and repairing	2	38,204	.....	37,959	245	223,803
Coffins, burial cases, and undertakers' goods	1	599	.....	599	.....	1,099
Engraving, steel, including plate printing	5	365,947	.....	350,852	15,095	2,273,859
Explosives	2	31,816	.....	28,323	3,493	60,303
Flouring and grist mill products	7	39,051	36,370	646	2,035	51,014
Foundry and machine shop products	9	32,920	.....	31,440	1,480	166,532
Furniture, cabinetmaking, repairing, and upholstering	9	97,781	.....	96,057	1,724	199,971
Iron and steel	1	61,602	.....	60,499	1,103	104,590
Leather, tanned, curried, and finished	1	17,383	.....	15,888	1,495	135,536
Lock and gun smithing	3	6,441	.....	6,441	.....	61,641
Lumber and timber products	4	4,975	800	4,175	.....	14,918
Marble and stone work	1	17,858	.....	16,143	1,715	29,008
Masonry, brick and stone	3	195,974	16,360	162,478	17,136	537,000
Models and patterns	2	28,874	.....	27,493	1,381	66,765
Ordnance and ordnance stores	1	853,360	.....	825,222	28,138	2,208,159
Painting, house, sign, etc	8	8,696	.....	8,584	112	27,148
Paving and paving materials	6	11,694	5,696	3,803	2,195	66,968
Photography	8	10,131	.....	9,983	148	35,859
Plumbing and gas and steam fitting	6	5,231	.....	5,181	50	13,965
Printing and publishing, book and job	7	1,200,487	.....	1,189,360	11,127	4,444,212
Shipbuilding	9	3,805,323	.....	3,647,152	158,171	11,034,312
Taxidermy	1	251	.....	251	.....	3,251
Tinsmithing, coppersmithing, and sheet-iron working	1	746	.....	746	.....	1,766

TABLE XIV.—EDUCATIONAL INSTITUTIONS.

INDUSTRIES.	Number of establishments.	COST OF MATERIALS USED.				Value of products.
		Total.	Purchased in raw state.	Purchased in partially manufactured form.	Fuel, freight, etc.	
Total	111	$605,816	$16,892	$551,018	$37,906	$1,134,827
Blacksmithing and wheelwrighting	11	11,474	.....	10,612	862	16,116
Bookbinding and blank book making	2	13,239	.....	13,164	75	21,875
Boots and shoes, custom work and repairing	6	13,545	.....	13,222	323	19,701
Boots and shoes, factory product	2	23,878	.....	22,739	1,139	27,614
Bread and other bakery products	2	30,006	.....	29,290	716	35,486
Brooms and brushes	6	17,563	3,372	13,670	521	17,810
Brick and tile	4	2,523	.....	2,185	338	10,164
Carpentering	8	125,878	2,874	114,313	8,691	285,417
Carriages and wagons	1	2,366	.....	2,291	75	1,665
Cheese, butter, and condensed milk, factory product	4	35,841	.....	34,906	935	44,808
Clothing, men's, custom work and repairing	7	32,937	.....	31,929	1,008	57,515
Clothing, women's, dressmaking	6	12,509	.....	12,349	160	26,154
Flouring and grist mill products	1	2,415	2,400	15	.....	2,800
Foundry and machine shop products	7	118,827	3,546	101,402	13,879	202,208
Furniture, cabinetmaking, repairing, and upholstering	2	37,122	100	35,250	1,772	45,250
Furniture, factory product	1	3,350	.....	3,350	.....	4,500
Gas, illuminating and heating	1	1,310	.....	1,200	110	3,975
Hand knit goods	1	301	.....	300	1	1,021
Hosiery and knit goods	2	773	.....	709	64	480
Ice, manufactured	2	1,830	.....	290	1,540	5,017
Kindling wood	1	5,000	4,600	275	125	7,701
Lumber, planing mill products, including sash, doors, and blinds	1	3,790	.....	3,040	750	6,100
Lumber and timber products	2	35,499	.....	35,499	.....	49,576
Mattresses and spring beds	1	369	.....	369	.....	720
Painting, house, sign, etc	1	1,478	.....	1,455	23	2,905
Photography	1	210	.....	200	10	250
Plumbing and gas and steam fitting	3	33,795	.....	32,518	1,277	67,884
Printing and publishing, book and job	6	22,215	.....	20,181	2,034	109,805
Printing and publishing, newspapers and periodicals	12	8,254	.....	7,591	663	30,663
Saddlery and harness	3	3,994	.....	3,943	51	5,429
Shirts	1	600	.....	100	500	20,876
Tinsmithing, coppersmithing, and sheet-iron working	1	2,482	.....	2,338	144	2,227
Tools, not elsewhere specified	1	400	.....	300	100	600
Woodenware, not elsewhere specified	1	43	.....	23	20	353

TABLE XV.—ELEEMOSYNARY INSTITUTIONS.

INDUSTRIES.	Number of establishments.	COST OF MATERIALS USED.				Value of products.
		Total.	Purchased in raw state.	Purchased in partially manufactured form.	Fuel, freight, etc.	
Total	138	$699,237	$79,734	$589,285	$30,218	$1,365,192
Blacksmithing	5	3,086	.....	2,672	414	10,694
Bookbinding and blank book making	1	70,000	.....	70,000	.....	80,000
Boots and shoes, custom work and repairing	10	24,421	.....	23,984	437	35,142
Boots and shoes, factory product	1	2,245	.....	2,210	35	2,930
Bread and other bakery products	5	72,427	277	69,576	2,574	104,981
Brick and tile	2	2,915	.....	515	2,400	278,252
Brooms and brushes	13	105,517	56,661	41,549	7,307	156,862
Carpentering	13	59,512	.....	56,100	3,412	86,086
Cheese, butter, and condensed milk, factory product	2	16,726	16,476	.....	250	18,487
Clothing, men's, custom work and repairing	9	52,809	.....	51,758	1,051	86,156
Clothing, men's, factory product	4	17,709	152	17,277	280	36,428
Clothing, women's, dressmaking	11	40,625	1,490	37,861	1,274	84,702
Cotton, ginning	3	698	.....	497	201	3,489
Flouring and grist mill products	1	960	960	.....	.....	156
Furniture, cabinetmaking, repairing, and upholstering	9	10,108	1,661	8,066	381	19,312
House furnishing goods, not elsewhere specified	3	2,337	.....	1,813	524	6,975
Ice, manufactured	3	3,853	895	2,089	869	13,259
Lumber and timber products	2	1,830	.....	1,830	.....	3,328
Marble and stone work	1	300	.....	250	50	4,200
Masonry, brick and stone	1	3,187	568	2,369	250	12,500
Mattresses and spring beds	4	11,883	29	11,667	187	25,319
Painting, house, sign, etc	4	7,900	.....	7,447	453	20,851
Paving and paving materials	1	910	500	110	300	6,504
Photography	1	600	.....	600	.....	3,310
Plumbing, and gas and steam fitting	6	19,031	65	15,752	3,214	42,076
Printing and publishing, book and job	2	20,239	.....	20,109	130	41,565
Printing and publishing, newspapers and periodicals	10	13,057	.....	12,337	720	29,515
Saddlery and harness	2	178	.....	136	42	860
Shirts	1	57	.....	52	5	130
Soap and candles	2	8,733	.....	8,497	236	11,977
Tinsmithing, coppersmithing, and sheet-iron working	5	3,134	.....	2,912	222	9,146
Woolen goods	1	122,250	.....	119,250	3,000	130,000

TABLE XVI.—PENAL INSTITUTIONS.

INDUSTRIES.	Number of establishments.	COST OF MATERIALS USED.				Value of products.
		Total.	Purchased in raw state.	Purchased in partially manufactured form.	Fuel, freight, etc.	
Total	134	$2,412,483	$941,717	$1,250,406	$220,360	$4,188,573
Bags, other than paper	1	127,129	85,918	21,628	19,583	155,847
Baskets, and rattan and willow ware	2	180	.....	180	.....	13,044
Blacksmithing and wheelwrighting	3	2,351	.....	2,270	81	10,638
Boot and shoe cut stock	2	23,030	.....	22,380	650	40,500
Boots and shoes, custom work and repairing	14	20,321	208	19,863	250	30,275
Boxes, wooden packing	2	15,973	.....	14,581	1,392	25,121
Bread and other bakery products	1	539	.....	509	30	1,850
Brick and tile	13	26,177	3,560	981	21,636	168,877
Brooms and brushes	11	325,363	184,196	127,870	13,297	726,021
Carpentering	3	7,710	650	6,905	155	13,828
Carpets, rag	2	5,144	.....	5,111	33	12,385
Carriages and wagons, including custom work and repairing	1	17,000	.....	14,500	2,500	42,900
Charcoal	1	21,150	21,100	50	.....	30,000
Clothing, men's, custom work and repairing	10	25,032	330	24,582	120	35,558
Clothing, men's, factory product	2	40,564	.....	40,518	46	51,827
Clothing, women's, dressmaking	2	6,561	.....	5,891	670	10,319
Coke	1	30,317	30,000	317	.....	85,796
Cordage and twine	4	549,521	525,000	10,553	13,968	639,868
Cotton goods	2	33,750	30,500	1,450	1,800	69,240
Dyeing and finishing textiles	1	24,370	.....	21,740	2,630	54,600
Foundry and machine shop products	5	247,338	12,419	165,885	69,034	572,568
Furniture, cabinetmaking, repairing, and upholstering	3	232	.....	202	30	6,173
Furniture, factory product	5	240,926	.....	233,806	7,120	401,008
Gloves and mittens	1	40,600	.....	40,050	550	52,500
Hand knit goods	2	18,427	1,583	16,333	511	24,269
Hosiery and knit goods	10	213,379	.....	211,506	1,873	368,738
Iron and steel	1	32,769	10,239	210	22,320	66,645
Jute and jute goods	1	55,274	18,466	26,314	10,494	80,330
Lumber	1	885	100	785	.....	1,750
Marble and stone work	3	3,425	1,200	1,650	575	10,267
Masonry, brick and stone	1	28,097	.....	15,571	12,526	25,765
Mats and matting	1	3,650	3,493	.....	157	7,325
Mattresses and spring beds	1	9,300	3,650	5,650	.....	12,500
Paving and paving materials	8	25,446	8,889	7,644	8,913	51,895
Painting, house, sign, etc	1	251	.....	251	.....	1,200
Plumbing, and gas and steam fitting	2	1,065	.....	1,055	10	2,000
Pottery, terra cotta, and fire-clay products	1	1,135	216	.....	919	7,420
Printing and publishing, book and job	1	400	.....	398	2	1,040
Printing and publishing, newspapers and periodicals	2	569	.....	569	.....	578
Shirts	2	77,420	.....	77,420	.....	134,500
Umbrellas and canes	1	110	.....	110	.....	6,844
Woolen goods	3	109,603	.....	103,118	6,485	139,764

XIV.

THE TENDENCY TOWARD CONCENTRATION INTO LARGE ESTABLISHMENTS.

The census figures throw some light upon the tendency in certain industries toward concentration into large establishments. The industries in which this tendency is most striking are presented in table XVII.

TABLE XVII.—*Sixteen Industries Illustrating Concentration.*

INDUSTRIES.	Year.	Number of establishments.	AVERAGE PER ESTABLISHMENT.			
			Capital.	Wage-earners. Average number.	Wage-earners. Wages.	Value of products.
Agricultural implements	1900	715	$220,571	65	$31,400	$141,549
	1890	910	159,686	43	19,898	89,310
	1880	1,943	31,966	20	7,905	35,327
	1870	2,076	16,780	12	5,853	25,080
	1860	2,116	6,553	8	2,800	9,845
	1850	1,333	2,674	5	1,626	5,133
Boots and shoes, factory product.	1900	1,600	63,622	89	36,985	163,143
	1890	2,082	45,765	64	29,139	105,980
	1880	1,959	21,947	57	21,951	84,763
Carpets and rugs, other than rag.	1900	133	334,205	214	83,619	362,349
	1890	173	220,860	166	64,291	276,128
	1880	195	110,095	104	35,052	163,040
	1870	215	58,329	56	21,775	101,217
	1860	213	22,168	31	7,257	36,890
	1850	116	33,215	58	10,746	46,574
Cotton goods	1900	1,055	442,882	287	80,170	321,517
	1890	905	391,183	242	72,955	296,112
	1880	1,005	218,412	185	45,387	209,901
	1870	956	147,182	142	40,841	185,659
	1860	1,091	90,362	112	21,943	106,033
	1850	1,094	68,100	84	.....	56,553
Glass	1900	355	178,025	149	76,295	159,267
	1890	294	139,343	153	71,041	139,629
	1880	211	94,051	115	43,337	100,259
	1870	201	70,207	79	39,037	95,701
	1860	112	54,765	81	25,927	78,350
	1850	94	36,195	60	22,283	49,380
Hosiery and knit goods	1900	921	88,882	91	26,448	103,673
	1890	796	63,578	75	20,827	84,474
	1880	359	43,397	80	18,667	81,246
	1870	248	44,078	60	17,859	74,240
	1860	197	20,485	46	8,436	36,957
	1850	85	6,409	27	4,239	12,095
Iron and steel	1900	668	858,371	333	180,869	1,203,545
	[1]1890	699	[2]591,085	250	136,652	683,124
	1880	699	294,692	197	78,020	418,583
	1870	726	161,523	103	54,158	274,878
	1860	542	82,283	65	20,405	97,341
	1850	468	46,716	53	13,810	43,650
Leather, tanned, curried, and finished	1900	1,306	133,214	40	17,298	156,231
	1890	1 787	54,890	24	11,891	96,327
	1880	5,028	13,039	7	2,932	35,584
	1870	7,569	8,076	5	1,916	20,774
	1860	5,188	7,522	5	1,576	14,591
	1850	6,686	3,406	4	978	6,500
Liquors, malt	1900	1,509	275,205	26	17,115	157,236
	1890	1,248	186,275	24	16,597	146,420
	1880	2,191	41,629	12	5,567	46,124
	1870	1,972	24,786	6	3,427	28,249
	1860	1,269	12,437	5	1,817	16,793
	1850	431	9,449	5	1,518	13,291
Paper and wood pulp	1900	763	219,538	65	27,191	166,876
	1890	649	138,412	48	20,346	121,629
	1880	742	64,878	35	12,089	77,314
	1870	677	51,043	27	10,648	72,156
	1860	555	25,320	20	4,986	38,228
	1850	443	16,390	15	3,381	22,996
Shipbuilding	1900	1,116	69,321	42	22,257	66,826
	1890	1,006	27,100	22	13,006	37,838
	1880	2,188	9,589	10	5,811	16,819
	1870	964	11,891	14	7,338	22,286
	1860	675	8,819	15	6,725	19,887
	1850	958	5,638	14	6,355	17,773

[1] Includes 1 penal institution.
[2] Includes value of rented property.

TABLE XVII.—*Sixteen Industries Illustrating Concentration*—Cont'd.

INDUSTRIES.	Year.	Number of establishments.	AVERAGE PER ESTABLISHMENT.			
			Capital.	Wage-earners. Average number.	Wage-earners. Wages.	Products.
Silk and silk goods	1900	483	$167,872	135	$43,441	222,063
	1890	472	108,067	105	37,632	184,954
	1880	382	50,066	82	23,944	107,416
	1870	86	72,455	77	22,585	141,984
	1860	139	21,057	39	7,556	47,538
	1850	67	10,124	26	4,439	27 007
Slaughtering and meat packing.	1900	1,134	168,172	61	29,915	696,872
	1890	1,367	86,332	33	18,046	413,070
	1880	872	56,673	31	12,051	348,122
	1870	768	31,543	11	3,325	98,732
	1860	259	39,221	20	3,935	113,675
	1850	185	18,824	18	6,657	64,766
Tobacco, chewing, smoking, and snuff.	1900	437	100,358	67	16,270	237,424
	1890	395	78,079	75	17,588	166,693
	1880	477	36,074	69	13,457	110,677
	1870	573	23,659	38	9,104	66,995
	1860	626	15,167	30	5,705	34,857
Woolen goods	1900	1,035	120,180	67	23,920	114,425
	1890	1,311	99,916	59	19,938	101,890
	1880	1,990	48,289	43	12,988	80,707
	1870	2,891	34,184	28	9,297	53,755
	1860	1,260	24,494	33	7,627	49,123
	1850	1,559	18,036	25	.....	27,715
Worsted goods	1900	186	710,581	306	108,025	646,851
	1890	143	476,120	301	104,510	553,809
	1880	76	268,080	247	74,777	441,447
	1870	102	98,880	127	42,832	216,572
	1860	3	1,076,667	793	181,228	1,233,793

This method of presentation by averages, which includes all the small establishments with the great ones, fails to give any true conception of the extent to which the total value of the product comes from a comparatively small number of establishments, the operatives of which are numbered by the thousand.

The tendency toward concentration appears to be most marked in the iron and steel industry. The largest number of rolling mills and blast furnaces was reported at the census of 1870, when 726 establishments reported an average capital of $161,523, 103 wage-earners, $54,158 paid in wages, and $274,878 worth of products. At the census of 1880 the number of establishments decreased to 699, at which point it stood again in the census of 1890, falling still further, to 668, in 1900. At the Twelfth Census these 668 establishments reported an average capital of $858,371, 333 wage-earners, $180,869 paid in wages, and $1,203,545 worth of products. During the last decade the average capital increased 45.2 per cent and the average product 76.2 per cent. During the last half century the average iron and steel establishment has increased its capital eighteenfold, the number of wage-earners fivefold, the amount paid in wages twelvefold, and the value of the product twenty-seven fold.

The manufacture of agricultural implements also shows a consistent decrease in the number of establishments since 1860, while the average size of the establishments has increased uninterruptedly since the first report. The glass industry shows a continuous increase in the size of establishments, with a general increase in their number. Leather and paper mills have about

kept pace with each other in the rate of increase in value of their products, but the amount of capital and the number of employees in the paper mills are greater than in the leather factories. The number of paper establishments has just held its own, while the number of leather establishments has actually decreased.

The size of textile establishments is notably larger than formerly. The number of establishments in carpets and in woolen goods are somewhat less than during the earlier periods; in cotton goods there was little difference between the number at the beginning and at the end of the half century period, with a minimum in 1890; while hosiery and knit goods, glass, and silk and silk goods have more establishments than at any other time during the half century. They have all, however, maintained an almost uninterrupted growth in all the four items shown in the comparative table.

On the other hand, there are certain industries for which the statistics reveal no such tendency toward concentration. In the flouring and grist mill industry the figures for 1900 show an average of 1 employee per mill, whereas in 1890 there was an average of 3 employees to each mill. This reduction in the average number is due to the fact that the present census made a much closer canvass of local country gristmills than was made in 1890, and to the further fact that a very large proportion of these country gristmills are operated by their proprietors, who employ no help.

It is a fact well within public knowledge, however, that the flour milling industry shows as pronounced a tendency toward concentration into large establishments as does any other branch of manufacture. Thus the misleading results which follow from including the little neighborhood gristmills in a general average with the giant flour milling establishments of Minnesota become apparent. Several other industries show no tendency toward concentration into larger establishments—the factory production of cheese and butter, for example. The reasons for this are the same as in the grist milling industry.

XV.

ESTABLISHMENTS, CLASSIFIED BY NUMBER OF EMPLOYEES.

A more exact and scientific method of measuring the size of manufacturing establishments in the United States is furnished by the data shown in general Tables 10 and 11 of this report, from page 582 to page 595. These tables show the establishments grouped according to the average number of employees in each. These groups are 9 in number, beginning with establishments having no employees and continuing with those employing less than 5, from 5 to 20, 21 to 50, 51 to 100, 101 to 250, 251 to 500, 501 to 1,000, and over 1,000 employees.

Table XVIII presents a summary of the tables mentioned above, showing for the United States and for the 15 industry groups the number of establishments classified by the number of persons employed in each.

TABLE XVIII.—ESTABLISHMENTS CLASSIFIED BY NUMBER OF EMPLOYEES, NOT INCLUDING PROPRIETORS AND FIRM MEMBERS: 1900.

INDUSTRY GROUPS.	NUMBER OF ESTABLISHMENTS REPORTING—									
	Total number of establishments.	No employees.	Under 5.	5 to 20.	21 to 50.	51 to 100.	101 to 250.	251 to 500.	501 to 1000.	Over 1000.
United States—all industries	512,254	110,510	232,726	112,188	32,408	11,663	8,494	2,809	1,063	443
I. Food and kindred products	61,302	14,611	34,759	8,135	1,890	916	715	166	81	29
II. Textiles	30,048	1,300	11,036	9,722	3,458	1,828	1,020	669	295	120
III. Iron and steel and their products	13,896	783	3,102	4,349	2,186	1,395	1,244	513	221	103
IV. Lumber and its remanufactures	47,079	2,070	16,846	20,051	4,816	1,892	1,128	218	51	7
V. Leather and its finished products	16,989	5,028	8,163	1,644	857	560	472	196	50	19
VI. Paper and printing	26,747	2,400	12,628	7,962	2,139	874	565	143	30	6
VII. Liquors and beverages	7,861	671	4,185	2,070	569	228	103	27	6	2
VIII. Chemicals and allied products	5,444	643	1,607	1,689	807	390	224	64	10	10
IX. Clay, glass, and stone products	14,809	1,022	3,876	6,121	2,186	857	562	134	42	9
X. Metals and metal products, other than iron and steel	16,305	2,950	8,029	3,542	951	386	291	85	51	20
XI. Tobacco	15,252	3,687	7,273	3,004	672	309	233	85	28	11
XII. Vehicles for land transportation	10,113	1,183	3,772	3,080	829	468	416	229	88	48
XIII. Shipbuilding	1,116	198	211	361	152	88	56	29	17	9
XIV. Miscellaneous industries	29,479	5,191	10,403	8,026	3,123	1,477	865	251	93	50
XV. Hand trades	215,814	68,823	[1]106,836	[2]32,382	[3]7,773	.....	.....	.....	.....	.....

[1] Includes establishments with 1 to 5 employees.
[2] Includes establishments with 6 to 20 employees.
[3] Includes establishments with over 20 employees.

Of the 512,254 establishments, shown in the table, 215,814 represent hand trades; and of these 68,823 were shops in which all the work was done by the proprietors without hired assistance. The largest group in the hand trades was that of establishments employing from 1 to 5 employees, in which were found 106,836 establishments, while there were 32,382 establishments employing from 5 to 20 persons, and 7,773 employing over 20. Of the latter 2,440, or 31.4 per cent, were establishments engaged in carpentering; 1,899 were masonry establishments; 872 were painting establishments; and 788 were plumbing, and gas and steam fitting

establishments. The large establishments in the hand trades were confined almost exclusively to the building trades.

Of the manufactures proper, out of the total number of establishments—296,440—there were 41,687 where the work was done by the proprietor without employees, and 125,890 where the number of employees was under 5; this was much the largest group, indicating that, notwithstanding the increase in large establishments, small factories are still most numerous. The number of establishments employing between 5 and 20 employees was 79,756, and from this group there is a regular gradation to the end of the groups, which show 1,063 establishments employing between 500 and 1,000 persons, and 443 establishments employing over 1,000 persons.

The establishments belonging to industrial combinations are treated as so many separate establishments in this table, except when they happen to be located in the same city or town.

Of the 443 establishments employing over 1,000 persons, the largest number existed in Group II, "textiles," which contains 120 such establishments, 68 of which were cotton mills, 12 worsted mills, and 8 carpet mills. The largest number of employees appearing in any one of these textile mills was 7,268 in a cotton mill located in New Hampshire. Three cotton mills—two in Massachusetts and one in Maine—employed between three and four thousand persons each; and one in New York state employed 2,689 persons.

The second group, ranked by the proportion of large establishments, is iron and steel, in which there were 103 establishments employing over 1,000 persons each; of these 53 were iron and steel mills proper, 31 were foundry and machine shops, and 7 were engaged in the manufacture of hardware. The establishment reporting the largest number of employees was an iron and steel mill located in Ohio, which reported 7,477. Two mills in Pennsylvania reported 5,847 and 4,537, respectively; one plant in Massachusetts reported 5,190; and one in Illinois, 5,119.

The third group was that of miscellaneous industries, in which there were 50 establishments reporting over 1,000 employees each; 11 of these were manufacturers of agricultural implements, 9 of rubber boots and shoes, 6 of electrical apparatus and supplies, 4 were gas plants, and 3 were manufacturers of corsets. Three establishments in Illinois, manufacturing agricultural implements, reported, respectively, 6,728, 4,059, and 1,348 employees; one in Ohio, 1,963; and one in New York, 1,949. Of establishments manufacturing electrical apparatus and supplies, one in Pennsylvania employed 6,318 persons; one in Illinois, 4,411; one in Massachusetts, 3,723; and one in New York, 2,473.

The fourth group was that of manufactures of vehicles for land transportation, in which there were 48 establishments employing more than 1,000 persons, of these 23 were engaged in car construction and repair shops operated by railroad companies, and 16 were engaged in car shops not operated by railroad companies.

The fifth group was that of the manufacture of food products, with 29 establishments employing over 1,000 persons, 19 of which were wholesale slaughtering and meat-packing establishments, and 4 were engaged in the canning and preserving of fruits. One sugar-refining company in New York state employed 2,099 employees.

The sixth group was that of metals, other than iron and steel, in which there were 20 establishments employing over 1,000 persons; 3 were engaged in the manufacture of brass and copper, rolled; 3 in the smelting and refining of lead, and 2 in the manufacture of watches.

Of the other establishments with over 1,000 employees, 19 were engaged in the manufacture of leather and its finished products, 16 of which were boot and shoe factories; 11 in the manufacture of tobacco; 10 in chemical manufactures; 9 in the manufacture of clay, glass, and stone products, 5 of which were glass factories; 9 in shipbuilding, iron and steel; and 6 in the paper and printing industries, 3 of which were newspaper or periodical publications. Of the establishments manufacturing tobacco, 1 employed 2,861, and another 2,317 persons.

The location of these large establishments by states, given in General Table 10, shows that 75, the greatest number in a single state, were found in Pennsylvania; 66 in Massachusetts; 52 in New York; 49 in Illinois; 29 in Connecticut; 21 in Ohio; 17 in New Jersey; 16 each in Indiana and Rhode Island; 11 in Wisconsin; and 9 each in Maryland and New Hampshire. The remaining 73 establishments were distributed among 19 states. Many additional details of interest to the economic student can be drawn from these tables.

XVI.

ESTABLISHMENTS USING POWER.

Still another method of measuring the evolution of American manufacturing industries is found in the statistics of establishments using power and those using no power. Table XIX shows these statistics for all establishments and table XX the statistics for all establishments exclusive of the hand trades, except for 1880, when all establishments are shown, for the reason that this division between the hand trades and manufactures proper can not be made for the figures of the Tenth Census.

TABLE XIX.—*Establishments reporting power and no power: 1880 to 1900.*

YEAR.	NUMBER OF ESTABLISHMENTS.				
	Total.	Reporting power.	Reporting no power.	Per cent of total.	
				Power.	No power.
1900	512,254	169,409	342,845	33.1	66.9
1890	355,415	100,735	254,680	28.3	71.7
1880	253,852	85,923	167,929	33.8	66.2

TABLE XX.—*Establishments reporting power and no power, exclusive of hand trades: 1880 to 1900.*

YEAR.	NUMBER OF ESTABLISHMENTS.				
	Total.	Reporting power.	Reporting no power.	Per cent of total.	
				Power.	No power.
1900	296,440	159,422	137,018	53.8	46.2
1890	216,281	97,442	118,839	45.1	54.9
1880	253,852	85,923	167,929	33.8	66.2

From these tables it appears that the number of manufacturing establishments proper using power increased from 97,442 in 1890 to 159,422 in 1900, an increase of 61,980, or 63.6 per cent. During the same period, the number of establishments using no power increased from 118,839 to 147,022, an increase of 28,183, or 23.7 per cent. In 1890, 45.1 per cent of the whole number of establishments, exclusive of hand trades, reported the use of power and 54.9 per cent used no power, while in 1900, 52 per cent of these establishments used power and 48 per cent used no power. In using these tables it should be borne in mind that they refer to the number of establishments using power and not to the total amount of power.

The increased use of power, and the increase in the quantity of power used by individual establishments, constitute, on the whole, the most remarkable phase of manufacturing growth brought out by the Twelfth Census of Manufactures. The actual increase in the total amount of horsepower used was 89.8 per cent from 1890 to 1900, as compared with an increase of 68.2 per cent in the number of establishments using power. The total horsepower thus increased in much greater proportion than either capital, employees, wages, or products—and there is, therefore, definite statistical evidence of the rapidity with which power-driven machinery is being adopted in American manufactures, and is increasing its relative ascendency over hand labor.

Equally significant is the evidence afforded by the statistics of the impending revolution in power used in manufactures by the substitution of electric power for steam and waterpower. Since 1890 there has been an increase of nearly twentyfold in the total amount of electrical power used, the increase being from 15,569 horsepower in 1890 to 311,016 in 1900.

These several changes bear so important a relationship to the present and future development of American manufactures, that it has been deemed wise to make them the subject of a special study, which appears as Chapter IV of this introduction. This chapter upon the use of power in manufactures has been prepared by experts, and incidentally treats with some detail the subject of the growing use of electrical power in manufacturing industry.

XVII.

INDUSTRIAL COMBINATIONS.

The tendency toward production on a large scale, shown in the preceding section, has been brought out by the Twelfth Census, in connection with a study of what has become commonly known as the industrial combination. This form of corporate industry was almost entirely developed in the United States during the period between the censuses of 1890 and 1900. The public interest in these combinations, and their economic relations to the general manufacturing industry, led the Census Office to prepare a special report of their operations during the census year, the result of which is here presented.

1. *Definition.*—Some misconception exists as to what constitutes an "industrial combination," and it was necessary, in order to obtain a uniform basis of tabulation, to fix a definition which should limit and designate the corporations to be included. The following definition was therefore formulated:

"For the purpose of the census the rule has been adopted to consider no aggregation of mills an industrial combination unless it consists of a number of formerly independent mills which have been brought together into one company under a charter obtained for that purpose. We therefore exclude from this category many large establishments comprising a number of mills which have grown up, not by combination with other mills, but by the erection of new plants or the purchase of old ones."

The word "trust" was avoided in this definition, because, while it may have come to convey to the popular mind a definite idea, it stands technically for a form of organization under which the stockholders of each of the separate companies assign their stock to a certain number of trustees, thus giving to these trustees an irrevocable power of attorney to vote the stock as they see fit. This form of organization has been

declared illegal by the act of July 2, 1890, Fifty-first Congress, first session, entitled "An act to protect trade and commerce against unlawful restraint of monopolies" (26 Statutes at Large, page 209), and by the statutes of many states.

The definition was found not to be sufficiently comprehensive, in that it did not take cognizance of a class of corporations organized for the purpose of holding the stock of other corporations, but not directly owning the plants and carrying on the business of manufacturing, which continues to be done by the constituent companies. In these cases the profits of the constituent companies form the fund from which the dividends of the holding company are paid. Of the combinations here included several are of this class. There are numerous instances of combination or association of independent establishments and corporations, for the purpose of selling goods at uniform prices, or through a single agency, or both, of which no cognizance has been taken in these tables, since they are in the nature of agreements only, similar in character to those which are often found to exist among dealers in milk, drugs, and other merchandise. These organizations or associations are often more effective in regulating prices, particularly in selected localities, than are actual consolidations under a charter, but they are voluntary and mutual, and can not be statistically traced.

2. *Classes Excluded.*—This definition excludes from the category of industrial combinations a number of corporations which are commonly considered as such combinations, because they represent enormous aggregations of capital, or control a large number of plants. Some of these large establishments are not incorporated; and many of them arose from very small beginnings, and have increased from time to time by the construction of new mills, or by the purchase and rehabilitation of other plants, and not through any method of combination or consolidation, or any change in the previous management.

There were also excluded from the statistics of the industrial combinations all corporations engaged in the manufacture and distribution of gas and electric light and power. A great many combinations in this branch of industry exist throughout the country, but it was impossible for the Census Office to trace them all, and it seemed inexpedient to include their statistics, not only for the reason given, but also because, as a general rule, combinations in this industry affect only the local supply of gas and electric light and power, and therefore do not possess the economic significance which attaches to this method of production in other branches of industry. Moreover, under the provisions of the Act of March 3, 1899, the statistics of electric light and power were reserved for the special reports provided for in section 8 of that law.

3. *Constituent Companies.*—In order to avoid any misunderstanding as to the corporations included by the Census Office in the group of industrial combinations, there is presented in table XXIX a list of the names and addresses of these corporations, together with the date of their organization, the number of plants controlled by each, the amount of bonds and stock authorized by their charters, and the amounts actually issued at the time the census was taken. The list contains the names and addresses of 185 corporations, controlling 2,040 plants that were active during the census year, and also 176 plants that were reported as idle during that period, showing an average of 11 active plants to each corporation.

In order that each branch of manufacturing industry might receive due consideration it was found necessary, in some cases, when companies were engaged in the manufacture of two or more classes of products of a different nature, to secure a separate report for each. This was particularly true in the case of iron and steel manufacture, in which industry separate returns were required for the blast furnaces, rolling mills, pipe works, tin-dipping plants, foundries and machine shops, and other branches. These also appear in the statistics of manufactures as separate and distinct plants, although the operations of all may really be carried on under one roof, and they are generally considered as one establishment. This will account for what appears to be an excess in the number of plants accredited to the American Tin Plate Company and others of the large iron and steel corporations. The American Tin Plate Company operated 34 rolling mills for the production of iron and steel sheets, in connection with which there were also operated 31 tin-dipping plants, making 65 plants in all. Although these apparent duplications occur principally in the iron and steel industry, there are a number of such instances in other groups, chief among which is that of the National Lead Company, in the group of "metals and metal products other than iron and steel." The nature of the products of this company made it necessary to secure several separate reports from some of the establishments controlled, thus making the total number of plants appear to exceed what was usually accredited to that company.

Attention is called to the fact that many industrial combinations, some of them of great magnitude, like the United States Steel Corporation, have been formed since the completion of the census year, and their returns are not included in these tables, except as some of

their constituent parts were previously included in an industrial combination.[1]

The list given in table XXIX reveals the fact that 65 of the 185 corporations herein treated as industrial combinations were organized prior to the year 1897, and that in the years 1897, 1898, 1899, and prior to June 30, 1900, there were organized 7, 20, 79, and 13 corporations, respectively. Of the total number, 92, or 49.7 per cent, were chartered during the eighteen months from January 1, 1899, to June 30, 1900. This wholesale reorganization of industry, right upon the eve of the taking of the present census, thrust upon the division of manufactures a multiplicity of problems such as had never before confronted it.

4. *Difficulties in Securing Statistics.*—In obtaining these statistics for the census this office received the utmost courtesy, consideration, and assistance from the officers and employees of these industrial combinations. There was but a single exception to this rule. Every facility was placed at the disposal of the agents to enable them to obtain the details desired in the most accurate form, and directly from the books of the corporations. In a number of cases the services of one or more clerks or bookkeepers were cheerfully given for several weeks, in order to make possible the procurement of the necessary data.

In spite of this fact, the preparation of the reports for these establishments was attended with numerous difficulties, and the development of the industrial combination has enormously increased the complexities of the manufacturing census. To illustrate these complexities: A number of these corporations were organized during the census year, and had been in operation only a part of that year. In some of these cases the books of the constituent plants were not available, and it was therefore possible to obtain only estimates of their operations. Again, it was necessary to present the manufacturing statistics by geographical divisions, in order that each locality might be properly credited with its local statistics, as shown in table XXVIII, where the statistics are presented by state totals. Many of the industrial combinations had plants in different states, or in different counties and cities of the same state, but did not keep their account books so that the data of the several plants were separately obtainable. In all such cases it was necessary to divide the one report into several separate parts, according to the best estimates that could be obtained, either from the general office or by application to the individual plants.

Again, it is customary for these industrial combinations to devote different mills or factories to different processes, one factory often furnishing the partially finished parts or materials for another; and upon the products of these preparatory mills and factories no value is placed by the corporation, since they are not sold. In all such cases a value had to be estimated in order that the locality might be duly credited with the capital invested and the product created by labor employed there. From the completed returns this estimated value of the partially finished materials had subsequently to be subtracted, to avoid a duplication in the value of the ultimate products into which they entered. This explanation will show that under the most favorable conditions, and with every disposition on the part of the officers to furnish exact information, it was necessary to make estimates, which are approximately accurate, but can not, in the nature of things, be absolutely exact.

The difficulties referred to were even more serious in the matter of capital; and here at least much trouble was encountered in inducing the managers of these corporations to make returns in conformity with the census schedules of inquiry. These schedules called for the actual investment of capital, in the form of lands, buildings, machinery, materials, and stocks on hand, etc., and took no cognizance of the nominal capitalization of the corporations in question. This capitalization had been effected, in many instances, on the basis of the supposed earning capacity of the several establish-

[1] The following is a statement of the constituent companies absorbed by the United States Steel Corporation, the amount of their authorized capitalization at the time of their absorption, and the amount of capital stock issued:

	AUTHORIZED CAPITALIZATION AND BONDS.				CAPITAL STOCK AND BONDS ISSUED.			
	Total.	Bonds.	Preferred stock.	Common.	Total.	Bonds.	Preferred stock.	Common.
United States Steel Corporation	$1,404,000,000	$304,000,000	$550,000,000	$550,000,000	$1,005,351,740	$301,000,000	$340,726,670	$363,625,070
Constituent companies: Total.	829,434,000	4,434,000	397,500,000	427,500,000	707,162,740	2,811,000	340,726,670	363,625,070
The Carnegie Company	160,000,000		80,000,000	80,000,000	156,800,000		78,400,000	78,400,000
American Bridge Company	70,000,000		35,000,000	35,000,000	61,055,600		30,527,800	30,527,800
Lake Superior Consolidated Iron Mines.	30,000,000		15,000,000	15,000,000	29,425,940		14,712,970	14,712,970
Federal Steel Company	200,000,000		100,000,000	100,000,000	99,745,200		53,260,900	46,484,300
American Steel and Wire Company of New Jersey	90,000,000		40,000,000	50,000,000	90,000,000		40,000,000	50,000,000
National Tube Company	80,000,000		40,000,000	40,000,000	80,000,000		40,000,000	40,000,000
National Steel Company	63,434,000	[1]4,434,000	27,000,000	32,000,000	61,811,000	[2]2,811,000	27,000,000	32,000,000
American Sheet Steel Company	53,000,000		26,500,000	26,500,000	49,000,000		24,500,000	24,500,000
American Tin Plate Company	50,000,000		20,000,000	30,000,000	46,325,000		18,325,000	28,000,000
American Steel Hoop Company	33,000,000		14,000,000	19,000,000	33,000,000		14,000,000	19,000,000
Shelby Steel Tube Company [2]								

[1] Underlying bonds.
[2] In June, 1901, a majority of the capital stock of the Shelby Steel Tube Company was purchased by the United States Steel Corporation. The total authorized capital stock of the Shelby Steel Tube Company is $15,000,000, of which $13,150,500 has been issued.

ments embraced in the corporation, and was therefore in excess of the actual cash invested in the business, or the market value of the plants at valuations based upon ordinary methods of assessment. While in many cases there existed an actual inventory of the value of the several plants, it did not always exist, or was not always obtainable; and any distribution among the several plants of the live capital actually required to carry on the business was necessarily an estimate, made in some cases in this office, on the basis of the value of the product of each plant considered in connection with its pay roll. While estimates of this character are unsatisfactory, and may affect the totals for the different states, they do not change the total for all the companies, and are unavoidable from the nature of the statistics.

The Census Office has aimed in this presentation to account only for such capital, in fixed plant and live assets, as was actually invested in the establishments covered.

5. *Idle Plants.*—In addition to the reports for the 2,040 active plants, the office received reports as to capital invested in 120 plants out of the 176 that were idle during the census year. The following statement summarizes the totals for the capital reported for both active and idle plants:

TABLE XXI.—*Industrial combinations: active and idle plants, 1900.*

	Total.	Active.	Idle.
Number of plants	2,160	2,040	120
Capital:			
Total	$1,461,631,743	$1,436,625,910	$25,005,833
Land	$157,230,865	$152,552,163	$4,678,702
Buildings	$261,648,364	255,172,039	6,476,325
Machinery, tools, and implements	$398,934,116	391,738,011	7,196,105
Cash, bills receivable, etc.	$643,818,398	$637,163,697	$6,654,701

In addition to the 120 idle plants contained in the above statement, there were also 56 plants which were idle during the census year, but concerning which no data could be obtained.

Table XXII gives the number of idle plants and the amount of idle capital reported in each group of industries.

TABLE XXII.—NUMBER AND CAPITAL OF IDLE PLANTS IN INDUSTRIAL COMBINATIONS, BY GROUPS OF INDUSTRIES.

	Total.	Iron and steel and their products.	Food and kindred products.	Chemicals and allied products.	Metals and metal products other than iron and steel.	Liquors and beverages.	Vehicles for land transportation.	Paper and printing.	Clay, glass, and stone products.	Lumber and its remanufactures.	Miscellaneous industries.
Number of plants reporting	120	22	6	39	5	17	1	3	21	4	2
Capital:											
Total	$25,005,833	$6,376,750	$103,180	$12,464,588	$560,699	$2,010,976	$8,000	$146,542	$1,540,576	$1,444,522	$50,000
Land	$4,678,702	$645,676	$76,180	$2,026,050	$186,500	$797,500	$3,000	$25,000	$472,896	$140,000	$5,000
Buildings	$6,476,325	$2,545,756	$151,000	$2,025,929	$339,397	$289,000	$4,000	$53,000	$588,243	$505,000	$25,000
Machinery, tools, and implements	$7,196,105	$2,809,273	$148,000	$2,566,475	$34,802	$754,476	$1,000	$67,642	$469,437	$325,000	$20,000
Cash and sundries	$6,654,701	$376,045	$28,000	$5,846,134	.....	$170,000	.....	.....	$60,000	$174,522	.....

6. *Capitalization.*—There is presented, in table XXIX, a statement of the actual amount of the capitalization, authorized and issued, of each of the corporations considered, divided among bonds, preferred stock, and common stock. This statement was compiled from returns made by the corporations directly to this office.

In addition to manufacturing operations, some of the companies for which statistics are presented were engaged in mercantile, transportation, and other pursuits, and their capital stock and bonds were issued to cover all their operations. In many instances the value of the related industries thus carried on was enormous, as in cases where iron and steel companies owned mines from which they obtained their raw material, and railroads and steamships by which they transported it; or where paper making companies owned vast tracts of forest from which to obtain their wood for pulp for years to come. It was found impossible to divide the capitalization so as to show only that portion which represented the manufacturing operations of these corporations, and care should be taken, therefore, not to regard this total capitalization as in any sense equivalent to the actual capital employed exclusively in manufacturing, which is shown in tables XXVII and XXVIII.

While, as just explained, some of these combinations were engaged in mercantile pursuits, their primary object was manufacturing, their mercantile interest being subservient to the industrial, and only engaged in because it was of assistance to and promoted the object for which the organization was formed.

The authorized capitalization of the corporations included in this report, and the amounts of capital stock issued, are summarized in table XXIII.

TABLE XXIII.—*Industrial combinations: capitalization, 1900.*

	Authorized.	Issued.
Total	$3,619,039,200	$3,093,095,808
Bonds	270,127,250	216,412,750
Preferred stock	1,259,540,900	1,066,525,963
Common stock	2,089,371,050	1,810,157,146

There are also certain intangible assets of which the census figures take no cognizance, such as patents, trademarks, franchises, good will, etc., whose value is included in the above capitalization. If allowance be made for

this qualification and for the others that have been explained, the true value of the capital invested in active and idle plants, $1,461,631,743, may be compared with the bonds and capital stock issued, amounting to $3,093,095,868, of which it formed 47.3 per cent, exceeding the amount of bonds and preferred stock issued, $1,282,938,722, by $178,693,021.

The par value of the bonds and stocks of these corporations is given in table XXIX. Attention may be directed to the fact that these bonds and stocks, in a majority of instances, are listed in the several stock exchanges of the country, and are there bought and sold at prices sometimes above par and sometimes below par, in accordance with the public estimate of their true value, on the basis of actual investment or actual earning capacity. As these market values fluctuate from day to day, it is impossible to make a correct statement of the actual market value of the stocks and bonds represented in the total capitalization of $3,093,095,868, shown in this table; and it is therefore impossible to state whether this market value was greater or less than the amount of actual capital invested, as shown in table XXVII.

The following summary of table XXIX shows the total authorized capitalization of the plants engaged in each group of industries:

TABLE XXIV.—SUMMARY OF CAPITALIZATION FOR INDUSTRIAL COMBINATIONS.

	Total.	Iron and steel, and their products.	Food and allied products.	Chemicals and allied products.	Metals and metal products other than iron and steel.	Liquors and beverages.	Vehicles for land transportation.
Number of plants controlled	[1]2,216	489	288	297	113	258	72
Capitalization:							
Amounts authorized by charter—							
Total	$3,619,039,200	$978,799,000	$348,818,750	$364,549,400	$245,900,000	$277,132,050	$203,300,000
Bonds	$270,127,250	$25,949,000	$32,943,750	$13,750,000	$10,300,000	$64,584,500	$10,300,000
Total stock	$3,348,911,950	$952,850,000	$315,875,000	$350,799,400	$235,600,000	$212,547,550	$193,000,000
Preferred stock	$1,259,540,900	$430,350,000	$130,425,000	$103,812,300	$60,500,000	$66,253,600	$54,500,000
Common stock	$2,089,371,050	$522,500,000	$185,450,000	$246,987,100	$175,100,000	$146,293,950	$138,500,000
Amounts issued—							
Total	$3,093,095,868	$784,420,295	$296,739,200	$289,151,295	$212,070,600	$248,830,300	$199,980,000
Bonds	$216,412,759	$20,614,000	$12,725,900	$9,294,000	$8,565,000	$55,529,142	$10,300,000
Total stock	$2,876,683,109	$763,806,295	$284,013,300	$279,857,295	$203,505,600	$193,301,158	$189,680,000
Preferred stock	$1,066,526,963	$349,763,485	$117,337,600	$78,151,084	$50,315,500	$62,503,169	$52,840,000
Common stock	$1,810,157,146	$414,042,810	$166,675,700	$201,706,211	$153,190,100	$130,797,989	$136,840,000

	Tobacco.	Textiles.	Leather and its finished products.	Paper and printing.	Clay, glass, and stone products.	Lumber and its remanufactures.	Miscellaneous industries.
Number of plants controlled	41	72	108	119	203	59	97
Capitalization:							
Amounts authorized by charter—							
Total	$205,000,000	$172,250,000	$219,000,000	$183,250,000	$81,600,000	$45,300,000	$294,050,000
Bonds		$39,250,000	$20,000,000	$41,250,000	$9,200,000	$1,800,000	$800,000
Total stock	$205,000,000	$133,000,000	$199,000,000	$142,000,000	$72,400,000	$43,500,000	$293,250,000
Preferred stock	$79,500,000	$42,000,000	$81,500,000	$52,500,000	$14,200,000	$11,300,000	$132,700,000
Common stock	$125,500,000	$91,000,000	$117,500,000	$89,500,000	$58,200,000	$32,200,000	$160,550,000
Amounts issued—							
Total	$197,184,628	$146,458,175	$197,820,200	$172,467,717	$69,464,358	$39,809,400	$238,699,700
Bonds		$36,944,000	$13,805,000	$42,461,217	$5,567,500	$275,000	$532,000
Total stock	$197,184,628	$109,514,175	$184,015,200	$130,006,500	$63,896,858	$39,534,400	$238,367,700
Preferred stock	$76,844,600	$33,417,775	$75,282,300	$48,115,500	$12,532,550	$10,027,800	$99,394,600
Common stock	$120,340,028	$76,096,400	$108,732,900	$81,891,000	$51,364,308	$29,506,600	$138,973,100

[1] The number of plants reported in this table does not agree with the number reported in tables XXVII and XXVIII because in a number of instances combinations operate plants engaged in different industries. In preparing this list the name of the combination has been placed in the group of industries to which it would be assigned according to its product of chief value. The number also includes 176 plants reported as idle during the census year.

7. *General Statistics.*—Since it is impossible to present the figures for each industrial combination separately, without violating the pledge of the office that no publication of the statistics of manufactures will be made which will reveal the details of private business, the reports for the different plants were assigned to the generic groups of industries, as classed at the Twelfth Census (see page cxliii), according to their products of chief value. These groups are enumerated and the detailed statistics for each group are presented in table XXVII. The grouping here employed is believed to be sufficiently minute, in most cases, to show what proportion of the products represented in each group was manufactured or controlled by industrial combinations. In a number of the industries, which are grouped under the head of "miscellaneous," there was but one industrial combination engaged in the production of the articles manufactured. In several of the other groups but one industrial combination, as in the case of bicycles and tricycles, was engaged in the production of one or more of the different products included in the group.

In table XXVII the groups are arranged in accordance with their importance as gauged by the value of their products, and the following summary of table XXVII presents the general totals for each group:

TABLE XXV.—SUMMARY OF STATISTICS FOR INDUSTRIAL COMBINATIONS.

	Number of combinations.	Number of plants.	Capital.	SALARIED OFFICIALS.		WAGE-EARNERS.	
				Number.	Salaries.	Average number.	Total wages.
Total	185	2,040	$1,436,625,910	24,640	$32,738,208	400,046	$195,122,980
Iron and steel and their products	40	447	341,779,954	6,075	7,462,386	145,609	81,098,583
Food and kindred products	22	282	247,944,675	4,036	4,468,804	33,165	12,446,866
Chemicals and allied products	15	250	176,502,835	3,036	4,403,424	28,401	13,214,006
Metal and metal products other than iron and steel	11	89	118,519,401	1,047	1,571,414	20,522	12,356,772
Liquors and beverages	28	219	118,489,158	1,151	2,406,096	7,624	4,859,457
Vehicles for land transportation	6	65	85,965,683	1,967	1,940,778	34,422	17,571,618
Tobacco	4	41	16,191,818	1,410	2,064,926	17,661	5,278,151
Textiles	8	72	92,468,606	1,095	1,841,913	37,723	13,297,357
Leather and its finished products	5	100	62,734,011	343	663,570	9,898	4,070,641
Paper and printing	7	116	59,271,691	1,165	1,831,528	16,706	7,478,982
Clay, glass, and stone products	15	180	46,878,928	1,001	1,301,159	20,294	10,994,488
Lumber and its remanufactures	8	61	24,470,281	615	756,783	10,778	4,389,944
Miscellaneous industries	16	118	45,408,869	1,099	2,030,927	17,243	8,056,140

	Miscellaneous expenses.	COST OF MATERIALS USED.				Value of products.
		Total.	Purchased in raw state.	Purchased in partially manufactured form.	Fuel, freight, etc.	
Total	$152,157,700	$1,089,666,334	$332,601,439	$697,811,264	$59,253,631	$1,667,350,949
Iron and steel and their products	18,067,249	325,630,784	22,979,550	272,510,700	30,140,534	508,626,482
Food and kindred products	11,963,893	243,315,234	52,972,600	186,999,640	3,342,994	285,941,066
Chemicals and allied products	7,258,867	142,572,256	98,081,833	37,623,230	6,867,193	184,914,344
Metals and metal products other than iron and steel	2,847,356	131,020,638	59,753,215	62,750,067	8,508,356	180,154,703
Liquors and beverages	58,621,319	19,117,973	10,265,538	7,656,535	1,195,900	93,432,274
Vehicles for land transportation	3,519,070	56,600,518	45,730	55,356,073	1,198,715	85,985,532
Tobacco	35,119,316	23,809,804	16,035,638	7,578,510	195,656	74,063,029
Textiles	3,224,606	41,919,311	26,574,699	13,964,847	1,379,765	71,888,202
Leather and its finished products	1,589,760	35,463,655	33,284,055	1,567,868	611,732	45,684,829
Paper and printing	3,655,291	24,554,364	3,421,721	18,998,025	2,134,618	44,418,417
Clay, glass, and stone products	1,995,220	6,474,516	276,426	4,054,381	2,144,009	23,258,182
Lumber and its remanufactures	1,098,276	11,028,757	325,972	10,325,905	376,880	20,378,815
Miscellaneous industries	3,197,477	28,158,224	8,584,462	18,416,483	1,157,279	48,605,073

The arrangement by groups, as shown in the above summary, brings the iron and steel industry at the head of the table, with a gross product of $508,626,482, which is more than double the value of the product of any other group, except that of "food and kindred products," and represents nearly one-third of the total gross value of products of all industrial combinations. The total value of all the products of the industrial combinations reported ($1,667,350,949) may be compared with the total gross value of all manufactured products, as shown by the census of 1900, for the purpose of indicating to what extent the manufacturing industry of the country is now carried on by industrial combinations. The total gross value of all manufactured products was $13,004,400,143. If from this total we subtract the value of the products of the hand trades, or the mechanical and neighborhood industries, ($1,183,615,478) which are not susceptible to the form of management known as the industrial combination, we have a residuum of $11,820,784,665, showing that the product of the industrial combinations in 1900 was equivalent to 14.1 per cent of the total gross products of the manufacturing industries of the country as they existed in 1900.

Table XXVI shows the average number of wage-earners, total wages paid, and value of products of industrial combinations in each of the 15 groups of industries, in comparison with the same for all establishments, except in the hand trades, with the percentual ratio between the two.

TABLE XXVI.—WAGE-EARNERS, TOTAL WAGES, AND VALUE OF PRODUCTS: PERCENTAGE OF INDUSTRIAL COMBINATIONS TO ALL ESTABLISHMENTS.

GROUP.	AVERAGE NUMBER OF WAGE-EARNERS.			TOTAL WAGES.			VALUE OF PRODUCTS.		
	All establishments.[1]	Industrial combinations.	Ratio of industrial combinations to all establishments.	All establishments.[1]	Industrial combinations.	Ratio of industrial combinations to all establishments.	All establishments.[1]	Industrial combinations.	Ratio of industrial combinations to all establishments.
			Per cent.			*Per cent.*			*Per cent.*
Total	4,749,276	400,046	8.4	$2,034,215,456	$195,122,980	9.6	$11,820,784,665	$1,667,350,949	14.1
Food and kindred products	313,809	33,165	10.6	129,910,070	12,446,866	9.6	2,277,702,010	285,941,066	12.6
Textiles	1,029,910	37,723	3.7	341,734,399	13,297,357	3.9	1,637,484,484	71,888,202	4.4
Iron and steel and their products	733,968	145,609	19.8	381,875,499	81,098,583	21.2	1,793,490,908	508,626,482	28.4
Lumber and its remanufactures	546,953	10,778	2.0	212,201,768	4,389,944	2.1	1,030,906,579	20,378,815	2.0
Leather and its finished products	238,202	9,898	4.2	99,759,885	4,070,641	4.1	583,731,046	45,681,829	7.8
Paper and printing	297,651	16,706	5.6	140,092,453	7,478,962	5.3	606,317,768	44,418,417	7.3
Liquors and beverages	63,072	7,624	12.1	36,946,557	4,869,457	13.2	425,504,167	93,432,274	22.0
Chemicals and allied products	101,522	28,401	28.0	43,870,602	13,214,006	30.1	552,891,877	184,914,344	33.4
Clay, glass, and stone products	244,987	20,294	8.3	109,022,582	10,994,488	10.1	293,564,235	23,258,182	7.9
Metals and metal products other than iron and steel	190,757	20,522	10.8	96,749,051	12,356,772	12.8	748,795,464	180,154,703	24.1
Tobacco	142,277	17,661	12.4	49,852,484	5,278,151	10.6	283,076,546	74,063,029	26.2
Vehicles for land transportation	316,214	34,422	10.9	164,614,781	17,571,613	10.7	508,649,129	85,985,533	16.9
Shipbuilding	46,781	[2]	.....	24,889,163	[2]	.....	74,573,158	[2]	.....
Miscellaneous industries	483,273	17,243	3.6	202,746,162	8,056,140	4.0	1,004,092,294	48,605,073	4.8

[1] Exclusive of hand trades.
[2] Reports for 11 establishments owned by the American Shipbuilding Co., and 3 establishments owned by the Electric Boat Co., were included in the group of "Miscellaneous industries" to avoid disclosing the operations of individual companies.

The 185 corporations represented in the tables employed, on an average, 400,046 wage-earners during the census year, or 8.4 per cent of all in the United States, excluding the hand trades, the greatest number employed at any one time during the year being 509,212, and the least number, 333,875. To these employees the sum of $195,122,980 was paid, which was 9.6 per cent of the total wages in all manufactures except hand trades. In addition to the wage-earners, employment was given to 24,640 salaried officials, clerks, etc., to whom salaries amounting to $32,738,208 were paid. There was expended by these industrial combinations for miscellaneous expenses a total of $152,157,700, which was distributed among the several items, as shown in table XXVII. The total cost of materials utilized by industrial combinations was $1,089,666,334. The gross value of the products given for all the industrial combinations was $1,667,350,949. As explained on page ccxiv of this volume, it is not to be assumed that a combination of these figures of expenses subtracted from the total reported value of products is in any sense indicative of the profits in the manufacture of these products during the census year. This statement is necessary in order to avoid erroneous conclusions from the figures presented.

Table XXVII presents the general statistics for the industrial combinations by industry groups; table XXVIII shows the totals by states; and table XXIX gives the name, office address, date of organization, and number of plants controlled, together with the amount of capitalization and amount of dividends paid by each of the 185 corporations.

TABLE XXVII.—INDUSTRIAL COMBINATIONS:

		Total.	Iron and steel and their products.	Food and kindred products.	Chemicals and allied products.	Metals and metal products other than iron and steel.
1	Number of combinations	185	40	22	15	11
2	Number of plants	2,040	447	282	250	89
	Capital:					
3	Total	$1,436,625,910	$341,779,954	$247,944,675	$176,502,835	$118,519,401
4	Land	$152,552,163	$30,840,801	$34,164,543	$20,487,622	$5,106,660
5	Buildings	$255,172,039	$54,813,790	$34,567,130	$23,788,307	$34,835,426
6	Machinery, tools, and implements	$391,738,011	$120,133,706	$67,309,461	$51,020,755	$35,157,769
7	Cash and sundries	$637,163,697	$135,982,657	$111,903,541	$81,206,151	$43,419,546
	Salaried officials, clerks, etc.:					
8	Total number	24,640	6,075	4,036	3,036	1,047
9	Total salaries	$32,738,208	$7,462,386	$4,403,304	$4,403,424	$1,571,414
	Officers—					
10	Number	1,473	427	99	206	63
11	Salaries	$7,152,067	$2,012,010	$589,464	$968,221	$311,305
	General superintendents, managers, clerks, etc.—					
12	Total number	23,167	5,648	3,937	2,830	984
13	Total salaries	$25,586,141	$5,450,376	$3,873,840	$3,435,203	$1,260,109
	Men—					
14	Number	21,263	5,355	3,574	2,672	906
15	Salaries	$24,687,964	$5,298,039	$3,726,448	$3,342,026	$1,225,147
	Women—					
16	Number	1,904	293	363	158	78
17	Salaries	$898,177	$152,337	$147,392	$93,177	$34,962
	Wage-earners, including pieceworkers:					
18	Greatest number employed at any one time during the year	509,212	178,047	49,187	38,270	24,350
19	Least number employed at any one time during the year	333,875	116,803	31,014	22,956	17,271
20	Average number	400,046	145,609	33,165	28,401	20,522
21	Wages	$195,122,980	$81,098,583	$12,446,866	$13,214,006	$12,356,772
	Men, 16 years and over—					
22	Average number	343,310	142,090	20,351	27,261	19,694
23	Wages	$181,232,149	$80,275,226	$9,842,031	$12,945,248	$12,112,921
	Women, 16 years and over—					
24	Average number	45,469	2,139	11,110	918	753
25	Wages	$11,878,043	$535,951	$2,376,684	$239,869	$223,422
	Children, under 16 years—					
26	Average number	11,267	1,380	1,704	222	75
27	Wages	$2,012,788	$287,406	$228,151	$28,889	$20,429
	Average number of wage-earners, including pieceworkers, employed during each month:					
	Men, 16 years and over—					
28	January	342,540	137,545	16,589	30,322	19,418
29	February	344,376	138,502	16,192	30,071	19,512
30	March	353,778	142,176	17,127	30,239	19,821
31	April	347,238	138,903	17,387	27,475	19,748
32	May	346,429	138,891	21,224	24,140	19,911
33	June	333,859	136,803	22,297	22,827	18,970
34	July	318,542	134,002	23,266	22,857	17,873
35	August	337,543	146,485	24,102	23,679	19,280
36	September	344,660	149,999	24,151	25,996	19,970
37	October	351,525	150,847	23,631	28,287	20,425
38	November	353,376	148,421	21,722	30,834	20,789
39	December	345,854	142,506	16,525	30,410	20,609
	Women, 16 years and over—					
40	January	40,563	2,132	5,699	936	693
41	February	41,326	2,262	5,925	910	708
42	March	42,432	2,365	6,426	914	742
43	April	42,664	2,425	6,805	934	755
44	May	45,357	2,456	10,094	919	757
45	June	46,448	2,274	18,805	901	738
46	July	48,504	1,909	17,429	850	729
47	August	51,236	2,245	18,011	844	749
48	September	51,676	2,112	17,953	917	765
49	October	49,040	1,955	14,107	970	791
50	November	45,419	1,896	10,082	975	812
51	December	41,969	1,638	6,982	950	799
	Children, under 16 years—					
52	January	10,539	1,201	745	178	58
53	February	10,789	1,340	751	169	70
54	March	11,229	1,420	877	313	81
55	April	10,967	1,381	905	170	78
56	May	11,032	1,428	2,193	158	80
57	June	11,257	1,433	2,284	243	75
58	July	10,613	1,264	2,882	274	80
59	August	11,379	1,527	2,423	252	80
60	September	11,228	1,530	2,406	230	82
61	October	12,596	1,519	2,332	201	70
62	November	12,510	1,379	2,224	208	76
63	December	11,060	1,136	921	268	69
	Miscellaneous expenses:					
64	Total	$152,157,700	$18,067,249	$11,963,893	$7,258,867	$2,847,856
65	Rent of works	$1,332,031	$187,719	$396,125	$76,589	$76,958
66	Taxes, not including internal revenue	$4,847,323	$974,364	$546,898	$715,187	$309,352
67	Rent of offices, insurance, interest, and all sundry expenses not hitherto included.	$145,197,396	$16,718,700	$11,010,710	$6,447,662	$2,446,166
68	Contract work	$780,950	$216,466	$10,160	$19,429	$14,902
	Materials used:					
69	Total cost	$1,089,666,334	$325,630,784	$243,315,234	$142,572,256	$131,020,638
70	Purchased in raw state	$332,601,439	$22,979,550	$52,972,600	$98,081,833	$59,753,215
71	Purchased in partially manufactured form	$610,751,571	$246,268,385	$167,650,270	$27,861,257	$58,864,473
72	Fuel	$46,818,582	$26,904,177	$2,957,528	$4,564,306	$4,314,179
73	Amount paid for rent of power and heat	$686,507	$85,018	$106,248	$6,012	$65,796
74	Mill supplies	$11,924,571	$5,219,960	$982,479	$1,078,180	$764,602
75	All other materials	$75,135,122	$21,022,355	$18,366,891	$8,683,793	$3,129,992
76	Freight	$11,798,542	$3,151,339	$279,218	$2,296,875	$4,128,381
77	Value of products	$1,667,350,949	$508,626,482	$285,941,066	$184,914,344	$180,154,703

DETAILED STATISTICS, BY GROUPS OF INDUSTRIES.

Liquors and beverages.	Vehicles for land transportation.	Tobacco.	Textiles.	Leather and its finished products.	Paper and Printing.	Clay, glass, and stone products.	Lumber and its remanufactures.	Miscellaneous industries.	
28	6	4	8	5	7	15	8	16	1
219	65	41	72	100	116	180	61	118	2
$118,489,158	$85,965,683	$16,191,818	$92,468,606	$62,734,011	$59,271,691	$46,878,928	$24,470,281	$45,408,869	3
$17,389,741	$4,439,536	$967,317	$8,229,696	$8,514,721	$8,419,241	$6,773,476	$1,867,885	$5,341,924	4
$36,589,250	$9,985,221	$3,323,219	$14,215,209	$8,284,378	$11,088,407	$13,539,123	$3,548,055	$6,594,529	5
$20,721,753	$13,069,713	$3,311,605	$25,358,231	$6,205,435	$20,610,416	$12,980,653	$4,267,997	$11,590,517	6
$43,788,414	$58,471,218	$8,589,677	$44,665,470	$39,729,482	$19,153,627	$13,585,676	$14,786,344	$21,881,899	7
1,151	1,967	1,410	1,095	343	1,165	1,001	615	1,699	8
$2,406,096	$1,940,778	$2,064,926	$1,841,913	$663,570	$1,831,528	$1,301,159	$756,783	$2,030,927	9
127	82	38	72	43	69	106	33	108	10
$619,868	$491,134	$267,343	$459,576	$243,340	$255,897	$349,154	$153,900	$430,855	11
1,024	1,885	1,372	1,023	300	1,096	895	582	1,591	12
$1,786,228	$1,449,644	$1,797,583	$1,382,337	$420,230	$1,575,631	$952,005	$602,883	$1,600,072	13
1,010	1,635	1,310	868	293	978	791	475	1,396	14
$1,778,689	$1,353,403	$1,774,948	$1,302,756	$417,244	$1,518,498	$894,303	$549,343	$1,507,060	15
14	250	62	155	7	118	104	107	195	16
$7,539	$96,241	$22,635	$79,581	$2,986	$57,133	$57,642	$53,540	$93,012	17
9,907	48,347	28,193	42,725	12,175	19,882	28,861	12,127	22,141	18
6,686	25,349	13,663	33,461	8,329	14,068	21,060	9,328	13,942	19
7,624	34,422	17,661	37,723	9,898	16,706	20,294	10,778	17,243	20
$4,869,457	$17,571,613	$5,278,151	$13,297,357	$4,070,641	$7,478,962	$10,994,488	$4,389,944	$8,056,140	21
7,455	33,764	8,396	19,577	9,877	13,145	17,409	9,286	15,005	22
$4,839,122	$17,380,811	$3,215,556	$8,114,054	$4,066,142	$6,545,304	$10,361,489	$4,084,929	$7,499,316	23
76	346	8,284	14,246	19	8,802	1,267	1,143	1,866	24
$15,079	$123,141	$1,960,579	$4,426,770	$4,049	$885,534	$306,105	$299,658	$481,202	25
93	312	981	3,900	2	259	1,618	349	372	26
$15,256	$67,661	$102,016	$756,583	$450	$48,124	$326,894	$55,357	$75,622	27
7,329	36,903	8,185	19,155	9,363	13,850	19,671	9,152	16,058	28
7,427	36,408	8,912	19,445	9,548	13,831	19,826	9,089	15,618	29
8,106	38,083	9,427	19,792	9,579	13,896	20,173	9,097	16,262	30
8,261	35,872	9,012	19,319	9,688	13,851	21,377	9,407	16,943	31
7,930	35,632	9,508	18,950	10,053	13,557	20,443	9,486	16,704	32
6,916	33,678	7,637	18,682	9,561	10,915	21,103	9,115	15,355	33
6,870	30,997	7,128	18,640	9,707	11,342	13,061	8,861	13,938	34
6,991	28,579	7,984	20,287	10,112	12,288	15,111	9,083	13,562	35
7,260	28,721	7,846	20,473	10,276	12,733	14,307	9,400	13,528	36
7,394	30,184	8,060	20,777	10,367	13,430	14,635	9,623	13,865	37
7,551	33,350	8,657	19,580	10,209	13,898	14,607	9,592	14,216	38
7,423	36,769	8,396	19,877	10,066	14,148	14,590	9,524	15,011	39
69	539	7,672	14,573	27	3,783	1,412	1,183	1,845	40
65	535	8,187	14,513	34	3,649	1,488	1,180	1,970	41
75	513	8,660	14,635	38	3,600	1,434	1,200	1,885	42
89	449	8,714	14,423	34	3,512	1,367	1,159	1,998	43
81	351	8,916	14,230	23	3,322	1,013	1,159	2,086	44
92	261	7,580	14,098	11	1,557	1,024	1,116	1,986	45
87	229	7,875	13,571	.....	2,190	725	1,093	1,817	46
84	274	7,914	13,739	2	3,470	998	1,091	1,815	47
67	317	8,123	13,870	1	3,463	1,228	1,104	1,756	48
76	221	8,634	14,218	16	3,628	1,508	1,186	1,780	49
60	235	8,720	14,471	21	3,687	1,529	1,188	1,793	50
68	232	8,459	14,610	22	3,768	1,530	1,152	1,759	51
81	337	838	3,960	2	301	2,154	384	350	52
77	339	931	3,940	2	297	2,199	321	353	53
81	361	996	3,943	2	284	2,179	338	354	54
101	375	947	3,872	2	259	2,164	319	394	55
107	312	1,011	3,871	2	230	900	320	420	56
111	277	1,029	3,858	2	218	960	360	407	57
104	257	946	3,907	2	210	433	379	375	58
108	225	979	3,908	2	186	941	363	385	59
108	222	913	3,877	2	227	926	358	347	60
82	294	1,036	3,867	2	287	2,184	365	357	61
78	352	1,089	3,875	2	298	2,197	371	361	62
78	388	1,062	3,924	2	310	2,175	363	364	63
$58,621,319	$3,519,070	$35,119,316	$3,224,606	$1,589,760	$3,655,291	$1,995,220	$1,098,276	$3,197,477	64
$62,788	$49,654	$34,713	$56,656	$100	$213,141	$5,875	$39,539	$162,251	65
$521,302	$166,988	$147,810	$423,115	$182,727	$390,355	$155,060	$125,090	$189,075	66
$58,037,284	$2,902,428	$34,936,793	$2,720,643	$1,406,933	$3,043,842	$1,779,264	$926,604	$2,821,367	67
.....	$400,000	.....	$24,192	.....	$7,953	$55,021	$8,043	$24,784	68
$19,117,973	$56,600,518	$23,809,804	$41,919,311	$35,463,655	$24,554,364	$6,474,816	$11,028,757	$28,158,224	69
$10,265,538	$45,780	$16,035,638	$26,574,699	$33,284,055	$3,421,721	$276,426	$325,972	$8,584,462	70
$5,217,899	$47,391,179	$3,018,207	$9,950,995	$1,446,266	$16,254,364	$1,867,059	$9,513,288	$15,447,929	71
$1,175,879	$1,044,492	$167,722	$934,348	$237,129	$1,743,778	$1,931,486	$136,908	$706,655	72
$975	$7,100	$7,850	$31,135	.....	$306,647	.....	$4,979	$14,747	73
$122,276	$357,354	$121,483	$1,682,052	$46,762	$861,783	$182,895	$65,678	$189,067	74
$2,316,360	$7,607,546	$4,438,820	$2,331,800	$74,840	$1,881,878	$2,054,427	$746,939	$2,479,487	75
$19,046	$147,123	$20,084	$414,282	$374,603	$84,198	$212,523	$284,998	$435,877	76
$93,432,274	$85,985,533	$74,063,029	$71,888,202	$45,684,829	$44,418,417	$23,258,182	$20,378,815	$48,605,073	77

TABLE XXVII.—INDUSTRIAL COMBINATIONS:

		Total.	Iron and steel and their products.	Food and kindred products.	Chemicals and allied products.	Metals and metal products other than iron and steel.
	Power:					
78	Total horsepower	1,583,503	798,839	76,404	88,021	67,156
	Owned—					
	Engines—					
	Steam—					
79	Number	8,975	3,229	745	1,448	436
80	Horsepower	1,253,077	748,035	66,717	83,664	46,314
	Gas or gasoline—					
81	Number	132	34	6	10	10
82	Horsepower	3,661	1,336	68	167	323
	Water wheels—					
83	Number	1,098	29	20	3	45
84	Horsepower	244,801	3,718	7,000	225	10,212
	Electric motors—					
85	Number	3,049	1,852	87	108	159
86	Horsepower	57,452	36,005	1,337	3,335	3,460
	Other power—					
87	Number	242	123	----	26	39
88	Horsepower	15,938	5,796	----	500	5,247
89	Rented, horsepower	8,574	3,949	1,282	130	1,600
90	Supplied to other establishments, horsepower	2,510	779	18	10	----
	Establishments classified by number of employees:					
91	Total number	2,040	447	282	250	89
92	Under 5	27	2	12	----	3
93	5 to 20	109	3	15	14	11
94	21 to 50	342	19	43	53	8
95	51 to 100	431	62	59	80	14
96	101 to 250	554	137	99	64	24
97	251 to 500	278	118	28	25	13
98	501 to 1,000	229	71	23	13	10
99	Over 1,000	70	35	3	1	6

TABLE XXVIII.—MANUFACTURES IN INDUSTRIAL

	STATES AND TERRITORIES.	Number of plants.	CAPITAL.					SALARIED OFFICIALS, CLERKS, ETC.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.			
			Total.	Land.	Buildings.	Machinery, tools, and implements.	Cash and sundries.	Number.	Salaries.	Total.		Men, 16 years and over.	
										Average number.	Wages.	Average number.	Wages.
1	Total	2,040	$1,436,625,910	$152,552,163	$255,172,039	$391,788,011	$637,163,697	24,640	$32,738,208	400,046	$195,122,980	343,310	$181,232,149
2	Alabama	25	9,858,740	588,429	2,745,826	2,504,812	4,019,673	230	281,064	6,296	2,010,145	5,728	1,942,675
3	California	57	12,918,344	1,422,626	2,381,371	3,597,840	5,511,507	308	356,984	5,063	2,108,466	2,230	1,325,350
4	Colorado	11	21,371,538	721,062	6,663,436	8,954,834	5,032,206	168	308,732	2,802	2,006,512	2,728	1,986,580
5	Connecticut	50	41,137,564	2,384,814	8,024,796	12,140,896	18,587,058	949	1,225,217	14,462	7,066,886	11,374	6,197,906
6	Delaware	6	3,012,805	274,824	561,482	964,975	1,211,524	73	81,927	1,628	781,931	1,599	774,288
7	Georgia	18	5,659,161	231,005	1,037,824	800,899	3,589,433	97	158,365	1,182	335,539	1,182	335,539
8	Illinois	163	157,342,806	31,659,387	32,985,260	43,651,999	49,046,160	2,799	3,376,689	41,497	23,036,359	39,158	22,512,729
9	Indiana	100	45,840,908	3,135,704	7,589,175	15,377,502	19,238,527	1,008	1,173,655	19,711	10,985,199	18,304	10,672,348
10	Iowa	16	13,384,333	3,079,160	3,726,160	4,376,169	2,202,844	171	217,224	1,768	729,612	1,309	644,329
11	Kansas	31	12,382,612	411,649	4,196,995	4,881,496	2,892,472	103	65,227	1,013	450,965	991	446,255
12	Kentucky	50	10,441,628	1,137,020	1,705,601	3,494,426	4,104,581	355	468,524	4,507	1,688,583	3,798	1,558,905
13	Louisiana	20	22,410,410	2,330,664	2,528,139	4,496,898	13,054,709	289	340,758	3,265	1,123,111	2,562	1,011,214
14	Maine	79	14,710,447	1,038,300	1,989,007	3,734,119	7,949,021	268	337,397	6,569	1,842,200	4,189	1,519,360
15	Maryland	70	33,481,205	3,127,424	12,926,452	7,007,913	10,419,416	621	926,188	10,392	3,254,666	6,228	2,350,684
16	Massachusetts	123	118,622,094	9,302,285	14,072,295	29,938,688	65,308,826	1,846	2,621,304	38,801	17,075,415	26,897	13,479,745
17	Michigan	31	19,033,339	2,302,070	3,250,423	3,924,929	9,555,917	457	599,337	8,955	3,931,652	8,002	3,746,274
18	Minnesota	18	12,255,415	646,109	1,187,423	5,525,839	4,896,044	272	279,906	2,732	1,114,476	2,251	1,028,410
19	Missouri	41	24,889,297	2,373,688	5,378,166	6,975,745	10,161,698	1,067	1,238,775	9,390	4,179,989	7,202	3,556,144
20	Montana	7	24,762,018	191,981	8,588,184	3,322,869	12,709,084	79	172,196	3,689	3,033,217	3,632	3,013,620
21	Nebraska	9	19,165,978	1,248,160	5,695,916	7,845,527	4,365,775	80	120,022	1,085	567,464	972	544,678
22	New Hampshire	9	5,383,444	872,049	1,093,000	1,394,477	2,023,918	78	121,566	2,071	773,665	1,761	671,480
23	New Jersey	75	80,582,879	8,611,124	10,333,278	20,729,336	40,908,641	1,104	1,645,499	13,258	6,991,501	11,947	6,625,868
24	New York	227	201,705,908	28,506,169	28,923,246	49,006,466	95,270,027	3,465	4,979,377	36,844	17,035,478	31,122	15,664,198
25	North Carolina	7	1,601,494	150,119	470,044	375,402	605,929	112	233,697	1,390	251,393	800	173,325
26	Ohio	225	131,826,823	10,218,215	21,426,256	51,529,656	48,652,696	2,519	3,138,744	47,623	25,705,082	44,519	24,973,609
27	Oregon	9	2,302,229	115,000	1,445,000	359,584	382,645	82	48,800	392	136,874	342	126,691
28	Pennsylvania	358	289,895,305	27,432,966	44,899,803	69,889,463	147,673,073	4,302	5,652,661	78,178	43,447,574	74,321	42,666,135
29	Rhode Island	18	18,717,005	2,134,916	2,384,961	5,387,889	8,809,239	235	439,726	7,509	3,049,822	4,305	2,055,972
30	South Carolina	17	11,719,339	115,901	1,992,774	1,304,862	8,305,802	78	162,816	2,463	580,081	2,122	538,109
31	Tennessee	21	6,688,444	752,778	1,189,212	1,740,801	3,005,653	146	159,397	1,887	544,844	1,794	526,416
32	Texas	18	6,892,957	878,045	1,823,914	2,751,985	1,944,013	153	187,725	1,986	735,787	1,960	727,377
33	Virginia	26	6,584,074	409,683	1,736,335	940,525	3,497,531	273	432,572	5,169	1,182,707	2,926	785,921
34	West Virginia	22	13,268,047	994,195	2,710,714	3,435,980	6,122,158	199	260,085	5,148	2,542,648	4,926	2,493,307
35	Wisconsin	42	26,124,863	3,203,199	4,748,958	5,490,825	12,686,891	504	629,192	7,445	3,213,583	6,492	3,027,509
36	All other states[1]	41	11,178,057	1,056,453	2,815,668	3,881,885	3,419,056	200	297,860	3,876	1,609,549	3,637	1,529,139

[1] Includes the following plants, grouped in order to avoid disclosing the operations of individual companies: Arkansas, 2; District of Columbia, 1; Florida, 1; Mississippi, 2; Oklahoma, 1; Utah, 2; Vermont, 2; and Washington, 2.

DETAILED STATISTICS, BY GROUPS OF INDUSTRIES—Continued.

Liquors and beverages.	Vehicles for land transportation.	Tobacco.	Textiles.	Leather and its finished products.	Paper and printing.	Clay, glass, and stone products.	Lumber and its remanufactures.	Miscellaneous industries.	
44,886	37,872	9,799	87,616	21,698	241,363	56,254	11,788	41,807	78
738	244	87	322	343	398	523	111	351	79
41,512	34,622	8,142	56,709	21,117	48,691	50,295	11,475	35,784	80
1	4	2	.....	11	2	20	2	30	81
20	66	62	.....	521	19	609	47	423	82
1	2	6	165	1	785	29	3	9	83
80	130	235	27,855	60	191,545	2,680	115	946	84
155	89	146	55	.....	162	99	2	135	85
3,188	2,189	1,132	2,671	.....	380	2,320	22	1,418	86
1	6	1	.....	.....	4	14	2	26	87
60	615	100	.....	.....	160	350	10	3,100	88
31	250	128	381	.....	568	.....	119	136	89
.....	80	425	60	.....	1,045	.....	80	13	90
219	65	41	72	100	116	180	61	118	91
.....	.....	.....	.....	1	.....	.....	1	8	92
29	.....	1	.....	.....	2	9	7	18	93
129	.....	1	1	15	15	27	5	26	94
47	5	7	3	41	22	55	19	17	95
13	17	8	12	86	56	58	14	16	96
.....	15	7	8	5	16	19	9	15	97
1	15	12	42	2	5	12	5	18	98
.....	13	5	6	.....	.....	.....	1	.....	99

COMBINATIONS, BY STATES AND TERRITORIES.

AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES—continued.				MISCELLANEOUS EXPENSES.					COST OF MATERIALS USED.			Value of products, including custom work and repairing.	
Women, 16 years and over.		Children, under 16 years.		Total.	Rent of works.	Taxes, not including internal revenue.	Rent of offices, interest, etc.	Contract work.	Total.	Principal materials, including mill supplies and freight.	Fuel and rent of power and heat.		
Average number.	Wages.	Average number.	Wages.										
45,469	$11,878,043	11,267	$2,012,788	$152,157,700	$1,332,031	$4,847,323	$145,197,396	$780,950	$1,089,666,334	$1,042,211,245	$47,455,089	$1,667,850,949	1
222	36,439	346	31,031	448,795	500	44,006	353,412	50,877	5,402,051	4,597,090	804,961	9,342,992	2
2,825	780,655	8	2,461	1,386,754	26,938	63,624	1,296,192	.....	10,936,975	10,026,782	310,193	16,281,310	3
74	19,932	.....	.....	211,507	7,380	32,352	171,775	.....	26,826,814	25,649,717	1,177,097	31,454,732	4
2,731	811,201	357	57,779	2,150,731	13,590	165,107	1,961,071	10,963	30,253,967	29,548,009	705,958	45,285,735	5
14	4,243	15	3,400	178,177	.....	4,584	168,643	.....	2,847,565	2,774,290	73,275	4,139,498	6
.....	.....	.....	.....	278,393	.....	34,247	244,146	.....	1,967,720	1,921,198	46,522	2,828,100	7
1,676	412,790	663	110,840	39,050,996	184,145	455,570	38,363,223	48,058	111,549,727	103,035,125	8,514,602	195,146,027	8
705	164,408	702	148,443	10,241,340	21,519	139,857	10,075,964	4,000	39,927,110	38,270,772	1,656,338	69,216,231	9
423	80,725	36	4,558	429,658	7,659	16,153	404,483	1,363	7,209,608	7,001,446	208,162	9,950,547	10
21	4,510	1	200	199,807	4,050	15,370	180,387	.....	16,811,621	16,581,864	229,757	22,381,661	11
460	108,478	249	21,145	5,777,723	6,794	49,551	5,721,378	.....	7,655,307	7,278,387	376,920	17,422,553	12
667	104,689	36	7,208	1,563,849	17,303	129,325	1,408,424	8,797	23,454,293	23,107,962	346,331	26,658,508	13
1,589	282,069	791	90,771	555,498	2,386	63,795	479,984	9,333	5,241,012	4,916,323	325,689	9,112,608	14
3,055	734,667	1,109	169,315	5,173,468	42,891	107,508	5,023,069	.....	13,114,313	12,719,749	394,564	25,990,702	15
10,378	3,184,196	1,526	411,474	5,566,359	97,157	638,093	4,818,693	12,416	64,510,139	62,760,044	1,750,095	102,921,247	16
777	158,585	176	26,793	2,260,866	14,466	98,983	2,147,417	.....	14,653,015	14,243,228	409,787	23,694,391	17
481	86,066	.....	.....	639,603	18,713	32,284	588,606	.....	20,977,537	20,728,635	248,902	24,571,960	18
2,091	597,925	97	25,920	13,008,528	31,998	123,909	12,850,498	2,123	23,256,381	22,828,787	427,594	46,742,416	19
29	7,442	28	12,155	411,642	25,000	119,918	251,822	14,902	22,419,105	21,197,225	1,221,880	35,399,006	20
103	19,633	10	3,153	2,203,295	4,026	19,581	2,179,688	.....	15,370,180	15,070,740	299,440	27,895,769	21
303	100,845	7	1,340	251,099	767	38,975	207,509	3,848	2,600,280	2,389,222	211,008	4,592,962	22
1,137	334,895	174	30,738	4,916,975	45,898	223,958	4,646,885	734	60,321,769	58,748,868	1,572,911	79,677,480	23
4,905	1,227,341	817	143,939	16,322,287	408,066	687,817	15,117,416	108,988	163,224,028	160,187,875	3,036,153	217,360,369	24
431	67,576	159	10,497	2,291,682	.....	10,649	2,281,033	.....	2,236,259	2,155,066	81,193	6,143,885	25
2,704	651,170	400	80,303	11,258,514	74,191	400,826	10,771,132	12,365	109,380,920	101,030,936	8,349,984	173,129,428	26
25	4,700	25	5,483	26,956	2,026	4,559	20,371	.....	844,209	834,638	9,571	1,145,766	27
1,794	386,687	2,063	394,752	14,965,702	191,487	655,131	13,644,252	474,832	215,168,360	204,928,798	10,239,562	326,309,151	28
2,529	888,196	675	105,654	570,207	45,099	57,902	460,508	6,788	7,478,147	7,240,473	237,674	13,225,599	29
178	26,346	163	15,626	697,760	.....	49,269	648,491	.....	3,378,246	3,272,373	105,873	5,413,477	30
83	16,155	10	2,273	359,106	6,540	35,959	316,607	.....	3,924,735	3,722,473	202,262	5,628,205	31
16	6,070	10	2,340	624,210	1,620	19,091	603,499	.....	7,706,090	7,265,440	440,650	10,041,150	32
1,976	373,590	267	23,196	3,801,600	3,556	50,571	3,745,103	2,370	4,714,374	3,922,659	791,715	11,305,246	33
66	14,176	156	35,165	384,511	600	45,965	337,096	850	13,791,958	12,838,938	953,020	20,858,551	34
768	152,990	185	33,084	2,943,227	19,379	147,402	2,772,158	4,293	20,156,271	19,203,067	953,204	30,907,714	35
233	78,658	6	1,752	1,011,785	6,837	65,482	936,466	3,000	10,296,298	9,614,056	682,242	15,180,963	36

TABLE XXIX.—CAPITALIZATION OF INDUSTRIAL

	NAME OF COMBINATION.	LOCATION OF CENTRAL OFFICE.	DATE OF ORGANIZATION.	Number of plants controlled.	CAPITALIZATION. Amounts authorized by charter. Bonds.	Stock. Total.	Stock. Preferred.	Stock. Common.
1	Total for all groups			[1] 2,216	$270,127,250	$3,348,911,950	$1,259,540,900	$2,089,371,050
2	Iron and steel and their products, total.			[1] 489	25,949,000	952,850,000	430,350,000	522,500,000
3	Alabama Consolidated Coal and Iron Co.	Equitable Bldg., Baltimore, Md.	July 19, 1899	4		5,000,000	2,500,000	2,500,000
4	American Axe and Tool Co.	253 Broadway, New York city.	December 1, 1889	6		2,000,000		2,000,000
5	American Bridge Co.	100 Broadway, New York city.	April 14, 1900	24		70,000,000	35,000,000	35,000,000
6	American Iron and Steel Mfg. Co.	Lebanon, Pa.	August 21, 1899	5		20,000,000	3,000,000	17,000,000
7	American Ordnance Co.	718 Crescent ave., Bridgeport, Conn.	December 31, 1895.	2		2,500,000	1,000,000	1,500,000
8	American Radiator Co.	Lake and Dearborn sts., Chicago, Ill.	February 10, 1899.	9		10,000,000	5,000,000	5,000,000
9	American Sheet Steel Co.	Battery Park Bldg., New York city.	March 28, 1900.	29		53,000,000	26,500,000	26,500,000
10	American Steel and Wire Co. of New Jersey.	Rookery Bldg., Chicago, Ill.	January 13, 1899.	42		90,000,000	40,000,000	50,000,000
11	American Steel Casting Co.	Chester, Pa.	February 23, 1894.	6	490,000	4,200,000	1,450,000	2,750,000
12	American Steel Hoop Co.	Carnegie Bldg., Pittsburg, Pa.	April 14, 1899.	15		33,000,000	14,000,000	19,000,000
13	American Tin Plate Co.	24 State St., New York city.	December 15, 1898.	65		50,000,000	20,000,000	30,000,000
14	American Wood Working Machine Co.[3]	136 Liberty St., New York city.	November 20, 1897.	8	2,000,000	4,000,000	2,000,000	2,000,000
15	Atlas Tack Co.	Taunton, Mass.	June 1, 1891[4].	4	1,250,000	700,000		700,000
16	Central Foundry Co.	116 Nassau St., New York city.	July 15, 1899.	14	4,000,000	14,000,000	7,000,000	7,000,000
17	Continental Gin Co.	Birmingham, Ala.	November 27, 1899	6	750,000	3,000,000		3,000,000
18	Empire Steel and Iron Co.	Empire Bldg., New York city.	March 14, 1899.	10		5,000,000	2,500,000	2,500,000
19	Federal Steel Co.	Empire Bldg., New York city.	September 9, 1898.	17		200,000,000	100,000,000	100,000,000
20	Herring-Hall-Marvin Co.	400 Broadway, New York city.	June, 1892[5].	2		3,300,000	1,800,000	1,500,000
21	International Heater Co.	Park Ave. and Erie Canal, Utica, N. Y.	July 1, 1898.	2		1,800,000	900,000	900,000
22	International Power Co.	253 Broadway, New York city.	January 14, 1899.	2	225,000	8,000,000	600,000	7,400,000
23	International Steam Pump Co.	26 Broadway, New York city.	March 24, 1899.	6		27,500,000	12,500,000	15,000,000
24	National Enameling and Stamping Co.	81-83 Fulton St., New York city.	January 29, 1899.	10		30,000,000	10,000,000	20,000,000
25	National Malleable Castings Co.	Cleveland, Ohio.	January 30, 1891.	4		3,000,000		3,000,000
26	National Saw Co.	Newark, N. J.	May 23, 1890.	4		1,000,000	600,000	400,000
27	National Shear Co.	Fremont, Ohio.	1898 ([6])	3		3,000,000	1,500,000	1,500,000
28	National Steel Co.	Carnegie Bldg., Pittsburg, Pa.	February 25, 1899.	22	4,434,000	59,000,000	27,000,000	32,000,000
29	National Tube Co.	Havemeyer Bldg., New York city.	June 16, 1899.	26		80,000,000	40,000,000	40,000,000
30	Niles-Bement-Pond Co.	136 Liberty St., New York city.	August 11, 1899.	4		8,000,000	3,000,000	5,000,000
31	Ohio Tool Co., of Auburn, N. Y.	Columbus, Ohio.	September 12, 1893.	2		350,000		350,000
32	Otis Elevator Co.	71 Broadway, New York city.	November 23, 1898.	6		11,000,000	4,500,000	6,500,000
33	Pittsburg Stove and Range Co.	610-612 Wood St., Pittsburg, Pa.	September 1, 1899.	8		2,000,000	1,000,000	1,000,000
34	Republic Iron and Steel Co.	Stock Exchange Bldg., Chicago, Ill.	May 3, 1899.	35		55,000,000	25,000,000	30,000,000
35	Shelby Steel Tube Co.	American Trust Bldg., Cleveland, O.	February 9, 1900.	14		15,000,000	6,000,000	9,000,000
36	Standard Chain Co.	First Nat'l Bank Bldg., Pittsburg, Pa.	February 2, 1900.	11	700,000	3,000,000	1,500,000	1,500,000
37	Steel Tired Wheel Co.	New York city.	January 26, 1897.	5		4,000,000	2,000,000	2,000,000
38	Susquehanna Iron and Steel Co.	Columbia, Pa.	June, 1899.	7		1,500,000		1,500,000
39	United Shoe Machinery Co.	205 Lincoln St., Boston, Mass.	February 8, 1899.	5		25,000,000	12,500,000	12,500,000
40	United States Cast Iron Pipe and Foundry Co.	80 Broadway, New York city.	March 13, 1899.	17	1,500,000	30,000,000	15,000,000	15,000,000
41	Virginia Iron, Coal, and Coke Co.	Bristol, Va.-Tenn.	January 2, 1899.	21	10,000,000	10,000,000		10,000,000
42	Wheeling Steel and Iron Co.	Wheeling, W. Va.	April 16, 1892.	7	600,000	5,000,000	5,000,000	
43	Food and kindred products, total.			[1] 288	32,943,750	315,875,000	130,425,000	185,450,000
44	American Beet Sugar Co.	32 Nassau St., New York city.	March 24, 1899.	4		20,000,000	5,000,000	15,000,000
45	American Caramel Co.	20 E. Allen St. Philadelphia, Pa.	March 28, 1898.	2	600,000	2,000,000	1,000,000	1,000,000
46	American Cereal Co.	1340 Monadnock Bldg., Chicago, Ill.	June, 1891.	6	1,600,000	3,400,000		3,400,000
47	American Chicle Co.	Park Row Bldg., New York city.	June 3, 1899.	6		9,000,000	3,000,000	6,000,000
48	American Pastry and Manufacturing Co.	Broadway, Thirty-sixth St., and Sixth Ave., New York city.	July 7, 1899.	6		3,000,000	1,000,000	2,000,000
49	American Preserve Co.	950 Beach St., Philadelphia, Pa.	December 21, 1897.	1		125,000		125,000
50	American Sugar Refining Co.	117 Wall St., New York city.	January 10, 1891.	5	10,000,000	75,000,000	37,500,000	37,500,000
51	California Fruit Canners' Ass'n.	203 California St., San Francisco, Cal.	July 3, 1899.	20		3,500,000		3,500,000
52	Columbia River Packers' Ass'n.	Astoria, Oreg.	February, 1899.	4		2,000,000		2,000,000
53	Continental Biscuit Co.	Chicago, Ill.	June 15, 1898.	5		500,000		500,000
54	Continental Creamery Co.	523 Jackson St., Topeka, Kans.	March 1, 1900.	13		500,000	500,000	
55	Glucose Sugar Refining Co.	845 Rookery Bldg., Chicago, Ill.	August 3, 1897.	5		40,000,000	14,000,000	26,000,000
56	National Biscuit Co.	205 La Salle St., Chicago, Ill.	February 3, 1898.	95		55,000,000	25,000,000	30,000,000
57	National Rice Milling Co.	542 Montegut St., New Orleans, La.	May, 1892[2].	5		5,000,000	2,000,000	3,000,000
58	National Sugar Refining Co.	109 Wall St., New York city.	June 2, 1900.	3		20,000,000	10,000,000	10,000,000
59	Pacific Coast Biscuit Co.	Seattle, Wash.	September 15, 1899	12	1,500,000	4,000,000	1,500,000	2,500,000
60	Pillsbury-Washburn Flour Mills Co., Ltd.	301 Guaranty Bldg., Minneapolis, Minn.	October, 1889.	5	4,243,750	4,850,000	2,425,000	2,425,000
61	Royal Baking Powder Co.	100 William St., New York city.	March 1, 1899.	3		20,000,000	10,000,000	10,000,000
62	Seacoast Packing Co.	Royal Ins. Bldg., Chicago, Ill.	April 5, 1899.	36		8,000,000	3,000,000	5,000,000
63	Sperry Flour Co.	134 California St., San Francisco, Cal.	September, 1892.	11		10,000,000		10,000,000
64	Standard Sardine Co.[10]	Eastport, Me.	March 6, 1899.	25		5,000,000	2,000,000	3,000,000
65	United States Flour Milling Co.	207 Produce Exchange, New York city.	April 27, 1899.	16	15,000,000	25,000,000	12,500,000	12,500,000

[1] The number of plants reported in this table does not agree with the number reported in tables XXVII and XXVIII, because in a number of instances combinations operate plants engaged in different industries. In preparing this list the name of the combination has been placed in the group of industries to which it would be assigned according to its product of chief value. The number also includes 176 plants reported as idle during the census year.

[2] Declined to furnish information.

[3] Went into receivership in 1899.

[4] Reorganized July 18, 1900.

[5] Reorganized as Herring-Hall-Marvin Safe Company, August 2, 1900.

COMBINATIONS, AND DIVIDENDS PAID.

CAPITALIZATION—continued.				DIVIDENDS PAID DURING CENSUS YEAR.					
Amounts issued.				Rate.					
Bonds.	Stock.			On preferred stock.	On common stock.	Total.	On preferred stock.	On common stock.	
	Total.	Preferred.	Common.						
$216,412,759	$2,876,683,109	$1,066,525,963	$1,810,157,146						1
20,614,000	763,806,295	349,763,485	414,042,810						2
	4,944,800	2,463,200	2,481,600	7 per cent.	None	$172,424	$172,424		3
	1,936,250		1,936,250		(2)				4
	61,055,600	30,527,800	30,527,800	None	None				5
	4,700,000	3,000,000	1,700,000	5 per cent.	20 per cent.	465,000	125,000	$340,000	6
	2,491,300	1,000,000	1,491,300	None	None				7
	7,893,000	3,000,000	4,893,000	7 per cent.	None	210,000	210,000		8
	49,000,000	24,500,000	24,500,000	None	None				9
	90,000,000	40,000,000	50,000,000	7 per cent.	5 per cent.	4,050,000	2,800,000	1,250,000	10
490,000	3,406,800	1,195,700	2,211,100	7 per cent.	6 per cent.	216,365	83,699	132,666	11
	33,000,000	14,000,000	19,000,000	7 per cent.	None	980,000	980,000		12
	46,325,000	18,325,000	28,000,000	7 per cent	None	1,282,750	1,282,750		13
1,232,000	3,445,000	1,760,000	1,685,000	None	None				14
232,000	700,000		700,000		None				15
4,000,000	14,000,000	7,000,000	7,000,000	None	None				16
	2,000,000		2,000,000		None				17
	4,649,500	2,368,100	2,281,400	6 per cent	None	142,086	142,086		18
	99,745,200	53,260,900	46,484,300	6 per cent	3¾ per cent	4,938,815	3,195,654	1,743,161	19
	3,300,000	1,800,000	1,500,000	None	None				20
	1,095,800	551,900	543,900						21
225,000	8,000,000	600,000	7,400,000	6 per cent	None	360,000	360,000		22
	13,850,000	8,850,000	5,000,000	6 per cent	None	531,000	531,000		23
	21,696,700	7,658,600	14,038,100	7 per cent	None	536,102	536,102		24
	3,000,000		3,000,000		None				25
	1,000,000	600,000	400,000	4 per cent	None	24,000	24,000		26
									27
2,811,000	59,000,000	27,000,000	32,000,000	7 per cent	None	1,890,000	1,890,000		28
	80,000,000	40,000,000	40,000,000	7 per cent	None[7]	2,800,000	2,800,000		29
	7,000,000	2,000,000	5,000,000	6 per cent	None	120,000	120,000		30
	350,000		350,000		None				31
	10,850,100	4,500,000	6,350,100	6 per cent	None	270,000	270,000		32
	1,991,150	994,500	996,650	7 per cent	None	52,500	52,500		33
	48,204,000	20,852,000	27,352,000	7 per cent	None	1,459,640	1,459,640		34
	13,150,500	5,000,000	8,150,500	3½ per cent	None	175,000	175,000		35
608,000	2,268,600	1,001,400	1,267,200	None	None				36
	3,346,800	1,444,300	1,902,500	3 per cent	3 per cent	100,404	43,329	57,075	37
	1,500,000		1,500,000		18 per cent	270,000		270,000	38
	18,261,495	9,331,385	8,930,110	6 per cent	8 per cent	1,249,035	537,251	711,784	39
1,500,000	25,000,000	12,500,000	12,500,000	3½ per cent	None	437,500	437,500		40
8,940,000	8,970,000		8,970,000		None				41
576,000	2,678,700	2,678,700		8 per cent[8]		199,334	199,334		42
12,725,900	284,013,300	117,337,600	166,675,700						43
	19,000,000	4,000,000	15,000,000	6 per cent	None	240,000	240,000		44
500,000	2,000,000	1,000,000	1,000,000	8 per cent	None	80,000	80,000		45
1,187,300	3,341,700		3,341,700		8 per cent	267,336		267,336	46
	9,000,000	3,000,000	6,000,000	6 per cent	8½ per cent	690,000	180,000	510,000	47
	2,993,100	993,100	2,000,000	None	None				48
	125,000		125,000						49
	73,936,000	36,968,000	36,968,000		6 per cent	7,500		7,500	50
	2,780,500		2,780,500	7 per cent	9 per cent	5,914,880	2,587,760	3,327,120	51
					60c. per share monthly.	83,175		83,175	52
	1,725,000		1,725,000		2½ per cent	43,125		43,125	53
	350,000		350,000		7 per cent	24,500		24,500	54
	410,000	410,000		None					55
	36,646,600	12,619,300	24,027,300	7 per cent	6 per cent	2,360,628	919,006	1,441,622	56
	53,028,700	23,792,700	29,236,000	7 per cent	4 per cent	2,840,193	1,670,753	1,169,440	57
	3,187,000	1,320,000	1,867,000	None	None				58
	20,000,000	10,000,000	10,000,000	None	None				59
1,000,000	2,850,000	900,000	1,950,000	None	None				60
4,084,600	4,850,000	2,425,000	2,425,000	8 per cent	4 per cent	291,000	194,000	97,000	61
	20,000,000	10,000,000	10,000,000	6 per cent	None	600,000	600,000		62
	8,000,000	3,000,000	5,000,000	None	None				63
	6,395,000		6,395,000		1½ per cent	79,938		79,938	64
	5,000,000	2,000,000	3,000,000	None	None				65
6,004,000	8,394,700	4,909,500	3,485,200	None	None				

[6] Went into bankruptcy during census year and is now out of existence.
[7] A reserve fund of $2,400,000, equal to a 6 per cent dividend on the common stock, was set aside out of the profits of that year, and cash for the same was on deposit in banks on June 30, 1900.
[8] Also a 10 per cent stock dividend of $245,200.
[9] Reorganized in December, 1900.
[10] Now out of business.

TABLE XXIX.—CAPITALIZATION OF INDUSTRIAL

	NAME OF COMBINATION.	LOCATION OF CENTRAL OFFICE.	DATE OF ORGANIZATION.	Number of plants controlled.	CAPITALIZATION. Amounts authorized by charter.			
					Bonds.	Stock.		
						Total.	Preferred.	Common.
66	Chemicals and allied products, total.			[1]297	$13,750,000	$350,799,400	$103,812,300	$246,987,100
67	American Agricultural Chemical Co	26 Broadway, New York city	April, 1899	27		40,000,000	20,000,000	20,000,000
68	American Cotton Oil Co	27 Beaver St., New York city	October 14, 1889	57	5,000,000	34,799,400	14,562,300	20,237,100
69	American Linseed Co	100 William St., New York city	December 5, 1898	47		33,500,000	16,750,000	16,750,000
70	Barrett Manufacturing Co., The	1205 Land Title Bldg., Philadelphia, Pa	January 1, 1896	12	2,500,000	5,000,000		5,000,000
71	California Powder Works, The	330 Market St., San Francisco, Cal	December 28, 1861	2		1,500,000		1,500,000
72	Celluloid Co., The	30-36 Washington Pl., New York city	November 28, 1890	1		6,000,000		6,000,000
73	Continental Cotton Oil Co	45 Cedar St., New York city	April 2, 1899	7		6,000,000	3,000,000	3,000,000
74	Fisheries Co., The	135 Front St., New York city	May 25, 1900	5	500,000	3,000,000	2,000,000	1,000,000
75	General Chemical Co	25 Broad St., New York city	February 14, 1899	17		25,000,000	12,500,000	12,500,000
76	Grasselli Chemical Co	784 The Arcade, Cleveland, Ohio	June 10, 1885	7		7,500,000		7,500,000
77	National Salt Co	26 Broadway, New York city	March 18, 1899	31		12,000,000	5,000,000	7,000,000
78	National Starch Manufacturing Co	1 Broadway, New York city	April 12, 1890[2]	22	4,500,000	10,500,000	5,500,000	5,000,000
79	Standard Oil Co	26 Broadway, New York city	August 1, 1882	26		110,000,000	10,000,000	100,000,000
80	United Starch Co	24 State St., New York city	August 31, 1899[2]	3	1,250,000	6,000,000	2,500,000	3,500,000
81	Virginia-Carolina Chemical Co	Crenshaw Warehouse, Richmond, Va.	September 12, 1895	33		50,000,000	12,000,000	38,000,000
82	Metals and metal products other than iron and steel, total.			[1]113	10,300,000	235,600,000	60,500,000	175,100,000
83	Amalgamated Copper Co	52 Broadway, New York city	April 27, 1899	4		75,000,000		75,000,000
84	American Brass Co	Waterbury, Conn	March 1, 1899	4		20,000,000		20,000,000
85	American Shot and Lead Co	902 Security Bldg., St. Louis, Mo	August 27, 1890	12		3,000,000		3,000,000
86	American Smelting and Refining Co	71 Broadway, New York city	April 4, 1899	18		65,000,000	32,500,000	32,500,000
87	American Type Founders Co	25 William St., New York city	February 8, 1892	12	1,000,000	4,000,000		4,000,000
88	Cherokee-Lanyon Spelter Co	Laclede Bldg., St. Louis, Mo	January 1, 1896	14	600,000	600,000		600,000
89	International Silver Co	Meriden, Conn	November 19, 1898	13	4,500,000	20,000,000	9,000,000	11,000,000
90	Magnus Metal Co	830 Ellicott Sq., Buffalo, N. Y	June, 1899	5		3,000,000	1,500,000	1,500,000
91	National Lead Co	100 William St., New York city	December 7, 1891	17		30,000,000	15,000,000	15,000,000
92	New Jersey Zinc Co	71 Broadway, New York city	June 30, 1880	8	1,700,000	10,000,000		10,000,000
93	Standard Sanitary Manufacturing Co	531-533 Wood St., Pittsburg, Pa	January 1, 1900	6	2,500,000	5,000,000	2,500,000	2,500,000
94	Liquors and beverages, total			[1]258	64,584,500	212,547,550	66,253,600	146,293,950
95	American Distributing Co	27 William St., New York city	August 10, 1891	2		5,000,000		5,000,000
96	American Malting Co	Sixty-third St. and East River, New York city.	September, 1897	36	5,000,000	30,000,000	15,000,000	15,000,000
97	American Spirits Manufacturing Co	27 William St., New York city	August 22, 1895	13	2,000,000	35,000,000	7,000,000	28,000,000
98	California Wine Association	661-671 Third St., San Francisco, Cal	August 10, 1894	9		10,000,000		10,000,000
99	Chicago Breweries, Ltd	Chicago, Ill	April, 1889	2	1,948,000	3,000,000		3,000,000
100	Chicago Consolidated Brewing and Malting Co.	1422 Monadnock Bldg., Chicago, Ill	June, 1890	4	3,166,000	5,000,000		5,000,000
101	Cleveland and Sandusky Brewing Co	Cleveland, Ohio	June 7, 1898	9	6,000,000	6,000,000	3,000,000	3,000,000
102	Connecticut Breweries Co., Ltd	Bridgeport, Conn	1890	2		700,000	350,000	350,000
103	Consumers' Brewing Co.[4]	Philadelphia, Pa	October 26, 1896	5	1,900,000	3,800,000	1,900,000	1,900,000
104	Erie Brewing Co	Erie, Pa	March 20, 1899	4	1,000,000	1,500,000	500,000	1,000,000
105	Evansville Brewing Ass'n	Fifth and Ingle Sts., Evansville, Ind.	March, 1894	2	500,000	400,000		400,000
106	Indianapolis Brewing Co.[5]	820 High St., Indianapolis, Ind		3				
107	Kentucky Distilleries and Warehouse Co.	27 William St., New York city	February 3, 1899	50	5,000,000	32,000,000	12,000,000	20,000,000
108	Maryland Brewing Co	Brewers' Exch. Bldg., Baltimore, Md.	December 23, 1898	16	7,500,000	6,500,000	3,250,000	3,250,000
109	New Orleans Brewing Co	New Orleans, La	October 6, 1899	4	300,000	2,790,000	1,100,000	1,690,000
110	New York and Kentucky Co	67 Lake Ave., Rochester, N. Y	January 25, 1900	3		2,000,000	1,000,000	1,000,000
111	Paterson Brewing and Malting Co	Paterson, N. J	July 1, 1899	6	3,000,000	3,000,000		3,000,000
112	Pennsylvania Central Brewing Co	431 N. Seventh St., Scranton, Pa	August 23, 1897	12	2,800,000	5,600,000	2,800,000	2,800,000
113	Pittsburg Brewing Co	Pittsburg, Pa	February 4, 1899	18	6,500,000	13,000,000	6,500,000	6,500,000
114	St. Louis Brewing Ass'n	Wainwright Bldg., St. Louis, Mo	June 1, 1889	11	5,250,000	5,250,000		5,250,000
115	San Francisco Breweries, Ltd	240 Second St., San Francisco, Cal	April 30, 1899	6	2,425,000	1,023,300	611,100	412,200
116	Seattle Brewing and Malting Co	Seattle, Wash	1893	3		1,000,000		1,000,000
117	Springfield Breweries, Ltd	Springfield, Ohio	June 1, 1890	2	145,500	509,250	242,500	266,750
118	Springfield Breweries Co	Springfield, Mass	April 19, 1899	3	1,150,000	1,375,000	1,250,000	125,000
119	Standard Distilling and Distributing Co.	27 William St., New York city	June 27, 1898	10		24,000,000	8,000,000	16,000,000
120	United Breweries Co	Stock Exch. Bldg., Chicago, Ill	August 8, 1898	12	3,500,000	5,600,000		5,600,000
121	United States Brewing Co., Ltd	788 Broad St., Newark, N. J	1889	5	2,000,000	3,500,000	1,750,000	1,750,000
122	United States Brewing Co	Monadnock Bldg., Chicago, Ill	September 1, 1890	6	3,500,000	5,000,000		5,000,000
123	Vehicles for land transportation, total.			[1]72	10,300,000	193,000,000	54,500,000	138,500,000
124	American Bicycle Co	Park Row Bldg., New York city	May 12, 1899	35	10,000,000	30,000,000	10,000,000	20,000,000
125	American Car and Foundry Co	Lincoln Trust Bldg., St. Louis, Mo	February 20, 1899	17		60,000,000	30,000,000	30,000,000
126	Pressed Steel Car Co	Tradesmen's Bldg., Pittsburg, Pa	January 12, 1899	4		25,000,000	12,500,000	12,500,000
127	Pullman Co., The	309 W. Third St., Chicago, Ill	December, 1899	5		74,000,000		74,000,000
128	Standard Wheel Co	Terre Haute, Ind	August 20, 1892	6	300,000	1,000,000	500,000	500,000
129	Southern Car and Foundry Co	Birmingham, Ala	June 1, 1899	5		3,000,000	1,500,000	1,500,000
130	Tobacco, total			[1]41		205,000,000	79,500,000	125,500,000
131	American Snuff Co	111 Fifth Ave., New York city	March 12, 1900	9		25,000,000	12,500,000	12,500,000
132	American Tobacco Co	111 Fifth Ave., New York city	January 21, 1890	15		70,000,000	14,000,000	56,000,000
133	Continental Tobacco Co	111 Fifth Ave., New York city	November 28, 1898	9		100,000,000	50,000,000	50,000,000
134	Havana-American Co., The	1322 Avenue A, New York city	November 9, 1899	8		10,000,000	3,000,000	7,000,000

[1] The number of plants reported in this table does not agree with the number reported in tables XXVII and XXVIII, because in a number of instances combinations operate plants engaged in different industries. In preparing this list the name of the combination has been placed in the group of industries to which it would be assigned according to its product of chief value. The number also includes 176 plants reported as idle during the census year.

[2] Acquired by the National Starch Co., April, 1900.

COMBINATIONS, AND DIVIDENDS PAID—Continued.

CAPITALIZATION—continued.				DIVIDENDS PAID DURING CENSUS YEAR.				
Amounts issued.				Rate.				
Bonds.	Stock.			On preferred stock.	On common stock.	Total.	On preferred stock.	On common stock.
	Total.	Preferred.	Common.					
$9,294,000	$279,857,295	$78,151,084	$201,706,211					
	33,577,900	17,044,900	16,533,000	6 per cent	None	$1,024,740	$1,024,740	
3,000,000	30,435,700	10,198,600	20,237,100	6 per cent	4 per cent	1,421,400	611,916	$809,484
2,304,000	33,500,000	16,750,000	16,750,000	7 per cent	None	1,172,500	1,172,500	
	3,319,700		3,319,700		10 per cent	329,470		329,470
	1,500,000		1,500,000		12 per cent	180,000		180,000
	5,925,000		5,925,000					
	2,924,845	1,364,584	1,560,261		6⅔ per cent	370,313		370,313
	3,000,000	2,000,000	1,000,000	7 per cent	6 per cent	189,137	95,521	93,616
	15,427,900	8,260,000	7,167,900	None	None			
	3,635,850		3,635,850	6 per cent	4 per cent	660,460	518,078	142,382
					7 per cent	253,860		253,860
	12,000,000	5,000,000	7,000,000	7 per cent	None	265,180	265,180	
3,040,000	8,516,900	4,066,200	4,450,700	4 per cent	None	88,776	88,776	
	97,246,600	[3]300	97,246,300	6 per cent	45 per cent	43,471,242	8,132	43,463,110
950,000	4,846,900	1,466,500	3,380,400	3 per cent	None	43,995	43,995	
	24,000,000	12,000,000	12,000,000	8 per cent	4 per cent	1,199,525	809,525	390,000
8,565,000	203,505,600	50,315,500	153,190,100					
	75,000,000		75,000,000		8 per cent	4,500,000		4,500,000
	6,000,000		6,000,000		5 per cent	225,000		225,000
	2,271,500		2,271,500		None			
	54,800,000	27,400,000	27,400,000	7 per cent	None	1,918,000	1,918,000	
1,000,000	4,000,000		4,000,000		4 per cent	160,000		160,000
600,000	600,000							
3,900,000	15,052,200	5,107,500	9,944,700		None			
	2,000,000	1,000,000	1,000,000	1½ per cent	None	89,371	89,371	
	29,809,400	14,904,000	14,905,400	8 per cent	10 per cent	180,000	80,000	100,000
1,261,000	10,000,000		10,000,000	7 per cent	1 per cent	1,192,334	1,043,280	149,054
1,804,000	3,972,500	1,904,000	2,068,500		6 per cent	600,000		600,000
				None	None			
55,529,142	193,801,158	62,503,169	130,797,989					
	2,650,000		2,650,000		None			
4,000,000	28,940,000	14,440,000	14,500,000	3½ per cent	None	505,400	505,400	
1,898,560	35,000,000	7,000,000	28,000,000	None	None			
	3,162,700		3,162,700		6 per cent	189,762		189,762
1,948,000	2,000,000		2,000,000					
3,166,000	5,000,000		5,000,000		½ per cent	25,000		25,000
4,773,000	4,778,000	2,386,500	2,386,500	6 per cent	None	143,190	143,190	
	700,000	350,000	350,000	8 per cent	None	28,000	28,000	
1,642,000	3,800,000	1,900,000	1,900,000	None	None			
944,000	1,196,700	426,700	770,000	7 per cent	None	29,869	29,869	
500,000	400,000		400,000		None			
				None	None			
	29,000,000	10,500,000	18,500,000					
7,500,000	5,500,000	2,750,000	2,750,000	6 per cent	None	165,000	165,000	
278,482	1,691,484	1,096,269	595,215	None	None			
	2,000,000	1,000,000	1,000,000	7 per cent	None	29,166	29,166	
2,265,000	3,000,000		3,000,000		None			
2,700,000	5,600,000	2,800,000	2,800,000	None	None			
6,319,000	12,062,350	6,100,100	5,962,250	7 per cent	4 per cent	665,497	427,007	238,490
4,961,600	5,088,624		5,088,624		$2.70 per share	137,393		137,393
2,425,000	1,023,300	611,100	412,200	None	None			
	1,000,000		1,000,000		6 per cent	60,000		60,000
145,500	485,000	242,500	242,500	8 per cent	6 per cent	33,950	19,400	14,550
1,150,000	1,265,000	1,150,000	115,000	8 per cent	None	92,000	92,000	
	24,000,000	8,000,000	16,000,000	None	None			
3,413,000	5,463,000		5,463,000		None			
2,000,000	3,500,000	1,750,000	1,750,000	8 per cent	5 per cent	227,500	140,000	87,500
8,500,000	5,000,000		5,000,000		70c. per share	35,000		35,000
10,300,000	189,680,000	52,840,000	136,840,000					
10,000,000	30,000,000	10,000,000	20,000,000	None	None			
	58,180,000	29,090,000	29,090,000	7 per cent	None	2,036,300	2,036,300	
	25,000,000	12,500,000	12,500,000	7 per cent	6 per cent	1,250,000	875,000	375,000
	74,000,000		74,000,000		8 per cent	5,024,000		5,024,000
300,000	1,000,000	500,000	500,000	6 per cent	None	30,000	30,000	
	1,500,000	750,000	750,000	None	None			
	197,184,628	76,844,600	120,340,028					
	23,001,700	12,000,000	11,001,700	None	None			
	68,500,000	14,000,000	54,500,000	8 per cent	6 per cent	4,390,000	1,120,000	3,270,000
	97,690,700	48,844,600	48,846,100	7 per cent	None	8,419,122	8,419,122	
	7,992,228	2,000,000	5,992,228	7 per cent	None	140,000	140,000	

[3] During the year the common stock was increased $38,550,700, and the preferred stock was decreased $3,968,400.
[4] In hands of receivers since April 1, 1900.
[5] This company declined to furnish the information, stating that their capital was nominal, the real owners being the Indianapolis Brewers, Limited, London, and as the statement, if given, would be misleading, they preferred to make no report.

TABLE XXIX.—CAPITALIZATION OF INDUSTRIAL

	NAME OF COMBINATION.	LOCATION OF CENTRAL OFFICE.	DATE OF ORGANIZATION.	Number of plants controlled.	CAPITALIZATION. Amounts authorized by charter. Bonds.	Stock. Total.	Preferred.	Common.
135	Textiles, total			[1]72	$39,250,000	$133,000,000	$42,000,000	$91,000,000
136	American Felt Co	110-112 E. Thirteenth St., New York city.	February 9, 1899	5	500,000	5,000,000	2,500,000	2,500,000
137	American Grass Twine Co	35 Wall St., New York city	June 8, 1899	3	.....	15,000,000	.....	15,000,000
138	American Thread Co	260 Broadway, New York city	March 10, 1898	10	6,000,000	12,000,000	6,000,000	6,000,000
139	American Woolen Co	Ames Bldg., Boston, Mass	March 29, 1899	30	.....	65,000,000	25,000,000	40,000,000
140	Mt. Vernon-Woodberry Cotton Duck Co.	Equitable Bldg., Baltimore, Md.	August 29, 1899	7	14,000,000	9,500,000	.....	9,500,000
141	New England Cotton Yarn Co	37 N. Water St., New Bedford, Mass	July 15, 1899	9	6,500,000	11,500,000	6,500,000	5,000,000
142	Standard Rope and Twine Co	17 State St., New York city	November 1, 1895	5	10,500,000	12,000,000	.....	12,000,000
143	United States Finishing Co	320 Broadway, New York city	July 1, 1899	3	1,750,000	3,000,000	2,000,000	1,000,000
144	Leather and its finished products, total.			[1]108	20,000,000	199,000,000	81,500,000	117,500,000
145	American Hide and Leather Co	92 Cliff St., New York city	August 29, 1899	30	10,000,000	35,000,000	17,500,000	17,500,000
146	Elk Tanning Co	Ridgway, Pa	April 17, 1893	23	.....	12,500,000	.....	12,500,000
147	Penn Tanning Co	Sheffield, Pa	April 13, 1893	14	.....	13,500,000	.....	13,500,000
148	Union Tanning Co	Williamsport, Pa	April 17, 1893	18	.....	10,000,000	.....	10,000,000
149	United States Leather Co	26 Ferry St., New York city	February 25, 1893	23	10,000,000	128,000,000	64,000,000	64,000,000
150	Paper and printing, total			[1]119	41,250,000	142,000,000	52,500,000	89,500,000
151	American Lithographic Co	Fourth Ave. and Nineteenth St., New York city.	January 1, 1896	1	3,000,000	4,000,000	.....	4,000,000
152	American Straw Board Co	84 Van Buren St., Chicago, Ill	May 29, 1889	17	1,250,000	6,000,000	.....	6,000,000
153	American Writing Paper Co	Springfield, Mass	July 25, 1899	25	17,000,000	25,000,000	12,500,000	12,500,000
154	International Paper Co	30 Broad St., New York city	January 31, 1898	32	10,000,000	45,000,000	25,000,000	20,000,000
155	National Wall Paper Co	121-127 Crosby St., New York city	June, 1892	18	8,000,000	30,000,000	.....	30,000,000
156	Union Bag and Paper Co	1602 Fisher Bldg., Chicago, Ill	February 27, 1899	17	.....	27,000,000	11,000,000	16,000,000
157	United States Envelope Co	Springfield, Mass	June, 1898	9	2,000,000	5,000,000	4,000,000	1,000,000
158	Clay, glass, and stone products, total.			[1]203	9,200,000	72,490,000	14,200,000	58,290,000
159	American Cement Co	22 S. Fifteenth St., Philadelphia, Pa	March 11, 1890	3	.....	500,000	.....	500,000
160	American Clay Manufacturing Co.[3]	Akron, Ohio	March 1, 1900	28	2,500,000	10,000,000	.....	10,000,000
161	American Window Glass Co	200 Ninth St., Pittsburg, Pa	July 31, 1899	39	.....	17,000,000	4,000,000	13,000,000
162	Baltimore Brick Co	1002 Atlantic Trust Bldg., Baltimore, Md.	June 23, 1899	28	1,500,000	2,100,000	600,000	1,500,000
163	Illinois Brick Co	Chamber of Com. Bldg., Chicago, Ill.	February 13, 1900	36	.....	9,000,000	4,000,000	5,000,000
164	International Pulp Co	41 Park Row Bldg., New York city	March, 1893	1	.....	5,000,000	2,000,000	3,000,000
165	Macbeth-Evans Glass Co	Telephone Bldg., Pittsburg, Pa	July 7, 1899	7	.....	2,200,000	200,000	2,000,000
166	National Fire Proofing Co	Carnegie Bldg., Pittsburg, Pa	December 20, 1899	5	.....	2,000,000	1,000,000	1,000,000
167	National Glass Co	Heeren Bldg., Pittsburg, Pa	November 1, 1899	19	2,000,000	4,000,000	.....	4,000,000
168	Pittsburg Plate Glass Co	Carnegie Bldg., Pittsburg, Pa	April 1, 1895[4]	10	2,500,000	10,000,000	150,000	9,850,000
169	Suburban Brick Co	Wheeling, W. Va	December 29, 1898	5	50,000	200,000	.....	200,000
170	Trenton Potteries Co	309 N. Clinton Ave., Trenton, N. J	May 27, 1892	6	.....	3,000,000	1,250,000	1,750,000
171	United States Clay Manufacturing Co.[3]	Fifth and Liberty Sts., Pittsburg, Pa.	December 26, 1899	2	.....	240,000	.....	240,000
172	United States Glass Co	Ninth and Bingham Sts., Pittsburg, Pa	February 12, 1891	13	.....	5,000,000	1,000,000	4,000,000
173	Western Stone Co	Chamber of Com. Bldg., Chicago, Ill.	September 16, 1889	1	650,000	2,250,000	.....	2,250,000
174	Lumber and its remanufactures, total.			[1]59	1,800,000	43,500,000	11,300,000	32,200,000
175	American School Furniture Co	111 Fifth Ave., New York city	March 13, 1899	17	1,500,000	10,000,000	5,000,000	5,000,000
176	Brunswick-Balke-Collender Co	860 Broadway, New York city	January 30, 1884	2	.....	1,500,000	.....	1,500,000
177	Diamond Match Co	504 Pullman Bldg., Chicago, Ill	February 13, 1889	9	.....	15,000,000	.....	15,000,000
178	Heywood Bros. & Wakefield Co	Gardner, Mass	March 16, 1897	4	.....	6,000,000	4,000,000	2,000,000
179	National Casket Co	Oneida, N. Y	July 1, 1890	11	.....	6,000,000	.....	6,000,000
180	National Cooperage and Woodenware Co.	Peoria, Ill	October 21, 1899	6	.....	500,000	500,000	.....
181	United States Bobbin and Shuttle Co	270 Butler Exch. Bldg., Providence, R. I.	July 31, 1899	7	300,000	2,000,000	800,000	1,200,000
182	Yellow Pine Co	16 Beaver St., New York city	November 12, 1891	3	.....	2,500,000	1,000,000	1,500,000
183	Miscellaneous industries, total			[1]97	800,000	293,250,000	132,700,000	160,550,000
184	American Glue Co	419 Atlantic Ave., Boston, Mass	July 7, 1894	6	.....	1,800,000	1,000,000	800,000
185	American Hard Rubber Co	9-13 Mercer St., New York city	April 21, 1898	3	.....	2,500,000	.....	2,500,000
186	American Ice Co	131 E. Twenty-third St., New York city.	March 11, 1899	7	.....	40,000,000	15,000,000	25,000,000
187	American Shipbuilding Co	120 Viaduct, Cleveland, Ohio	March 16, 1899	11	.....	30,000,000	15,000,000	15,000,000
188	American Soda Fountain Co	278 Congress St., Boston, Mass	February 4, 1891	7	.....	3,750,000	1st 1,250,000 2d 1,250,000	1,250,000
189	Central Fireworks Co	15 Exchange Pl., Jersey City, N. J	June 8, 1896	6	.....	3,500,000	1,750,000	1,750,000
190	Commonwealth Roofing Co	100 William St., New York city	June 6, 1899	6	.....	500,000	250,000	250,000
191	Consolidated Ice Co.[5]	Thirteenth and Pine Sts., Pittsburg, Pa.	April 1, 1899	7	.....	4,000,000	2,000,000	2,000,000
192	Consolidated Railway Electric Lighting and Equipment Co.	100 Broadway, New York city	January 6, 1900	3	.....	16,000,000	.....	16,000,000
193	Electric Boat Co	100 Broadway, New York city	February 7, 1899	3	.....	10,000,000	5,000,000	5,000,000
194	General Aristo Co	343 State St., Rochester, N. Y	August 4, 1899	5	.....	5,000,000	2,500,000	2,500,000
195	National Carbon Co	Lock Drawer L, Cleveland, Ohio	January 16, 1899	5	.....	10,000,000	4,500,000	5,500,000
196	Pittsburg Coal Co	Pittsburg, Pa	September 1, 1899	5	.....	64,000,000	32,000,000	32,000,000
197	Rubber Goods Manufacturing Co	New Brunswick, N. J	March 26, 1899	14	.....	50,000,000	25,000,000	25,000,000
198	United States Rubber Co	9 Murray St., New York city	March 30, 1892	5	.....	50,000,000	25,000,000	25,000,000
199	United States Whip Co	Westfield, Mass	December 29, 1892	4	800,000	2,200,000	1,200,000	1,000,000

[1] The number of plants reported in this table does not agree with the number reported in tables XXVII and XXVIII, because in a number of instances combinations operate plants engaged in different industries. In preparing this list the name of the combination has been placed in the group of industries to which it would be assigned according to its product of chief value. The number also includes 176 plants reported as idle during the census year.

[2] Of this amount, $3,236,500 is for divisional mortgage bonds, assumed at time of incorporation for prior mortgages.

COMBINATIONS, AND DIVIDENDS PAID—Continued.

CAPITALIZATION—continued.				DIVIDENDS PAID DURING CENSUS YEAR.					
Amounts issued.				Rate.		Total.	On preferred stock.	On common stock.	
Bonds.	Stock.			On preferred stock.	On common stock.				
	Total.	Preferred.	Common.						
$36,944,000	$109,514,175	$33,417,775	$76,096,400						135
441,000	3,254,600	1,627,300	1,627,300	6 per cent	None	$97,638	$97,638		136
	14,118,000		14,118,000		None				137
5,798,000	8,490,475	4,890,475	3,600,000	5 per cent	10 per cent	604,524	244,524	$360,000	138
	49,501,100	20,000,000	29,501,100	7 per cent	None	1,400,000	1,400,000		139
13,000,000	9,500,000		9,500,000		1½ per cent	142,500		142,500	140
5,577,000	10,000,000	5,000,000	5,000,000	7 per cent	None	350,000	350,000		141
10,378,000	12,000,000		12,000,000		None				142
1,750,000	2,650,000	1,900,000	750,000	7 per cent	None	133,000	133,000		143
13,805,000	184,015,200	75,282,300	108,732,900						144
8,525,000	24,500,000	13,000,000	11,500,000	None	None				145
	12,319,900		12,319,900		$1.50 per share	184,799		184,799	146
	13,380,900		13,380,900		None				147
	8,649,800		8,649,800		$1.50 per share	129,747		129,747	148
5,280,000	125,164,600	62,282,300	62,882,300	6 per cent	None	3,736,376	3,736,376		149
42,461,217	130,006,500	48,115,500	81,891,000						150
2,284,000	3,775,600		3,775,600		None				151
657,000	6,000,000		6,000,000		3 per cent	180,000		180,000	152
17,000,000	20,949,900	10,958,800	9,991,100	None	None				153
[2]13,102,117	39,849,500	22,406,700	17,442,800	6 per cent	None	1,344,402	1,344,402		154
7,418,100	27,931,500		27,931,500		None				155
	27,000,000	11,000,000	16,000,000	7 per cent	None	770,000	770,000		156
2,000,000	4,500,000	3,750,000	750,000	7 per cent	None	262,500	262,500		157
5,567,500	63,896,858	12,532,550	51,364,308						158
	499,550		499,550		32½ per cent	162,353		162,353	159
1,548,500	7,582,700		7,582,700		None				160
	16,315,808	4,000,000	12,315,808	7 per cent	None	103,067	103,067		161
1,500,000	2,100,000	600,000	1,500,000	6 per cent	None	18,000	18,000		162
	7,901,000	3,550,500	4,350,500	None	None				163
	4,502,500	1,502,500	3,000,000	4 per cent	None	60,100	60,100		164
	1,846,250	200,000	1,646,250	7 per cent	4 per cent	78,780	14,000	64,780	165
	1,089,550	589,550	500,000	7 per cent	None	29,277	29,277		166
2,000,000	2,317,900		2,317,900	None	None				167
10,000	10,000,000	150,000	9,850,000	12 per cent	6 per cent	609,000	18,000	591,000	168
13,000	103,500		103,500		6 per cent	6,210		6,210	169
	3,000,000	1,250,000	1,750,000	None	None				170
	240,000		240,000		None				171
	4,148,100	690,000	3,458,100	None	None				172
496,000	2,250,000		2,250,000		None				173
275,000	39,534,400	10,027,800	29,506,600						174
	8,856,100	3,977,800	4,878,300	None	None				175
	1,500,000		1,500,000		6 per cent	90,000		90,000	176
	14,750,000		14,750,000		10 per cent	1,475,000		1,475,000	177
	6,000,000	4,000,000	2,000,000	8 per cent	None	320,000	320,000		178
	4,177,300		4,177,300		5 per cent	208,820		208,820	179
	500,000	500,000		None					180
275,000	1,651,000	650,000	1,001,000	7 per cent	None	34,125	34,125		181
	2,100,000	900,000	1,200,000	None	None				182
332,000	238,367,700	99,394,600	138,973,100						183
	1,800,000	1,000,000	800,000	8 per cent	None	80,000	80,000		184
	2,455,200		2,455,200		7 per cent	171,814		171,814	185
	35,249,100	12,327,200	22,921,900	6 per cent	4 per cent	1,246,001	558,120	687,881	186
	15,500,000	7,900,000	7,600,000	7 per cent	None	553,000	553,000		187
	3,750,000	1st 1,250,000 2d 1,250,000	1,250,000	3 per cent on 1st preferred	None	37,500	37,500		188
	2,673,000	1,267,200	1,405,800	3½ per cent	None	44,352	44,352		189
	430,000	215,000	215,000	3½ per cent	None	7,525	7,525		190
	4,000,000	2,000,000	2,000,000	6 per cent	4 per cent	200,000	120,000	80,000	191
	16,000,000		16,000,000		None				192
	6,744,600	1,745,000	4,999,600	None	None				193
	4,800,000	2,400,000	2,400,000	7 per cent	10 per cent	369,000	152,000	217,000	194
	10,000,000	4,500,000	5,500,000	7 per cent	None	315,000	315,000		195
	64,000,000	32,000,000	32,000,000	7 per cent	None	1,680,000	1,680,000		196
	22,765,200	7,624,400	15,140,800	7 per cent	None	607,624	607,624		197
	47,191,500	23,525,500	23,666,000	8 per cent	3 per cent	2,592,020	1,882,040	709,980	198
332,000	1,009,100	390,300	618,800	12 per cent	None	46,876	46,876		199

[3] Acquired by the American Sewer Pipe Company.
[4] Latest reorganization.
[5] Merged with the American Ice Company.

XVIII.

IDLE ESTABLISHMENTS.

1. *Scope of Statistics of Idle Establishments.*—The Twelfth Census contains reports from 3,864 establishments which were idle during the entire census year. Except for a few special industries, no cognizance was taken of similar establishments in previous censuses. In 1900 the enumerators and special agents were instructed to gather statistics and make reports for these establishments, but to regard no factory or mill as idle which had been dismantled of its machinery and was not in a condition to resume operations. Thus absolutely abandoned plants were not reported. The returns for idle establishments cover only capital and power equipment, if any, represented by such establishments. The results of the inquiry are presented in table xxx and table xxxi. The former shows the distribution of idle establishments by states, with the amount of capital and the power they represent; the second, the distribution of these establishments among the industries.

TABLE XXX.—SUMMARY OF IDLE ESTABLISHMENTS, BY STATES AND TERRITORIES: 1900.

STATES AND TERRITORIES.	Number of establishments.	CAPITAL.					POWER.						
		Total.	Land.	Buildings.	Machinery, tools, and implements.	Cash and sundries.	Number of establishments reporting.	Total horse power.	Steam engines.		Water wheels.		Other horse-power.
									Number.	Horse-power.	Number.	Horse-power.	
United States	3,864	$99,440,311	$25,769,199	$29,296,108	$32,136,101	$12,238,903	2,296	210,461	2,443	175,485	546	30,879	4,097
Alabama	121	3,388,916	782,128	1,264,261	1,274,665	67,862	63	19,416	96	19,360	5	43	13
Alaska	2	101,750	1,550	30,500	69,700								
Arizona	10	163,775	13,125	74,750	52,300	23,600	6	397	6	377	1	20	
Arkansas	106	601,048	220,546	59,370	266,453	54,679	72	2,460	70	2,386	4	48	26
California	76	2,226,897	332,018	660,353	1,121,525	113,001	41	7,369	54	3,516	19	3,850	3
Colorado	13	1,721,775	65,725	506,450	1,061,000	88,600	6	4,075	16	3,975	3	100	
Connecticut	56	1,582,519	228,148	500,490	638,965	214,916	29	2,913	22	1,944	20	965	4
Delaware	5	59,940	3,900	6,500	30,000	19,540	1	40	1	40			
District of Columbia	3	360,000	92,500	85,600	115,700	66,200	2	422	4	300	2	122	
Florida	29	524,379	295,755	52,608	139,316	36,700	15	524	13	465	6	59	
Georgia	103	1,117,076	400,767	313,706	302,831	99,772	84	3,432	83	3,285	10	147	
Idaho	2	26,275	20,375	1,100	4,400	400	1	28			1	28	
Illinois	194	6,096,601	2,175,978	1,449,349	1,986,803	484,471	108	10,889	109	10,403	3	27	459
Indiana	170	4,048,806	710,841	986,249	2,013,196	338,520	114	8,654	145	8,329	10	295	30
Indian Territory	14	28,181	316	8,915	18,550	400	10	240	11	240			
Iowa	76	1,293,220	379,940	440,520	446,000	35,760	40	1,955	41	1,744	7	192	19
Kansas	52	1,689,755	258,390	560,680	827,865	42,820	33	2,267	36	1,858	10	397	12
Kentucky	146	3,563,231	347,475	988,267	1,117,097	1,110,392	78	5,407	93	5,092	7	168	147
Louisiana	76	499,431	54,492	103,955	292,905	48,079	31	1,008	31	980			28
Maine	67	859,049	179,997	250,337	281,953	146,762	32	2,217	29	1,697	10	385	135
Maryland	37	1,226,058	249,952	439,749	365,777	170,580	25	1,673	31	1,390	9	275	8
Massachusetts	148	5,583,033	870,330	1,608,293	1,572,868	1,531,542	64	6,346	86	3,651	38	2,351	344
Michigan	139	2,861,192	683,158	460,284	1,227,241	500,514	96	6,739	110	5,278	8	253	1,208
Minnesota	59	4,296,797	602,878	910,722	830,507	1,952,690	39	7,265	49	7,126	1	55	84
Mississippi	68	68,677	6,589	21,412	37,522	3,154	31	657	28	638	1	15	4
Missouri	107	2,156,423	409,623	673,952	889,752	183,096	62	4,108	73	3,928	7	132	48
Montana	8	335,248	37,300	163,800	132,873	1,275	5	282	5	282			
Nebraska	37	297,232	30,160	161,134	72,473	33,465	24	1,168	23	818	4	350	
Nevada	6	98,285	5,025	36,020	50,040	7,200	5	350	4	150	1	200	
New Hampshire	48	822,951	165,455	278,700	184,729	194,067	34	3,064	23	1,290	31	1,749	25
New Jersey	92	5,362,986	1,215,742	2,558,519	1,239,931	348,794	56	3,915	61	3,497	15	363	55
New Mexico	8	108,289	8,510	63,829	35,550	400	3	130	3	130			
New York	264	10,519,033	2,149,020	4,001,423	3,053,493	1,315,097	154	29,081	181	23,890	68	4,954	237
North Carolina	174	762,243	132,385	145,302	331,807	152,749	105	3,895	88	3,187	34	626	82
North Dakota	10	44,950	3,350	11,900	21,550	8,150	7	233	6	193			40
Ohio	226	5,163,185	768,092	1,479,068	2,275,762	640,263	127	8,527	137	7,746	18	613	168
Oklahoma	5	13,720	140	1,800	11,730	50	3	91	3	91			
Oregon	43	1,050,193	311,004	414,200	261,929	63,060	26	1,803	29	1,527	7	231	45
Pennsylvania	349	10,751,710	2,156,353	3,722,525	3,416,009	1,456,823	229	20,575	244	18,885	66	1,379	311
Rhode Island	13	605,565	124,100	206,600	273,510	1,355	6	1,310	5	950	10	360	
South Carolina	58	115,115	25,803	52,095	34,580	2,637	44	673	37	559	10	114	
South Dakota	12	105,645	30,525	25,700	36,450	12,970	7	251	6	210	1	35	6
Tennessee	128	1,469,568	521,993	575,497	294,098	77,980	71	2,217	60	1,796	20	421	
Texas	177	1,158,574	157,065	398,405	531,080	72,024	106	4,260	110	4,062	4	63	135
Utah	16	276,471	42,075	172,897	55,749	5,750	9	232	3	86	6	146	
Vermont	23	104,160	28,510	22,025	37,200	16,425	13	649	8	327	10	322	
Virginia	112	1,884,479	501,763	863,816	352,851	166,049	66	8,782	67	8,456	21	302	24
Washington	42	8,479,707	7,598,559	424,460	346,868	109,820	25	2,740	28	2,667	3	56	17
West Virginia	33	868,450	99,902	254,487	421,528	92,533	25	2,785	16	2,381	12	224	180
Wisconsin	98	2,836,898	277,777	803,834	1,629,770	125,517	61	12,807	56	4,163	23	8,444	200
Wyoming	3	60,850	1,100	9,700	49,650	400	2	140	3	140			

TABLE XXXI.—SUMMARY OF IDLE ESTABLISHMENTS, BY INDUSTRIES: 1900.

MANUFACTURING AND MECHANICAL INDUSTRIES.	Number of establishments.	CAPITAL.					POWER.						
		Total.	Land.	Buildings.	Machinery, tools, and implements.	Cash and sundries.	Number of establishments reporting.	Total horsepower.	Steam engines.		Water wheels.		Other horsepower.
									Number.	Horsepower.	Number.	Horsepower.	
All industries	3,864	$99,440,311	$25,769,199	$29,296,108	$32,136,101	$12,238,903	2,296	210,461	2,443	175,485	546	30,879	4,097
Agricultural implements	19	2,189,362	234,775	735,013	335,107	884,467	11	1,283	13	1,271	.....	.....	12
Ammunition	4	579,853	170,000	150,000	12,853	247,000	.....	.....	.....	.....	.....	.....	.....
Axle grease	1	400	.....	.....	300	100	1	10	1	10	.....	.....	.....
Babbitt metal and solder	1	17,400	.....	3,000	10,000	4,400	1	35	2	35	.....	.....	.....
Bags, paper	1	55,000	10,000	30,000	15,000	.....	1	150	2	150	.....	.....	.....
Baskets, and rattan and willow ware	4	72,565	800	68,950	2,750	65	2	265	1	250	1	15	.....
Bicycle and tricycle repairing	11	16,241	6,376	4,820	4,475	570	1	90	1	90	.....	.....	.....
Bicycles and tricycles	5	103,500	14,500	59,000	25,000	5,000	2	55	1	20	1	35	.....
Blacksmithing and wheelwrighting	202	80,356	20,961	34,889	19,893	4,613	12	220	9	149	3	65	6
Bookbinding and blank book making	3	14,850	3,500	2,500	4,700	4,150	.....	.....	.....	.....	.....	.....	.....
Boot and shoe cut stock	1	1,000	.....	.....	500	500	.....	.....	.....	.....	.....	.....	.....
Boots and shoes, custom work and repairing	8	3,650	825	2,050	675	100	.....	.....	.....	.....	.....	.....	.....
Boots and shoes, factory product	22	403,360	32,360	100,000	149,871	120,629	11	437	33	392	.....	.....	45
Boots and shoes, rubber	1	105,000	5,000	75,000	25,000	.....	1	435	4	400	1	35	.....
Boxes, wooden, packing	3	21,325	2,000	4,050	15,225	50	1	20	1	20	.....	.....	.....
Brass castings and brass finishing	6	344,822	104,670	116,324	115,127	8,701	3	1,054	3	1,050	.....	.....	4
Brassware	1	7,000	5,000	2,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bread and other bakery products	10	56,875	15,750	24,500	12,275	4,350	3	35	3	35	.....	.....	.....
Brick and tile	411	4,921,049	1,842,959	1,810,481	1,165,912	601,697	198	12,100	209	12,063	.....	.....	37
Bridges	3	83,700	10,900	5,950	63,250	3,600	1	12	1	12	.....	.....	.....
Brooms and brushes	12	28,146	2,785	10,150	11,686	3,575	2	55	2	50	.....	.....	5
Buttons	1	2,500	.....	.....	1,500	1,000	1	25	1	25	.....	.....	.....
Carpentering	42	258,975	62,310	111,750	17,295	67,620	4	35	3	30	.....	.....	5
Carpets and rugs, other than rag	2	24,000	.....	.....	14,000	10,000	1	66	3	66	.....	.....	.....
Carpets, rag	17	3,999	466	1,185	323	2,025	.....	.....	.....	.....	.....	.....	.....
Carriage and wagon materials	7	30,408	5,715	6,100	17,718	875	5	193	5	193	.....	.....	.....
Carriages and wagons	16	109,161	7,700	37,338	38,344	25,779	3	125	4	125	.....	.....	.....
Cars, steam railroad, not including operations of railroad companies	2	564,426	203,000	204,000	141,000	16,426	.....	.....	.....	.....	.....	.....	.....
Charcoal	2	1,405	110	1,200	75	20	.....	.....	.....	.....	.....	.....	.....
Cheese, butter, and condensed milk, factory product	128	349,366	31,466	151,857	159,278	6,765	61	727	62	714	1	10	3
Chemicals	11	593,577	45,101	136,797	348,900	62,779	5	1,956	9	775	.....	.....	1,181
Clocks	2	17,300	300	200	15,300	1,500	.....	.....	.....	.....	.....	.....	.....
Clothing, men's, custom work and repairing	4	1,180	10	190	622	358	.....	.....	.....	.....	.....	.....	.....
Clothing, men's, factory product	1	4,050	.....	.....	4,000	50	.....	.....	.....	.....	.....	.....	.....
Clothing, women's, dressmaking	6	1,167	100	200	200	667	.....	.....	.....	.....	.....	.....	.....
Clothing, women's, factory product	1	12,000	.....	.....	2,000	10,000	1	3	.....	.....	.....	.....	3
Coffee and spice, roasting and grinding	1	12,000	4,000	6,000	1,000	1,000	1	3	.....	.....	.....	.....	3
Coffins, burial cases, and undertakers' goods	3	75,750	7,000	10,250	57,500	1,000	2	110	2	110	.....	.....	.....
Coke	14	511,669	13,950	224,769	272,950	.....	.....	.....	.....	.....	.....	.....	.....
Confectionery	4	31,200	2,500	1,900	6,250	20,550	1	4	1	4	.....	.....	.....
Cooperage	29	176,982	61,050	24,225	44,092	47,615	12	517	13	483	1	10	24
Copper, smelting and refining	9	371,320	16,023	235,904	80,852	38,541	4	220	4	220	.....	.....	.....
Cotton, compressing	3	105,375	3,000	37,000	65,000	375	3	335	4	335	.....	.....	.....
Cotton, ginning	375	444,401	29,847	97,005	305,257	12,292	276	5,762	258	5,386	19	319	57
Cutlery and edge tools	2	11,850	3,500	3,850	3,500	1,000	2	88	1	18	2	70	.....
Dentists' materials	1	1,100	.....	.....	1,000	100	.....	.....	.....	.....	.....	.....	.....
Druggists' preparations, not including prescriptions	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dyeing and cleaning	1	250	.....	.....	200	50	.....	.....	.....	.....	.....	.....	.....
Dyestuffs and extracts	2	38,465	2,700	12,600	13,165	10,000	2	85	2	85	.....	.....	.....
Electrical apparatus and supplies	11	741,570	87,600	380,400	235,372	38,198	5	566	4	557	.....	.....	9
Electrical construction and repair	5	14,156	.....	101	8,230	5,825	1	10	.....	.....	.....	.....	10
Electroplating	2	4,300	1,400	1,100	1,800	.....	2	10	1	2	.....	.....	8
Enameling and enameled goods	1	900	100	450	50	300	.....	.....	.....	.....	.....	.....	.....
Envelopes	1	1,300	.....	.....	300	1,000	.....	.....	.....	.....	.....	.....	.....
Explosives	5	156,500	16,700	68,500	71,300	.....	4	542	3	415	3	127	.....
Fancy articles not elsewhere specified	1	6,500	2,000	2,000	2,500	.....	1	80	1	80	.....	.....	.....
Felt goods	1	60,000	9,000	17,000	34,000	.....	1	50	.....	.....	.....	.....	50
Fertilizers	10	341,890	155,175	71,329	83,818	31,568	7	331	9	316	.....	.....	15
Fish, canning and preserving	18	213,455	10,175	48,575	82,445	72,260	3	163	4	153	.....	.....	10
Flavoring extracts	1	325	50	100	100	75	.....	.....	.....	.....	.....	.....	.....
Flouring and grist mill products	357	2,283,770	297,412	768,650	1,132,978	84,730	315	17,197	189	9,279	213	7,745	173
Food preparations	4	77,000	8,850	23,800	25,000	19,350	2	170	2	170	.....	.....	.....
Foundry and machine shop products	91	1,442,774	143,293	336,850	527,314	435,317	56	2,055	52	1,688	10	258	109
Fruits and vegetables, canning and preserving	92	453,289	60,415	152,925	145,384	94,565	32	745	35	740	.....	.....	5
Fur hats	1	5,500	500	3,000	2,000	.....	1	10	1	10	.....	.....	.....

TABLE XXXI.—SUMMARY OF IDLE ESTABLISHMENTS, BY INDUSTRIES: 1900—Continued.

MANUFACTURING AND MECHANICAL INDUSTRIES.	Number of establishments.	CAPITAL.					POWER.						
		Total.	Land.	Buildings.	Machinery, tools, and implements.	Cash and sundries.	Number of establishments reporting.	Total horsepower.	Steam engines.		Water wheels.		Other horsepower.
									Number.	Horsepower.	Number.	Horsepower.	
Furniture, cabinetmaking, repairing, and upholstering	12	$74,103	$11,635	$19,880	$36,323	$6,265	6	42	4	85	.....	.....	57
Furniture, factory product	18	1,546,307	456,010	530,000	367,975	192,322	12	306	14	794	.....	.....	12
Gas and lamp fixtures	1	16,800	.....	.....	1,800	15,000	.....	.....	.....	.....	.....	.....	.....
Gas machines and meters	2	2,800	.....	.....	.....	2,800	.....	.....	.....	.....	.....	.....	.....
Gas and oil stoves	1	2,200	.....	.....	2,000	200	.....	.....	.....	.....	.....	.....	.....
Glass	60	3,544,536	844,511	1,292,115	892,668	515,242	36	1,954	42	1,634	.....	.....	320
Glass, cutting, staining, and ornamenting	3	30,000	12,500	4,600	11,700	1,200	.....	.....	.....	.....	.....	.....	.....
Gloves and mittens	1	7,500	.....	1,000	500	6,000	.....	.....	.....	.....	.....	.....	.....
Grease and tallow	1	50,000	.....	.....	40,000	10,000	1	40	1	40	.....	.....	.....
Hammocks	1	1,250	.....	.....	1,000	250	1	7	1	7	.....	.....	.....
Hand-knit goods	2	1,425	375	100	450	500	.....	.....	.....	.....	.....	.....	.....
Hardware	4	40,515	1,800	35,600	2,315	800	2	108	2	108	.....	.....	.....
Hardware, saddlery	1	4,150	600	500	1,200	1,850	1	6	.....	.....	.....	.....	6
Hats and caps, not including fur hats and wool hats	3	50,000	9,600	28,800	11,500	100	2	290	2	290	.....	.....	.....
Horseshoes, factory product	3	993,747	2,000	17,000	52,607	922,140	1	440	2	350	2	90	.....
Hosiery and knit goods	36	1,173,803	102,450	236,900	544,426	290,027	30	1,568	27	1,265	2	118	185
House furnishing goods not elsewhere specified	2	33,040	19,540	4,000	7,200	2,300	1	10	.....	.....	.....	.....	10
Ice, manufactured	15	344,275	33,875	63,000	238,550	8,850	10	1,065	16	1,065	.....	.....	.....
Ink, writing	1	700	.....	.....	700	.....	1	4	1	4	.....	.....	.....
Instruments, professional and scientific	1	4,050	1,000	1,500	1,400	150	1	2	.....	.....	.....	.....	2
Iron and steel	123	23,831,819	4,769,740	8,821,645	8,004,147	2,236,287	95	76,556	302	75,123	16	793	640
Iron and steel, forgings	3	109,510	15,000	35,000	49,880	9,680	1	35	.....	.....	.....	.....	35
Iron and steel, nails and spikes, cut and wrought, including wire nails	5	445,815	33,800	82,190	329,825	.....	1	20	1	20	.....	.....	.....
Iron and steel, pipe, wrought	1	257,672	100,000	100,000	50,000	7,672	.....	.....	.....	.....	.....	.....	.....
Ironwork, architectural and ornamental	3	510,520	22,300	40,950	262,500	184,770	.....	.....	.....	.....	.....	.....	.....
Kaolin and other earth grinding	8	89,030	9,300	22,250	24,800	32,680	6	226	5	205	1	16	5
Lamps and reflectors	1	5,000	.....	.....	5,000	.....	.....	.....	.....	.....	.....	.....	.....
Lasts	1	5,000	1,000	4,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lead, smelting and refining	3	629,871	20,025	338,897	264,449	6,500	1	50	1	50	.....	.....	.....
Leather, tanned, curried, and finished	57	1,403,987	314,921	540,557	456,468	92,041	18	1,587	20	1,442	7	120	25
Lime and cement	33	1,149,754	382,225	313,035	423,784	30,700	16	2,540	24	2,365	1	140	35
Liquors, distilled	109	3,633,910	874,807	900,520	1,109,656	748,927	44	2,139	56	2,044	4	70	25
Liquors, malt	16	945,577	130,750	410,474	364,123	40,230	8	481	15	481	.....	.....	.....
Liquors, vinous	12	70,026	5,775	28,250	18,251	17,750	4	71	3	70	.....	.....	1
Lithographing and engraving	1	500	.....	.....	.....	500	.....	.....	.....	.....	.....	.....	.....
Lock and gun smithing	5	1,145	155	470	475	45	.....	.....	.....	.....	.....	.....	.....
Lumber and timber products	521	11,260,031	8,963,002	516,607	1,482,561	297,861	515	22,275	498	19,890	89	2,290	95
Lumber, planing mill products, including sash, doors, and blinds	86	687,052	155,622	172,126	223,246	86,058	72	2,440	70	2,075	8	185	180
Malt	9	595,500	229,000	255,000	67,500	44,000	6	143	6	143	.....	.....	.....
Marble and stone work	37	663,248	333,325	48,397	149,798	131,728	21	1,385	30	1,165	1	200	20
Masonry, brick and stone	11	64,665	11,000	10,300	5,965	37,400	2	15	1	10	.....	.....	5
Matches	3	189,000	10,000	85,000	71,000	14,000	3	630	3	630	.....	.....	.....
Mattresses and spring beds	2	7,750	.....	1,200	5,800	750	2	33	1	25	.....	.....	8
Millinery and lace goods	1	17,500	2,000	14,000	1,500	.....	.....	.....	.....	.....	.....	.....	.....
Millinery, custom work	5	1,327	200	.....	2	1,125	.....	.....	.....	.....	.....	.....	.....
Mineral and soda waters	5	67,500	50,300	6,300	10,400	500	1	32	1	32	.....	.....	.....
Models and patterns	3	29,700	10,500	7,500	11,150	550	1	6	.....	.....	.....	.....	6
Monuments and tombstones	5	5,238	837	604	755	3,042	.....	.....	.....	.....	.....	.....	.....
Musical instruments, organs, and materials	1	20,100	8,000	7,000	5,000	100	.....	.....	.....	.....	.....	.....	.....
Musical instruments, pianos, and materials	2	27,000	.....	12,000	2,000	13,000	1	30	1	30	.....	.....	.....
Needles and pins	1	40,000	6,000	10,000	24,000	.....	.....	.....	.....	.....	.....	.....	.....
Oil, castor	1	58,117	12,000	16,798	15,044	14,275	1	25	1	25	.....	.....	.....
Oil, cottonseed and cake	2	52,500	1,125	9,200	42,175	.....	2	125	2	125	.....	.....	.....
Oil, essential	4	13,335	1,115	1,390	10,830	.....	2	23	3	23	.....	.....	.....
Oil, linseed	14	1,660,318	579,500	274,000	330,000	476,818	3	340	3	340	.....	.....	.....
Painting, house, sign, etc	4	10,665	.....	.....	2,565	8,100	.....	.....	.....	.....	.....	.....	.....
Paints	5	59,600	14,900	12,100	23,100	9,500	4	280	5	280	.....	.....	.....
Paper and wood pulp	28	4,288,629	327,087	1,422,727	2,327,315	211,500	23	20,777	40	7,425	44	13,352	.....
Paper goods, not elsewhere specified	1	150,000	20,000	100,000	30,000	.....	1	345	1	155	1	190	.....
Paper hanging	2	9,260	3,000	2,500	210	3,550	.....	.....	.....	.....	.....	.....	.....
Patent medicines and compounds	9	175,017	15,300	5,200	27,803	126,714	1	100	1	80	.....	.....	20
Paving and paving materials	29	331,956	66,540	93,033	62,302	110,081	9	350	9	350	.....	.....	.....
Perfumery and cosmetics	2	200	5	75	10	110	.....	.....	.....	.....	.....	.....	.....
Petroleum, refining	2	90,000	20,250	34,750	35,000	.....	.....	.....	.....	.....	.....	.....	.....
Photography	10	2,351	300	675	1,330	46	.....	.....	.....	.....	.....	.....	.....
Photolithographing and photoengraving	1	800	.....	.....	800	.....	1	10	.....	.....	.....	.....	10
Pickles, preserves, and sauces	2	3,200	660	1,340	1,200	.....	.....	.....	.....	.....	.....	.....	.....
Pipes, tobacco	2	6,700	600	1,300	2,000	2,800	1	8	1	8	.....	.....	.....
Plated and britannia ware	1	25,000	5,000	10,000	10,000	.....	1	50	1	50	.....	.....	.....
Plumbers' supplies	1	41,000	.....	.....	40,000	1,000	1	75	1	75	.....	.....	.....

TABLE XXXI.—SUMMARY OF IDLE ESTABLISHMENTS, BY INDUSTRIES: 1900—Continued.

MANUFACTURING AND MECHANICAL INDUSTRIES.	Number of establishments.	CAPITAL.					POWER.						
		Total.	Land.	Buildings.	Machinery, tools, and implements.	Cash and sundries.	Number of establishments reporting.	Total horsepower.	Steam engines.		Water wheels.		Other horsepower.
									Number.	Horsepower.	Number.	Horsepower.	
Plumbing and gas and steam fitting	5	$4,000	$2,000	$500	$1,250	$250	.....	.....	.....	.....	.....	.....	.....
Pottery, terra cotta, and fire-clay products	53	1,409,703	285,960	563,026	387,972	172,745	37	2,837	43	2,827	.....	.....	10
Printing and publishing, book and job	11	10,507	275	700	8,966	566	1	2	.....	.....	.....	.....	2
Printing and publishing, music	1	500	.....	.....	500	.....	.....	.....	.....	.....	.....	.....	.....
Printing and publishing, newspapers and periodicals	21	24,945	.....	75	20,400	4,470	2	13	1	5	.....	.....	8
Printing materials	1	2,500	.....	.....	2,500	.....	.....	.....	.....	.....	.....	.....	.....
Pumps, not including steam pumps	1	10,000	5,000	3,000	2,000	.....	.....	.....	.....	.....	.....	.....	.....
Refrigerators	1	5,000	1,000	3,000	1,000	.....	1	12	.....	.....	.....	.....	12
Registers, cash	1	36,000	.....	.....	26,000	10,000	1	165	1	150	.....	.....	15
Rice, cleaning and polishing	3	66,200	6,050	25,050	35,100	.....	1	4	.....	.....	1	4	.....
Roofing and roofing materials	6	180,464	80,014	36,300	42,600	21,550	3	510	9	510	.....	.....	.....
Rubber and elastic goods	2	6,000	.....	.....	.....	6,000	1	10	.....	.....	.....	.....	10
Saddlery and harness	7	39,745	14,010	16,700	8,615	420	.....	.....	.....	.....	.....	.....	.....
Salt	10	1,737,150	302,900	942,500	491,350	400	7	632	16	632	.....	.....	.....
Saws	2	69,527	8,000	21,000	35,263	5,264	1	165	1	125	.....	.....	40
Scales and balances	1	38,000	2,000	12,000	16,000	8,000	.....	.....	.....	.....	.....	.....	.....
Sewing machines and attachments	1	5,900	.....	.....	4,000	1,900	1	3	.....	.....	.....	.....	3
Shipbuilding, iron and steel	3	2,688,940	298,096	1,219,422	811,079	360,343	1	50	1	50	.....	.....	.....
Shirts	3	12,385	385	6,100	5,900	.....	3	27	2	21	.....	.....	6
Shoddy	1	46,000	5,000	18,000	23,000	.....	.....	.....	.....	.....	.....	.....	.....
Silk and silk goods	22	427,491	63,800	209,381	129,050	25,260	13	1,956	10	1,793	3	125	38
Silverware	1	30,000	.....	.....	10,000	20,000	.....	.....	.....	.....	.....	.....	.....
Slaughtering and meat packing, wholesale	4	351,590	33,890	302,400	15,300	.....	3	430	5	430	.....	.....	.....
Slaughtering, wholesale, not including meat packing	1	185,000	20,000	160,000	5,000	.....	.....	.....	.....	.....	.....	.....	.....
Soap and candles	6	54,850	11,500	17,850	19,550	5,950	5	142	5	142	.....	.....	.....
	1	44,500	8,000	12,000	22,000	2,500	1	10	.....	.....	.....	.....	10
Stamped ware	11	3,727,293	965,000	844,250	1,810,757	107,286	3	365	5	365	.....	.....	.....
Starch	1	816,800	29,100	159,383	628,317	.....	1	775	5	620	7	155	.....
Sugar and molasses, beet	62	756,658	11,224	152,710	411,420	181,304	9	1,674	24	1,544	.....	.....	130
Sugar and molasses, refining	4	607,484	40,725	50,500	328,250	188,009	2	840	13	840	.....	.....	.....
Tin and terne plate	18	121,948	32,350	17,750	30,575	41,273	2	36	1	30	.....	.....	6
Tinsmithing, coppersmithing, and sheet-iron working	7	151,075	5,550	28,400	38,100	79,025	3	172	3	172	.....	.....	.....
Tobacco, chewing, smoking, and snuff	13	15,577	1,666	4,050	1,020	8,841	.....	.....	.....	.....	.....	.....	.....
Tobacco, cigars and cigarettes	4	75,950	3,050	11,000	1,400	60,500	1	78	1	78	.....	.....	.....
Tobacco, stemming and rehandling	1	6,000	1,000	5,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tools, not elsewhere specified	2	27,666	666	1,000	6,000	20,000	2	70	2	40	.....	.....	30
Toys and games	1	850	150	100	600	.....	.....	.....	.....	.....	.....	.....	.....
Turpentine and rosin	1	12,250	250	2,000	5,000	5,000	1	65	1	65	.....	.....	.....
Upholstering materials	1	5,500	3,500	1,000	1,000	.....	.....	.....	.....	.....	.....	.....	.....
Varnish	30	27,700	2,855	8,600	15,685	560	17	197	15	166	3	31	.....
Vinegar and cider	1	1,600	300	1,000	300	.....	.....	.....	.....	.....	.....	.....	.....
Washing machines and clothes wringers	7	3,590	100	100	2,780	660	1	8	1	8	.....	.....	.....
Watch, clock, and jewelry repairing	3	6,920	100	1,000	5,700	120	1	5	.....	.....	.....	.....	5
Windmills	1	5,000	.....	.....	1,575	3,425	.....	.....	.....	.....	.....	.....	.....
Window shades	2	340,000	80,000	85,000	225,000	.....	.....	.....	.....	.....	.....	.....	.....
Wire	11	77,852	2,550	11,000	54,190	10,112	6	142	2	115	.....	.....	27
Wirework, including wire rope and cable	13	79,345	12,000	11,750	34,150	21,445	11	630	10	425	4	190	15
Wood, turned and carved	6	120,035	12,200	15,581	75,176	17,078	5	335	7	335	.....	.....	.....
Woodenware, not elsewhere specified	108	3,742,484	537,392	1,116,202	1,439,088	649,852	102	8,794	73	4,863	91	3,731	200
Woolen goods	1	6,000	.....	.....	1,000	5,000	1	15	1	15	.....	.....	.....
Wool pulling	6	890,182	129,150	231,496	329,169	200,367	6	1,150	7	725	5	375	50
Worsted goods	2	59,500	2,000	45,500	12,000	.....	2	59	1	40	1	15	4
Zinc, smelting and refining													

Included among these idle establishments were undoubtedly a number of new mills in course of construction and not in operation prior to the close of the census year. But where the establishment was reported to have been in operation within the year, it was considered as active rather than idle. There probably were reported as idle, however, some establishments for which, since they were not in operation at the time of enumeration, the enumerator or special agent was unable to secure a complete schedule, and so reported only the capital and power as for an establishment idle throughout the year. In this way the figures for idle establishments have doubtless been somewhat inflated, while the production of active establishments has been proportionately understated.

2. *Comparison with Statistics for Active Establishments.*—The number of establishments reported as idle is remarkably small, in comparison with the number of active establishments reporting, and the amount of capital represented—$99,440,311—while a large sum,

is insignificant in comparison with the total capital represented, being only 1 per cent of that total. Of this unproductive capital, all but $12,238,903 appears as capital invested in land, buildings, and machinery. In addition to this investment in plant, the establishments in question have represented a large investment of live capital which has disappeared, having been lost or sunk in unsuccessful enterprise. Of the fixed capital represented by the idle establishments $32,136,101 was invested in machinery and tools; and this amount, together with the live capital above referred to, may be regarded as having been lost or sunk, as it seldom happens that a factory or a mill suspends operations for any length of time without requiring a complete refitting in machinery if it is subsequently applied to the same manufacture, and naturally the old equipment of machinery is useless for another industry. The conditions of modern manufacture are such that the machinery must be kept in the highest condition of efficiency, in order to meet competition successfully. The mills that are abandoned are either those with a disadvantageous location for manufacturing, or those whose equipment is obsolete, and whose proprietors are either financially unable to reequip them, or are convinced that such a reequipment is not economically wise.

One of the most striking phases of modern industry is the readiness with which machinery that is only slightly antiquated is consigned to the scrap heap. The manufacturer who abandons an entire plant disadvantageously located in favor of a superior new location, possesses in a high degree that industrial courage which has done much to bring America to the front rank of manufacturing nations.

Manufacturing localities throughout the older parts of the country contain many mill buildings which were erected years ago, and which can not be adapted to the exacting requirements of modern mills.

Of the idle establishments in these tables, 2,296, or 59.4 per cent of the total number, reported equipment of engines, motors, water wheels, etc., of 210,461 horsepower, made up of 175,485 steam, 30,879 water, and the remaining 4,097, gas or electric motors. It appears that the motive machinery in idle establishments represents but an insignificant fraction of the country's equipment for the productive utilization of energy, since the horsepower here represented is but 1.8 per cent of the total horsepower employed in the manufacturing industries in 1900.

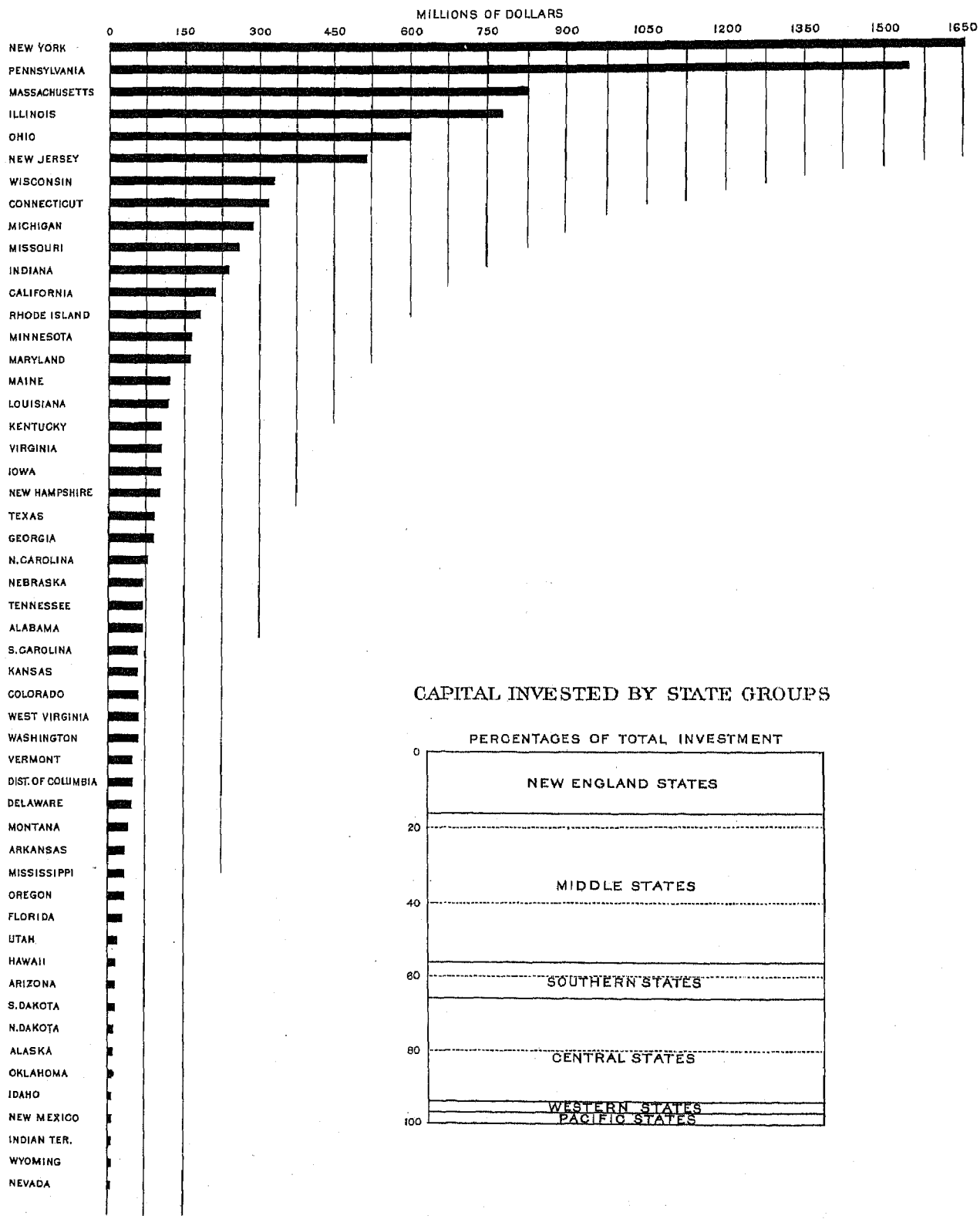
3. *Distribution by Industries.*—The distribution of idle establishments was so nearly uniform throughout the United States as to indicate no special localization; but in their distribution among the industries some striking facts appear. There were 411 brickyards, representing a total capital of $4,921,049. This may be taken as a sign of the decreasing demand for bricks, due to the substitution of iron in modern building construction. There were 375 cotton ginning establishments, but as they represented a capital of only $444,401, unquestionably they were small ginneries, abandoned because of the rapid concentration of this industry in larger and centrally located establishments. There were 357 flouring and grist mill establishments, with a capital of $2,283,770; and in these figures there is shown the gradual disappearance of neighborhood manufacture in this industry through causes similar to those which have affected the small cotton gins. Sixty glass manufacturing establishments, with a capital of $3,544,536, were reported as idle—a condition chiefly attributable to industrial combination and the concentration of the industry in the natural gas belt, with a concomitant withdrawal from other localities. There were 123 iron and steel establishments, with a total capital of $23,831,819, reported as idle. This is the largest idle investment shown for any industry; and it is significant of the gradual shifting of the locus of iron manufacture, and of the increasing concentration of this industry in large establishments. There exist in many states abandoned iron mills, which were built to utilize a local supply of ore, and which have been rendered permanently unproductive by the competition of new mills in proximity to superior raw materials. The same conditions operate in the lumber industry and the paper and wood pulp industry. Five hundred and twenty-one lumber mills, with a capital of $11,260,031, and 28 paper mills, with a capital of $4,288,629, were reported as idle. These establishments represent the shifting of industries due to the disappearance of the local supply of raw material. One hundred and eight woolen mills, representing an investment of $3,742,484, are included among the idle establishments. In this industry it is strictly true that old and dilapidated mills are finding it increasingly difficult to maintain themselves in competition with the new establishments which possess faster running machinery of the latest patterns. The preceding section, on industrial combinations, shows that 120 establishments, representing an investment in plant and other assets of $25,005,833, have been abandoned by the corporations which acquired them.

XIX.

CAPITAL INVESTED IN MANUFACTURES.

1. *Definition.*—The census act requires that the manufacturing schedules shall contain an inquiry as to "amount of capital invested," but it does not define what shall be construed as "capital" for the purposes of census investigation; and this is unfortunate, for, in order to have value, census figures must measure or relate to a definite and measurable thing which can be clearly defined and limited. It is difficult, if not impossible, to define the word "capital" for statistical measurement so that the thing measured shall be a tangible, restricted, and uniform thing. The attempt to measure

CAPITAL INVESTED IN EACH STATE AND TERRITORY: 1900



CAPITAL INVESTED BY STATE GROUPS

capital absolutely and accurately has never yet been successful in a census in the United States or elsewhere.

The total returns of capital invested in manufactures in the United States, as shown at the last three censuses, have been as follows:

TABLE XXXII.—*Invested capital: 1880, 1890, and 1900.*

	DATE OF CENSUS.			Per cent of increase, 1890 to 1900.
	1900	1890	1880	
Total	$9,817,434,799	$6,525,156,486	$2,790,272,606	50.5
Land	$1,027,453,140	$775,586,849	(1)	32.5
Per cent of total	10.5	11.9		
Buildings	$1,450,495,991	$878,570,737	(1)	65.1
Per cent of total	14.8	13.4		
Machinery, tools, and implements	$2,543,080,244	$1,584,276,390	(1)	60.5
Per cent of total	25.9	24.3		
Cash and sundries	$4,796,405,424	$3,286,722,510	(1)	45.9
Per cent of total	48.8	50.4		

[1] Not reported separately.

2. *Form of Inquiry.*—The returns for 1880 are inserted in the above table, not for comparative purposes, but to illustrate the fact that no such comparison is possible. In 1880 the schedule question regarding capital read as follows: "Capital (real and personal) invested in the business," and this was substantially the form in which the question was couched at all prior censuses. At the census of 1900 the question read as follows:

4. CAPITAL INVESTED—Owned and borrowed (see instruction 4).
Land ..... $.....
Buildings ..... $.....
Machinery, tools, and implements ..... $.....
Cash on hand, bills receivable, unsettled ledger accounts, raw materials, stock in process of manufacture, finished products on hand, and other sundries ..... $.....
Total capital ..... $.....

INSTRUCTION 4.—*Capital invested:* The answer must show the total amount of capital, both owned and borrowed. 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 buildings are both owned and rented, the fact should be stated, and only the value of the owned property given. The value of all items of live capital, cash on hand, bills receivable, unsettled ledger accounts, value of raw materials on hand, materials in process of manufacture, and finished products on hand, etc., should be given as of the last day of the business year reported.

This inquiry was the same as that used at the census of 1890, with only a slight simplification of the form. The wording of the inquiry in 1890 was as follows:

4. CAPITAL INVESTED (both owned and borrowed):
Value of plant (the value should be estimated at what the works would cost in 1890, if then to be erected with such allowance for depreciation as may be suitable in the individual case):
Land ..... $.....
Buildings ..... $.....
Machinery, tools, and implements ..... $.....
Total ..... $.....

4. CAPITAL INVESTED (both owned and borrowed)—Continued.
Live capital:
Raw materials on hand ..... $.....
Stock in process, and finished products on hand ..... $.....
Cash on hand, bills receivable, unsettled ledger accounts, and sundries not included in any of the foregoing items ..... $.....
Total ..... $.....
Average annual allowance since June 1, 1880, for depreciation of buildings and machinery ..... $.....

It will be seen that the difference between the form of the question in 1880 and at the two subsequent censuses is fundamental. The question of 1880 may have been intended to elicit the live capital employed in manufacturing, in addition to that actually invested in plant, and may frequently have brought such a return. No explanation was given on the schedule as to what was expected in this respect, and the great increase in total capital between 1880 and 1890 compared with the following decade indicates that the live capital must have been overlooked in 1880 in the great bulk of the returns.

It will be observed from table XXXII that in 1890 exactly 50.4 per cent of the total capital invested in manufactures was cash and sundries, representing live capital, and this probably indicates in a broad, general way the amount of deficiency in the returns of 1880, when live capital was not specifically called for. In 1900 the live capital represented 48.8 per cent of the total capital invested, or, as in 1890, about one-half. The land represented 10.5 per cent of the investment, and the buildings 14.8 per cent. Machinery, tools, and implements represented 25.9 per cent. These figures, therefore, indicate that about one-half of the total investment is in the form of live capital, one-quarter in the form of machinery, tools, etc., and the remainder in land and buildings, with the buildings representing the larger proportion.

3. *Defects of the Capital Inquiry.*—It will now be shown wherein the return of capital, as required by the census law, is necessarily defective, and of little value as a statistical presentation. Superintendent Walker's realization of the worthlessness of the answers to the capital question in the Tenth and previous censuses led him to the conclusion that it is not possible to measure statistically the amount of capital invested in the manufacturing enterprises of the country, and hence his recommendation that these statistics should be omitted altogether. In the census of 1870 he said:[1]

> The census returns of capital invested in manufactures are entirely untrustworthy and delusive. The inquiry is one of which it is not too much to say that it ought never to be embraced in the schedules of the census, not merely for the reason that the results are, and must remain, wholly worthless, the inquiry occupying upon the schedules the place of some technical question which

[1] Ninth Census of the United States, Industry and Wealth, page 381.

might be made to yield information of great value, but also because the inquiry in respect to capital creates more prejudice and arouses more opposition to the progress of the enumeration than all the other inquiries of the manufacturing schedule united. It is, in fact, the one question which manufacturers resent as needlessly obtrusive, while at the same time it is perhaps the one question in respect to their business which manufacturers, certainly the majority of them, could not answer to their own satisfaction, even if disposed. No man in business knows what he is worth—far less can say what portion of his estate is to be treated as capital. With respect, indeed, to corporations having a determinate capital stock, the difficulty of making a correct return in this particular becomes very much reduced; yet, even here the difference caused by returning such capital stock at its normal value on the one hand, or at its actual selling price on the other, whether above or below par, might easily make a difference of 50 or 75 per cent in the aggregate amount of capital stated for any branch of industry.

Where, however, business is carried on outside of incorporated companies, the difficulty of obtaining even an approximate return of capital, resulting from the nature of the inquiry itself, irrespective of the reluctance of manufacturers, becomes such as to render success hopeless. So numerous are the constructions possible, and even reasonable, in respect to what constitutes manufacturing capital that anything like harmony or consistency of treatment is not to be expected of a large body of officials pursuing their work independently of each other. The superintendent is free to confess that he would be puzzled to furnish a definition (fit for practical use by enumerators) of manufacturing capital, or even in a single case, with complete access to the books of a manufacturing establishment conducted by two or more partners, and with the frankest exhibit of the assets, both of the firm and of the individuals thereof, to make up a statement of the capital of the concern in respect to which he would feel any assurance. When to such difficulties in the nature of the subject is added the reluctance of manufacturers to answer an inquiry of this character, it may fairly be assumed, in advance of any enumerations, that the results will be of the slightest possible value.

In 1880 General Walker returned to the subject in the following language:[1]

The statistics of capital invested in manufactures, as obtained by a popular canvass, in which the statements of individual proprietors are necessarily accepted, and, indeed, are by the law intended to be accepted, are always likely to be partial and defective, far beyond the limit of error which pertains to other classes of statistics derived from the manufacturing schedule. The liability to error in this respect inheres in the very nature of the subject, and is probably ineradicable.[2] * * *

A host of illustrations might be offered showing the hopelessness of securing anything like complete and accurate returns of capital invested. Take a single class of difficulties: Here are two shoe factories in the same town, each employing 200 workmen. In one case the manufacturer owns the building in which his operations are carried on, and reports his capital at $75,000, being the value of his stock and machinery plus the value of the building; the other reports his capital at $25,000, being the value of stock and machinery only. The latter would not, and could not rightfully, report the value of the building as a part of his capital, for it does not belong to him. Yet that building is devoted to manufacturing uses, and any summary of the manufacturing capital of the country which omits consideration of it is, in so far, defective.

Let it not be thought that this element is a slight one. A very large part of the manufacturing establishments of a great city like New York or Philadelphia are located in leased buildings. In a single block may be found 20 clothing manufacturers, corset manufacturers, hat and cap makers, printers and publishers, engravers and die sinkers, not one of these concerns having a dollar's interest in the building, of which the upper three or five stories may be wholly devoted to manufacturing uses.

In the same way the value of the utilized water power of the United States must amount to a vast sum; yet a very large part of this will not be, indeed can not properly be, included in the returns of manufacturers, being the property of water-power companies or of the individual owners of adjacent lands.

Take still another large class of cases: A manufacturer has habitually $50,000 worth of his paper discounted by one, two, or three banks with which he keeps accounts, or by bill brokers. He can not return this as a part of his manufacturing capital. It is not his manufacturing capital, for the best reason in the world, viz, that it is not his property at all; it is the capital of the banks or of his individual creditors. That particular portion of wealth is not even capital invested permanently in manufactures. The notes might conceivably be paid off in the course of three months, and the same parties might thereafter loan their capital, not to that manufacturer, not to any manufacturer, but to some person engaged in trade or transportation; yet many hundreds of millions of dollars of borrowed capital are habitually employed in prosecuting the manufacturing enterprises of the country.

A variety of additional illustrations might be offered, were it needed, to show that altogether, in addition to the strong inclination of manufacturers to misrepresent the facts regarding the amount of their invested property, there is found, in the very nature of the industrial operations, a liability to the serious understatement of the capital invested. No corresponding difficulty is experienced in obtaining a fair and just statement of the annual value of the product, or of the kind and quantities thereof.

The capital inquiry, as it appeared upon the schedule of 1890, was an attempt to meet this class of criticisms by formulating a drag-net inquiry which should cover all forms of capital directly or indirectly employed in manufactures, whether the same be fixed or floating, owned or borrowed, real or personal. The inquiry, so comprehensive that it permits no form of the investment to escape, was the result of much careful consultation with bankers, manufacturers, and financial experts. It was again adopted for the Twelfth Census, without change except to simplify somewhat the return without in any way affecting the reports under it. Careful inquiry preceded the readoption of the form of inquiry, resulting in a general agreement that the question could not be materially improved, if the purpose was to obtain a statement which should show the gross investment of capital and make no allowance for duplications or for temporary use of money in the business. These duplications, it was conceded, could not be eliminated nor could their amount be ascertained.

The statistics of capital invested at the two censuses, therefore, show totals which are perfectly comparable, and in this sense and to this degree they are of value, and their collection and publication may thus be justified. As an actual measure of the amount of money

[1] Tenth Census, 1880, Manufactures, Introduction, page xxxix.

[2] "It seems best, therefore, to abandon the attempt to get statistics of capital. They are entirely uncertain and unreliable, and can be utilized only for the roughest generalizations, which are sufficiently obvious to all having any knowledge of business. On the other hand, they may give rise to very misleading inferences in regard to questions of the relative importance and the relative reward of capital and labor." Prof. Richmond Mayo-Smith in *Statistics and Economics*, page 187.

invested in the manufactures of the country and required to carry them on from year to year, they are not trustworthy data, for the following reasons.

4. *Land.*—Although the actual land, buildings, etc., commonly included under the term "fixed capital" are in themselves sufficiently tangible and definite, their value is in a high degree intangible and indefinite, dependent upon conditions of which a census can not take cognizance. The value of the land upon which a factory is built may depend altogether upon the fact of its being occupied as the site of that factory, and upon the continuance of the latter as a going concern.

5. *Buildings and Machinery.*—The value of the capital represented by buildings and machinery (supposed to be returned as the valuation of the property upon the inventories of the census year) is too variable to permit statistical accuracy. The return is, strictly speaking, a return of estimated market value, rather than of capital invested. The amount of the latter is affected by many causes—by depreciation requiring additional investment, by throwing out old machinery and substituting new, by business failures, and by other causes. So that in the case of most of the old and successful manufacturing concerns of the country the total investment in the plant has been very much greater than the present market value, as estimated by assessors. This is another example of the difficulties which arise from the impossibility as yet of arriving at a definition of capital invested which will command general assent.

6. *Investments Outside of Manufacturing Proper.*—Many establishments reporting to the census have large investments outside the amounts actually required to carry on their business, and yet constituting a part of the manufacturing investment. For instance, paper mills and lumber mills have large tracts of timber lands, in the purchase of which their capital has been expended, and from which they cut their raw material as it is required. The land so held is strictly analogous to the stock of materials on hand in other industries, e. g., to the cotton and wool purchased by a textile mill and held for use as needed; but in the former case the investment would be reported as land and in the latter as live capital.

Iron mills have investments in mines, and in railroads, and in steamships to transport the raw materials from mine to furnace. Mining and transportation, however, are special subjects for census investigation, apart from manufactures, and it was intended to omit from the reports all details of business connected with those subjects. There are numerous illustrations in other industries of capital invested in property that contributes with more or less directness to manufacturing, often in a manner not immediately essential to the daily conduct of the business, but none the less forming a part of the necessary investment of the manufacturing establishment. In other cases, although auxiliary to some manufacture, the capital clearly can not be statistically identified with it, and there are many instances where the question of capital invested admits of no general description or classification. No general rule can be formulated by which to determine in advance whether a certain investment of capital shall be considered as having been made in manufacturing or in some subsidiary pursuit.

7. *Rented Property.*—Where the manufacturing establishment reporting occupied rented property, in whole or in part, it was called upon to report the amount of rent paid during the census year. The aggregate amount of rent so paid was $95,708,226, which represents an enormous amount of real estate—all just as truly and as certainly invested in manufacturing, and therefore a part of the capital of the country so invested, as though it had been owned by its occupants. We quote from the text of the Eleventh Census report, showing the manner in which this phase of the question was handled in 1890 and the results attained:[1]

> The questions used at the Eleventh Census did not call specifically for the value of hired property, but the amount paid for tenancy was called for, and the value of hired property may be estimated upon the basis of the amount reported as paid for rent. The value of hired property is not shown in the general tables (in Part I), but is given for the 165 principal cities, also for selected industries in Parts II and III. The value of hired property in the 165 cities is given as $833,173,008, and for the country, exclusive of the cities, it is estimated at $323,052,049, making a total of $1,156,225,057. Adding this to the "total capital, direct investment," gives an aggregate capital of $7,681,381,543 for the United States, of which hired property forms 15.05 per cent. Omitting the value of hired property, the average capital per establishment for all classes of manufacturing and mechanical industries at the Eleventh Census was $13,359, as compared with $10,992 at the Tenth Census. Including the value of hired property in 1890, the average capital per establishment is found to be $21,612.

No such estimate has been attempted at the Twelfth Census. It is evident that the basis of such an estimate involves too large an element of guesswork to justify its use in any calculations deducible from census returns. The rate of rental for manufacturing property is subject to the widest variation, dependent upon the location and character of the property, its uses, the age and adaptability of the buildings, etc. In cities like New York and Chicago, where a very large proportion of the manufacturing is carried on in hired property—often in the upper lofts of buildings devoted in their lower floors to mercantile purposes, the rental will depend upon many considerations entirely absent in smaller towns and in rural districts. The amount paid for rent of factory property in the census year is returned as $95,708,226, which capitalized at an average rental of 8 per cent would represent an investment of $1,196,352,825. This amount added to the return of capital invested,[2] would make the total value of property de-

[1] Eleventh Census of the United States, 1890; Manufacturing Industries, Part I, Introduction, page 10.

[2] Exclusive of the amount returned for governmental establishments in the District of Columbia.

voted to manufactures in 1900 $11,013,787,624, of which 10.9 per cent was rented property. But where an estimate based upon such uncertain and varying conditions forms 10.9 per cent of the total, the element of necessary error is too large to justify any attempt to utilize the figures in a calculation of the amount of capital required to produce a given value of product or in any other like calculation.

8. *Good Will, Trade-Marks, Patents, etc.*—Another form of capital, of which no account is taken in the schedule and of which obviously no account can be taken, includes the good will, so called, the value of trade-marks, and the value of patents owned or controlled. These things possess a value more or less intangible, but in the transfers of property they are frequently appraised at a fixed value, and thus become tangible capital—not capital that represents an actual investment of money, but capital that has grown up or accrued out of the investment of money. Such capital would be properly included among the assets of manufacturers, if it were possible to measure its value statistically; but this can not be done, and the return of capital is therefore short by the most of this unknown amount. It is possible that in a few instances this form of capital has been included to some extent in the item of live capital, the inquiry for which asked for "other sundries." Where the schedule showed such an inclusion to have been made, a correction was asked in order to eliminate such assets for the sake of uniformity.

9. *Live Capital.*—The second part of the capital inquiry relates to live capital invested in manufactures—described upon the schedule as "cash on hand, bills receivable, unsettled ledger accounts, raw materials, stock in process of manufacture, finished products on hand, and other sundries." The difficulties in the way of securing a proper statistical presentation are here even greater than in the case of fixed capital, and thus invalidate the result in a more marked degree.

An analysis of the question in regard to capital invested will show that it accepts the gross assets of the establishment as constituting its capital, and that these gross assets are assumed to include the real property, whether land, buildings, or machinery, the actual cash on hand, the raw materials in hand or in process, the finished goods on hand, the unpaid accounts for goods made and delivered—everything, in a word, in the way of an asset, which the establishment may have in its possession, irrespective of whether the same is paid for or is owed for. In other words, the census schedule includes the credit of the establishment among its assets, and as a part of its live capital. What proportion of $4,796,405,424, the total amount of live capital returned, is therefore actually and permanently invested in manufactures, and what proportion is borrowed money, temporarily so invested by outsiders, it is impossible to determine. But the distinction is one which ought to be borne in mind in using these statistics. The borrowed capital, though actually employed, is usually less closely identified with the business using it, and thus ought, if it were possible, to be shown separately.

10. *Credit Capital, and its Duplications.*—The credit capital of manufacturing establishments may properly be described as the *extent* to which their standing and success will enable them to borrow, as necessity requires. This credit is rarely drawn upon to its full limit; but it is a very variable thing—dependent at all times upon the general conditions of the money market, and shrinking suddenly in case of panic to proportions relatively small. It is utilized in manufacturing, as in other business, in varying degree, according to the immediate business conditions. Some industries, during the period when the census returns were made, were borrowing heavily, in order to acquire stocks of raw materials or carry finished products; others were at that point in their year's business when the amount of credit utilized was small, or nothing, or even much less than the amount of credit they were extending to others. The census figures are made up of returns from all stages. It may be presumed, therefore, that they represent a fair average of credit; but it is an average from which nothing can be determined of statistical value. It is impossible to tell the amount of the permanent investment in live capital or the enormous variation which occurs continually in the amount of credit required to carry on the great industries of the country. Credits of this character may have been, and probably were, turned over several times during the census year; and loans to one firm may have been reloaned by that establishment to a second, and by the second to a third. In a word, it is impossible to say what portion of this live capital is borrowed capital, or how many times this borrowed capital has been duplicated and reduplicated in the returns.

11. *Further Duplication — Unsettled Ledger Accounts.*—That a large duplication in the live capital occurs in these returns in another way is also obvious. As industries become more highly specialized, there is a constantly increasing interchange of products between them, the finished product of one establishment becoming the material of another, in an ascending scale. Thus, there is an enormous volume of open accounts between manufacturing establishments, and these open accounts are represented in the census inquiry by bills receivable or unsettled ledger accounts. The bills receivable of one establishment represent, however, the materials on hand of other establishments. For example, a yarn mill will report as a part of its capital the amount of money owed it for the yarn sold to another establishment which reports the identical yarn as a part of its stock on hand or in process. This becomes a duplication of capital the moment the statistics of the two establishments are combined in a general tabulation, and it is easily conceivable that a reduplication may occur. This

duplication and reduplication can not be traced and eliminated, as this report has attempted to do in the matter of products. It is embedded in the returns—an indefinite and unknown amount, but an enormous aggregate in a total of ten billions—and it vitiates any conclusions drawn from the total.

Thus it appears that by reason of the inherent difficulties in defining capital for the purpose of statistical measurement, the Census Office is compelled, in compliance with the act of Congress, to report as the "amount of capital invested" in manufactures, a sum which is avowedly too small in some respects and undoubtedly too large in others, with no method available whereby the omissions and the duplications may be balanced, and with no reliance whatever to be placed upon the accuracy of the figures in consequence.

In 1890 a capital of $6,525,156,486 (or $7,681,381,543 if hired property be included) produced $9,372,437,283, gross products; in 1900, $9,817,434,799 (or $11,013,787,624 including an amount estimated for rented property) produced gross products valued at $13,004,400,143. An enormous exaggeration of investment is apparent; for, as shown in another part of this report, the product given for 1900 involved a duplication of $4,633,804,967, and in 1890 an enormous amount also, but one not to be ascertained from the reports. In 1900 this duplication was more than one-third, and it was probably not much less at the earlier census. Assuming that the duplication in products at the two censuses was proportionate, the value of products was not equal to the capital invested at either period.

12. *Computations based upon Capital Statistics.*—In view of what has been said, no computations are presented showing the average amount of capital required for a product valued at $100, tables showing which were presented at the last census for all industries.[1] No weight can properly be attached to a statement of the amount of capital required to produce a given amount of product, as computed from the census returns, either for the different industries or for the total of all industries. The discussion which has preceded has shown that the capital of a manufacturing establishment, as called for on the census schedule, may vary widely during the different periods of the year, and computations extracted from the comparison of the capital of a single establishment with its product will vary accordingly. When these variations are combined in the statistics of all the establishments reported for a particular industry, results are secured which are most incongruous. Some illustrations of these incongruities may be given from the tables of the last census in further explanation of the omission of these tables at the present census.

The tables presented in 1890 show that to produce $100 worth of products an average capital of $40.82 was required for the 20,803 establishments reported as engaged in the industry of making and repairing custom boots and shoes, indicating that for every thousand dollars' worth of product in these little shops there was invested a capital of $408. It is clear that an investment of this amount neither exists nor is required in establishments of this character. The ordinary custom boot and shoe maker requires no machinery, only the simplest of tools, carries but little stock, and usually occupies rented quarters.

Similar computations indicate that the 18 establishments engaged in the manufacture of gold pens in 1890 utilized a capital of $66.01 to produce a product valued at $100, while the 3 establishments engaged in the manufacture of steel pens utilized a capital of $148.80. These figures can not be reconciled with anything known to exist in these two industries.

It was shown that the average amount of capital required to produce a hundred dollars' worth of products, in the manufacture of woolen goods, was $98.06, in worsted goods, $85.97, and in cotton goods, $132.11. It is a fact that the machinery required to produce woolen goods is simpler, less complicated, and less expensive than that employed in the manufacture of worsted. In all other respects the normal conditions of the two branches of the industry are the same; so that the average amount of capital required in the worsted industry should have appeared from the census statistics to be greater than that required in the woolen industry.

The cotton manufacture is probably the best organized of any of our great industries, and it is probable that in this industry a given amount of capital will produce, under ordinary conditions, the largest quantity of product. The census figures showing that it requires $132.11 of capital to produce $100 worth of cotton goods, and only $98.06 and $85.97, respectively, to produce the same quantity of woolen and worsted goods, are deductions from the census statistics directly at variance with actual experience.

Made on the basis of the figures for 1900, computations similar to those made in 1890 for the three industries of cotton, woolen, and worsted manufactures show singular variations. The average capital required to produce $100 worth of cotton goods apparently increased to $138.47, of woolen goods to $105.03, and of worsted goods to $109.85. As between worsted and woolen goods, the census of 1900 reverses the statistics of 1890, and shows a capital required for worsted goods slightly greater than for woolen goods. The worthlessness of such computations at both censuses is demonstrated by their contradictory character. The computations in repect to these three industries are here inserted in tabular form for the two censuses, and will be accepted as a sufficient explanation of the failure to reproduce this table in its entirety.

[1] Eleventh Census, Manufactures, Part 1, page 49, ff.

TABLE XXXIII.—*Capital required for products worth $100.*

INDUSTRIES.	Year.	Capital.	Net products.	Average capital to $100 of net product.	Gross product.	Average capital to $100 of gross product.
Cotton goods	1900	$460,842,772	$292,978,759	$157.30	$332,806,156	$138.47
	1890	351,020,843	(1)	.....	267,981,724	132.11
Woolen goods	1900	124,386,262	89,137,638	139.54	118,480,158	105.03
	1890	130,989,940	(1)	.....	133,577,977	98.06
Worsted goods....	1900	132,168,110	91,846,971	144.69	120,314,344	109.85
	1890	68,085,116	(1)	.....	79,194,652	85.97

[1] Computed on different bases at the two censuses, and hence comparisons are omitted.

The amount of capital required to produce a given amount of product in any industry depends primarily upon the rapidity of the turn-over. In some industries this turn-over can be made three or four times in a year, provided that business conditions are normal. The cotton manufacture is an illustration of this; here the machinery can be run continuously at its highest capacity, and standard goods may be turned out as rapidly as the market will absorb them. The turn-over may therefore be effected three or four times in a year, according to business conditions and the energy and efficiency of the management. In the woolen manufacture there are two seasons, known as a "heavy-weight" and a "light-weight" season, and the turn-over is limited accordingly, although there may be exceptions to this rule. In the fur-goods manufacture there is but one season, and it is not possible for the fur manufacturer to turn his capital continuously as in the case of the cotton industry; yet, singularly enough, it appears from the Eleventh Census that the capital required to manufacture a product of a hundred dollars in the fur-goods manufacture was $54.15, as contrasted with a capital of $132.11 in the cotton manufacture.

These illustrations are cited to justify the contention made throughout this report, that it is impossible to attempt refinement of analysis in census statistics, with the expectation of securing results which are of any value for economic purposes. The determination of the true relation of capital to product in any given industry can be satisfactorily made only by special investigations of typical establishments, in which all the limitations and conditions are given their proper weight.

13. *Capital Stock of Corporations.*—In the capital statistics of the census no cognizance has been taken of the capital stock of corporations. The returns are supposed to represent the actual investment, which is in most cases something very different from the amount represented by capital stock. The rapid increase in the importance of the corporation in manufacturing renders it essential that the Census Office, if the capital inquiry is to be continued, shall so extend this inquiry as to take cognizance of the amount of investment as measured by the capital stock of corporations, and shall show the difference in the amount of the investment, as indicated by the two forms of return.

The statistics elsewhere given regarding the form of organization of industry indicate that the corporation is superseding the partnership and individual proprietorship in the great industries which require an abundance of capital for successfully conducting them on a large scale. This form of organization has certain definite advantages over any other. It permits the gathering together of large amounts of capital required for great manufacturing enterprises which are beyond the power of individuals. It permits individuals of small means to find investment for their resources in manufacturing enterprises by the purchase of stock—often of corporations in their own locality, regarding which they are personally cognizant—thus distributing both the risks and the emoluments of manufacturing among a great mass of people instead of confining them to comparatively few. It carries with it limited liability of the stockholder. Taking these and other advantages into consideration, it is clear that the facilities which the laws of the several states afford for obtaining the necessary capital to carry on manufacturing in the corporate form have been among the most potent factors contributing to the rapid development of the great industries of the United States.

Undoubtedly it would appear in a census inquiry that there is no correlation between capital stock and actual investments. This has been strikingly shown in the preceding section on Industrial Combinations, where there appears an actual investment, in accordance with the terms of the census schedules, of $1,436,625,910, whereas the total amount of capital stock issued by the corporations included in the report was $3,093,095,868; the difference between the figures indicating, in a general way, the extent to which the incorporators had utilized their supposed earning capacity, and had increased, in the form of stock certificates, the nominal amount of their capital.

The conditions which have been found to prevail in industrial combinations are not those which ordinarily exist in the capitalization of manufacturing enterprises carried on by corporations. In some of the states the law requires that the full amount of the capital stock authorized in a charter obtained under the laws of the state shall be paid in, and such is in fact the case with the larger number of these corporations. Their stock represents the money invested in buildings and machinery, and generally only a portion of the money required to carry on manufacturing operations; for these corporations find it necessary to utilize their credit at certain times in the year to obtain money from outside sources, by the use of which they are enabled to extend their operations far beyond the limits possible if they were confined to the nominal investment represented in their capital stock. In the case of such corporations, the capital stock represents less than the actual investment as shown by the returns under the census inquiry, thus offering a striking contrast to the facts brought out in the case of industrial combinations.

In the Massachusetts census of 1875, the Hon. Carroll D. Wright found occasion to believe that the normal cap-

ital of certain corporations was fully one-third short of the actual amount in current use by these corporations, and it was this discovery which led to the first attempt in any census inquiry to ascertain the real capital invested, by additional questions regarding live assets. The correctness of Mr. Wright's deductions in 1875 is demonstrated with respect to the cotton manufacture by the report of Mr. Stanwood, expert special agent in charge of that industry at the present census. He shows that the capital stock of 708 corporations engaged in the manufacture of cotton during the census year was $204,157,914, while the actual capital required to carry on the business of these corporations as shown by the returns under the census capital inquiry was $385,863,827. The difference between these two sums may be said to represent, in the broadest and most general way only, the extent to which the cotton manufacturers resort to their borrowing power for the purpose of carrying on their business, and also, to some extent, the accumulation of earnings.

These matters are alluded to in this connection for the purpose of further indicating the totally misleading character of the census returns on capital invested, and of further emphasizing the impossibility of devising any scheme whereby so complicated a matter, into which so many different elements enter, under so many different conditions, can be accurately treated from the statistical point of view.

XX.

PERSONS EMPLOYED.

1. *Form of Inquiry.*—The most radical departure in the manufacturing schedule of 1900 from that of 1890 was the inquiry relating to persons employed and wages paid.

The form of inquiry used at the Eleventh Census, in 1890, was as follows:

INQUIRY 6.—LABOR AND WAGES.

NOTE.—Hands employed on piecework and their earnings should be separately reported below. Wages paid should include board or rent furnished as part compensation.

CLASSES.	Average number employed during the year.	Total amount paid in wages during the year.
Operatives, engineers, and other skilled workmen, overseers, and foremen or superintendents (not general superintendents or managers):		
Males above 16 years		$
Females above 15 years		
Children		
Officers or firm members—		
Males		
Females		
Clerks—		
Males above 16 years		
Females above 15 years		
Children		
Watchmen, laborers, teamsters, and other unskilled workmen		
Males above 16 years		
Females above 15 years		
Children		
Piecework (not included in the foregoing statement)—		
Males above 16 years		
Females above 15 years		
Children		
Total		

In 1900 the following form was used:

INQUIRY 5.—PERSONS EMPLOYED.

NOTE.—Account for all persons engaged in the business, both in the management and in production. Give the total salaries and wages paid, which should include board or rent when furnished as part compensation. Give the number of proprietors and firm members, and, if they are not paid salaries, so state on the schedule. Stockholders of corporations are not to be reported unless they are salaried officials. Amounts paid for outside contract work must not be included in the wages, but be reported in answer to inquiry 8.

CLASSES.	Greatest number employed at any one time during the year.	Least number employed at any one time during the year.	Total amount paid in wages or salaries during the year.
Proprietors and firm members:			
Men			$
Women			$
Salaried officers of corporations			$
General superintendents, managers, clerks, and salesmen:			
Men			$
Women			$
All other employees, including pieceworkers:			
Men, 16 years and over			$
Women, 16 years and over			$
Children, under 16 years			$
Total			$

AVERAGE NUMBER EMPLOYED DURING EACH MONTH.

[Wage-earners only, including pieceworkers. Do not include proprietors, firm members, officers, superintendents, managers, clerks, or salesmen.]

MONTH.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.	MONTH.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.
January				July			
February				August			
March				September			
April				October			
May				November			
June				December			

2. *Persons Employed, Classes.*—A proper statistical showing divides the persons engaged in manufactures into three distinct groups:

I. Proprietors and firm members of establishments, receiving their compensation from the earnings of the enterprise.

II. Officers of corporations, managers, clerks, etc., receiving salaries.

III. Employees receiving wages at a given rate per hour, day, week, or piece, as the case may be, for work actually performed, and only for such work. This third class includes all wage-earners in the common significance of the term.

The census of 1900 has attempted to differentiate sharply between these three classes of persons engaged in manufactures. The distinction is absolutely necessary in order to render of value in economic and sociological study statistics relating to the wage-earning classes. No similar definite grouping was made at the census of 1890 or at any previous census, and this fact constitutes the principal reason why comparisons with these previous censuses can not be satisfactorily made.

3. *Changes in Form of Inquiry.*—The principal changes in the form of the inquiry were three in number:

I. General superintendents and managers, many of whom, owing to a misunderstanding of the schedule,

were included in the class of skilled workmen in 1890, were reported in 1900 with other salaried employees, except salaried officers of corporations, who formed a separate group.

II. Proprietors and firm members were eliminated from the class of salaried officials, and reported separately without salaries.[1]

III. The schedules of 1890 made no provision for reporting the average number of employees for each month, and the average number was in most cases based upon the actual time each establishment was in operation, and not upon the entire twelve months of the year, as was the case in 1900.

The first of these changes has affected all classes of industries, but the exact results of the change can not be established by deduction from the statistics presented. Many of the general superintendents and managers, and their salaries, were included in the first item on the schedule for employees and wages in 1890, which called for operatives, engineers, and other skilled workmen, overseers, foremen, or superintendents (not general superintendents or managers). No provision was made elsewhere for "general superintendents or managers," except as they were inferentially called for under the head of "officers or firm members," which is commonly assumed to apply to the official staff of a corporation. An examination of the schedules of 1890 gives reason for believing that in many instances these salaried officials were included among skilled workmen.

The second change, compared with 1890, resulted in reducing the number of salaried officials and total salaries in all classes of industries.

At the census of 1890 the number and salaries of proprietors and firm members actively engaged in business or in its supervision were reported, combined with clerks and other officials. In cases where proprietors and firm members were reported without salaries, the amount that would ordinarily be paid for such services was estimated. It is impossible to segregate the number of proprietors and firm members, with their compensation, from the number of salaried officials, managers, clerks, etc., with their salaries.

At the census of 1900 only the number of proprietors and firm members actively engaged in the industry or in supervision was ascertained, and no salaries were reported for them, since it is an almost universal rule that their compensation is not a fixed sum, but is dependent upon the earnings of the enterprise.

4. *Salaried Officials, etc.*—Table XXXIV shows the total sum of money reported as paid in the United States in all industries for salaries and wages in 1900, and the total number of the two classes of employees, with the per cent of each to the total:

TABLE XXXIV.—*Employees, salaries, and wages, 1900.*

Total salaries and wages	$2,726,045,110
Salaries	$403,711,233
Per cent of total	14.8
Wages	$2,322,333,877
Per cent of total	85.2
Total average number of all employees	5,705,165
Salaried employees	396,759
Per cent of total	7.0
Wage earners	5,308,406
Per cent of total	93.0

The above table shows that the salaried officials of all classes received $403,711,233, or 14.8 per cent of the total amount paid for salaries and wages. The wage-earners received $2,322,333,877, or 85.2 per cent of the total. The figures given are not comparable with those reported for 1890, for the reason before stated.

In 1890 the salaries reported and estimated for proprietors and firm members, together with those of salaried officials, clerks, etc., a total of 461,009 persons, aggregated $391,988,208, or 17.2 per cent of the total amount paid for salaries and wages, as compared with 14.8 per cent in 1900. This apparent decrease in the percentage of earnings of the class of salaried officials is altogether deceptive by reason of the omission in 1900 of salaries for proprietors and firm members. In 1890 the wage-earners were reported as receiving but 82.8 per cent of the total sum paid for services, while in 1900 this class received 85.2 per cent of the total.

Table XXXV presents the statistics of 28 selected industries in which the effect of eliminating proprietors and firm members from the class of salaried officials is most marked.

[1] In the comparative tables published in the state reports in Part II, and in many of the special reports in Parts III and IV, against the number of salaried officials, clerks, etc, and salaries, in 1890, reference is made to the following note: "Includes proprietors and firm members, with their salaries, number only reported in 1900." It should be stated that in such cases the number of proprietors and firm members in 1900 is not included in the number of salaried officials, although this might perhaps be inferred from the wording of the note.

TABLE XXXV.—COMPARATIVE SUMMARY, TWENTY-EIGHT SELECTED INDUSTRIES: 1890 AND 1900.

INDUSTRIES.	Year.	Number of establishments.	Proprietors and firm members.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		Value of products, including custom work and repairing.
					Number.	Salaries.	
Total	1900	359,025	413,746	$1,940,212,175	85,256	$71,969,426	$3,471,131,588
	1890	247,187	.....	1,701,669,941	253,006	176,738,237	2,933,939,153
Blacksmithing and wheelwrighting	1900	51,771	58,150	54,976,341	339	217,718	85,971,630
	1890	28,000	.....	34,500,139	24,328	13,297,189	54,304,039
Boots and shoes, custom work and repairing	1900	23,560	23,878	9,262,134	138	81,864	26,550,678
	1890	20,803	.....	14,230,081	18,467	9,328,352	34,856,651
Bread and other bakery products	1900	14,917	16,011	81,049,553	9,177	6,067,103	175,657,348
	1890	10,484	.....	45,758,489	13,921	9,668,788	128,421,535
Brick and tile	1900	5,423	6,652	82,086,438	2,426	2,024,683	51,270,476
	1890	5,828	.....	82,578,566	4,975	2,985,832	67,770,695
Brooms and brushes	1900	1,526	1,800	9,616,780	900	757,631	18,490,847
	1890	1,235	.....	7,743,832	1,428	1,017,633	14,156,383
Carpentering	1900	21,315	24,665	71,327,047	2,701	2,228,434	316,101,758
	1890	16,917	.....	81,542,845	17,069	15,169,168	281,195,162
Carriages and wagons	1900	7,632	9,357	118,187,838	4,302	4,078,932	121,537,276
	1890	8,614	.....	104,210,602	9,194	7,533,221	114,551,907
Clothing, men's[1]	1900	28,014	32,501	173,034,543	14,150	13,723,046	415,256,391
	1890	18,658	.....	182,552,938	26,587	23,676,358	378,022,815
Clothing, women's, dressmaking	1900	14,479	15,753	13,815,221	908	750,658	48,356,034
	1890	19,587	.....	12,883,079	18,985	9,227,902	57,071,732
Cooperage	1900	2,146	2,371	22,568,873	838	843,668	40,576,462
	1890	2,652	.....	17,806,554	2,097	1,609,117	38,617,956
Dyeing and cleaning	1900	1,810	2,029	4,673,211	595	292,460	7,567,358
	1890	976	.....	3,041,178	1,198	820,169	5,267,819
Flouring and grist mill products	1900	25,258	30,240	218,714,104	5,790	5,404,750	560,719,063
	1890	18,470	.....	208,473,500	16,078	8,897,840	513,971,474
Lock and gun smithing	1900	2,103	2,267	2,250,300	69	41,695	3,703,127
	1890	1,308	.....	1,867,220	1,318	846,455	3,153,884
Lumber and timber products	1900	33,035	43,322	611,611,524	12,530	11,260,608	566,832,984
	1890	22,617	.....	557,881,054	20,375	11,203,757	437,957,382
Marble and stone work[2]	1900	6,070	7,579	67,509,533	3,306	3,003,875	85,101,591
	1890	3,373	.....	37,115,193	4,261	4,020,898	62,595,762
Masonry, brick and stone[3]	1900	8,333	10,176	48,070,239	2,386	2,352,394	203,593,634
	1890	7,715	.....	54,969,408	8,411	8,216,204	204,165,642
Mattresses and spring beds	1900	797	909	8,298,772	869	778,817	18,463,704
	1890	696	.....	6,662,929	1,019	896,344	15,683,932
Millinery, custom work	1900	16,151	18,615	27,740,386	3,723	1,508,987	70,363,752
	1890	5,999	.....	16,309,220	6,904	3,703,738	36,983,082
Mineral and soda waters	1900	2,816	3,252	20,518,708	1,464	1,203,407	23,874,429
	1890	1,377	.....	10,781,817	1,798	1,426,705	14,353,745
Painting and paper hanging[4]	1900	16,939	19,662	27,217,086	2,204	1,478,024	88,396,852
	1890	10,048	.....	23,135,781	10,945	8,935,219	74,067,998
Photography	1900	7,553	8,269	13,193,589	1,063	664,083	23,238,719
	1890	3,105	.....	7,804,532	3,465	2,933,228	15,488,324
Plumbing, and gas and steam fitting	1900	11,876	14,313	47,111,264	3,780	2,593,594	131,852,567
	1890	5,327	.....	29,335,247	7,056	6,847,297	80,905,925
Roofing and roofing materials	1900	2,162	2,505	17,594,162	1,198	1,051,983	29,916,592
	1890	2,140	.....	13,303,597	2,396	2,088,512	29,412,813
Saddlery and harness	1900	12,934	14,253	43,354,136	1,976	1,587,651	62,630,902
	1890	7,931	.....	35,346,620	7,654	5,121,927	52,970,801
Tinsmithing, coppersmithing, and sheet-iron working	1900	12,466	14,701	55,703,509	3,115	2,596,695	100,310,720
	1890	7,002	.....	38,434,900	7,065	5,426,110	66,653,746
Tobacco, cigars and cigarettes	1900	14,539	16,217	67,706,493	4,470	4,712,786	160,228,152
	1890	10,956	.....	59,517,827	11,156	8,292,929	129,693,275
Watch, clock, and jewelry repairing	1900	12,229	12,961	12,741,978	330	181,018	20,235,039
	1890	4,502	.....	6,057,125	3,828	2,655,475	10,704,477
Wood, turned and carved	1900	1,171	1,338	10,278,418	564	487,862	14,338,503
	1890	872	.....	7,825,668	1,028	893,370	10,939,647

[1] Includes 22,134 establishments in 1900 and 13,591 in 1890, reported as "clothing, men's custom work and repairing;" 5,731 in 1900 and 4,867 in 1890, reported as "clothing, men's factory product," and 149 in 1900 and 200 in 1890, reported as "clothing, men's factory product, buttonholes."

[2] Includes 2,351 establishments in 1900 and 1,321 in 1890, reported as "marble and stone work," and 3,719 in 1900 and 2,052 in 1890, reported as "monuments and tombstones."

[3] Includes 6,431 establishments in 1900 and 5,969 in 1890, reported as "masonry, brick, and stone," and 1,902 in 1900 and 1,746 in 1890, reported as "plastering and stucco work."

[4] Includes 15,295 establishments in 1900, reported as "painting, house, sign, etc.," and 1,644 in 1900, reported as "paper hanging."

The result of this change in the manner of reporting proprietors and firm members is very noticeable in blacksmithing and wheelwrighting, the first industry shown in the above table. In this industry there was an apparent decrease of 23,989 in the number of salaried officials and an apparent decrease of $13,079,471 in total salaries. The average salary for 1900, however, exceeded that of 1890 by $95. The 51,771 establishments in 1900 had 58,150 proprietors and firm members, including only those who were actively engaged in the business, and 339 salaried officials whose salaries aggregated $217,718; while the 28,000 establishments in 1890 reported 24,328 salaried officials with salaries amounting to $13,297,189. A condition similar to this exists in all industries of like character. The number of salaried officials reported for establishments classed as boots and shoes, custom work and repairing, decreased from 18,467 to 133; in carpentering, from 17,069 to 2,701; in clothing, women's, dressmaking, from 18,985 to 908; in lock and gun smithing, from 1,318 to 69; in painting and paper hanging, from 10,945 to 2,204; and in watch, clock, and jewelry repairing, from 3,828 to 330. In the aggregate, the industries in the table show a decrease of 167,750 in the number of salaried officials, and $104,768,811 in the amount of salaries paid. The average salary reported as paid in 1890 was $698 compared with $844 in 1900, a difference of $146 in favor of the latter.

It is obvious from the above table that the elimination of proprietors and firm members from the class of salaried officials in 1900 caused a very decided decrease in the number of salaried officials, while the apparent increase in the average salary is fictitious, being due to the low estimated salary assigned to proprietors and firm members in 1890.

5. *Average Number of Wage-earners.*—The third change consisted in a radical difference in the method of ascertaining the average number of wage-earners during the entire year, and undoubtedly invalidates, in a marked degree, any comparison that may be attempted between the returns of the two censuses.

At the census of 1890 the average number of persons employed during the entire year was called for, and also the average number employed at stated weekly rates of pay, and the average number was computed for the actual time the establishments were reported as being in operation. At the census of 1900 the greatest and least numbers of employees were reported, and also the average number employed during each month of the year. The average number of wage-earners (men, women, and children) employed during the entire year was ascertained by using 12, the number of calendar months, as a divisor into the total of the average numbers reported for each month.

It appears from General Table 3, page 59, that the greatest number of persons employed during the census year in all the establishments reporting was 7,069,144, and the least number 4,524,466, a difference of 2,544,678, or more than one-half the least number of employees. As computed by the Census Office, the average number of wage-earners was 5,308,406, a total which is not far below the average of the two extremes.

In view of this striking variation in the number of wage-earners, an important object of the manufacturing census must be to ascertain a certain number, somewhere between the greatest and least number, which shall represent, so far as it is possible to do so, the equivalent of the actual amount of work done by all the wage-earners during the census year. The figures representing the average number of wage-earners can have no value or utility except as they convey some definite conception of the amount of work done. From this point of view, the number of persons employed during the census year should be treated as an abstract unit (like the foot-pound), affording a rough measure of the amount of work actually accomplished by all the employees involved, whether they individually work one day, one week, one month, or twelve months in the year.[1] For this reason, the method adopted at the census of 1890 for computing the average number of wage-earners can not be accepted as accurate. The average number as obtained in 1890 is plainly an average number for the actual time that the several establishments concerned were in operation during the year, and not an average number for the whole year. Under the method of computation adopted in 1890, if an establishment was in operation one month, the average number of persons employed during that month must have appeared as the average number employed during the whole year. On the other hand, by the method adopted in 1900, the average number employed for one or two months by the several establishments was distributed throughout the whole year in order to obtain a statement, approximately correct, of the average number for the whole year, and this is what the census figures are actually supposed to show.

Before adopting this change in the method of computing the average number of employees, inquiry was made of statisticians and others as to the relative worth of the two methods under consideration. The letter of inquiry and several of the replies received are reproduced below.[2]

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[1] See letter of Walter F. Willcox, chief statistician of the division of methods and results, page cviii.

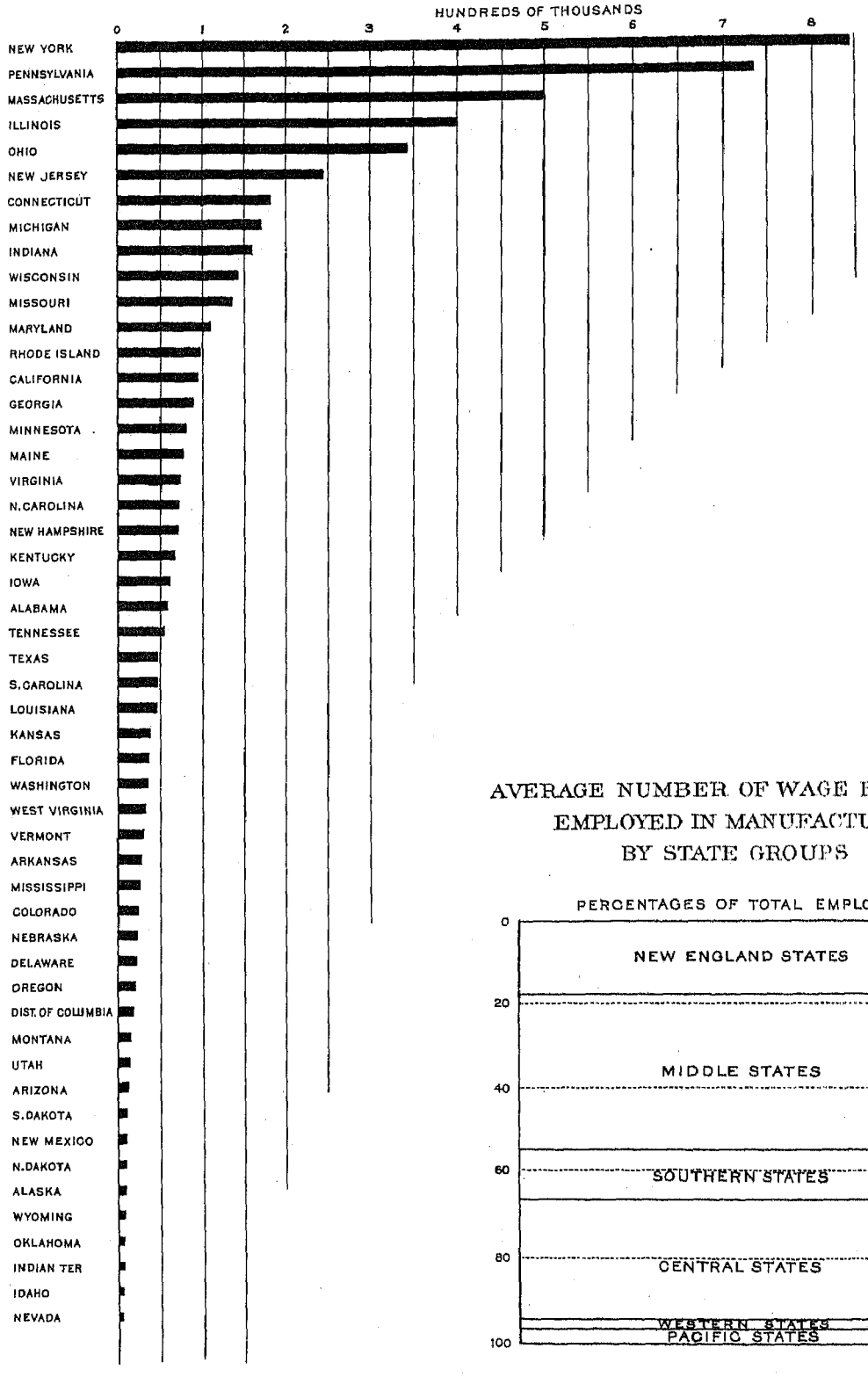
[2] LETTER OF INQUIRY.

DEPARTMENT OF THE INTERIOR,
CENSUS OFFICE,
Washington, D. C., August 25, 1900.

DEAR SIR: The question has arisen in this division as to the proper treatment of the question of the average number employed during the census year in the several establishments reporting. We have on the schedule the average number employed during each month. We have also the total amount of wages paid during the year.

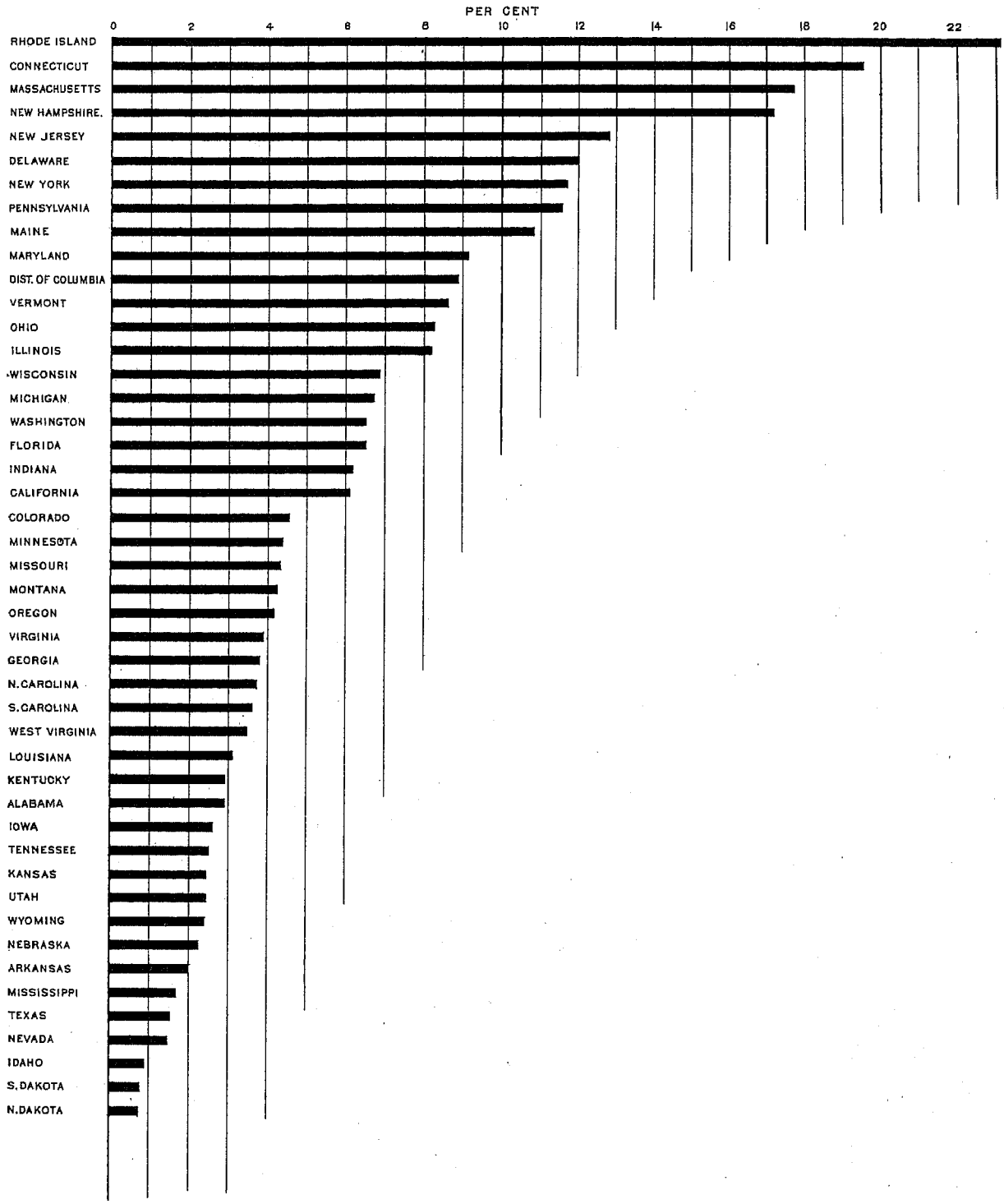
In obtaining the average number employed during the year, one method will be to uniformly divide the total number employed in

AVERAGE NUMBER OF WAGE EARNERS EMPLOYED IN MANUFACTURES: 1900



AVERAGE NUMBER OF WAGE EARNERS EMPLOYED IN MANUFACTURES BY STATE GROUPS

PROPORTION OF AVERAGE NUMBER OF WAGE EARNERS EMPLOYED IN MANUFACTURES TO TOTAL POPULATION: 1900



It is obvious that the method adopted in 1900 tends to produce a smaller average number than the method employed in 1890. This is most strikingly shown in the operations of those establishments which are carried on during comparatively brief portions of the year. This is illustrated in table XXXVI, showing, for the industry of canning and preserving fruits and vegetables, the number of wage-earners employed each month of the year, by states, for 1900.

TABLE XXXVI.—FRUITS AND VEGETABLES, CANNING AND PRESERVING: 1900.

STATES.	AVERAGE NUMBER OF WAGE-EARNERS EMPLOYED DURING EACH MONTH.												Total.	Greatest number employed at any one time during the year.	Average number.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.			
The United States	6,205	5,643	7,321	8,620	13,246	30,480	45,577	97,322	116,550	67,143	27,718	11,039	436,814	133,106	36,401
Alabama	.....	.....	.....	5	.....	29	53	71	37	1	1	.....	197	84	16
Arkansas	.....	.....	.....	.....	.....	.....	102	463	544	424	103	.....	1,636	601	136
California	508	391	525	1,319	2,683	8,570	18,005	22,023	20,353	11,132	3,148	1,177	89,829	24,935	7,486
Colorado	53	55	55	55	55	280	280	298	613	498	160	70	2,472	613	206
Connecticut	2	4	1	2	3	6	8	265	420	282	153	54	1,200	429	100
Delaware	67	89	158	169	327	899	502	5,038	5,635	3,808	456	102	17,250	5,909	1,437
Georgia	17	17	17	17	2	73	302	334	141	17	15	15	967	468	81
Illinois	447	453	463	569	615	619	1,054	4,615	4,931	2,112	849	598	17,325	5,573	1,444
Indiana	196	199	285	371	495	1,604	1,630	6,736	8,020	3,541	648	295	24,020	8,718	2,002
Iowa	53	49	171	80	102	210	298	2,335	3,582	870	495	142	8,387	3,867	699
Kansas	1	.....	.....	11	20	77	44	478	441	267	62	2	1,393	512	116
Kentucky	15	10	10	15	20	200	421	758	751	527	41	10	2,778	874	231
Maine	240	264	303	328	312	177	259	1,945	4,742	1,341	715	221	10,847	5,050	904
Maryland	2,395	1,907	2,962	2,967	4,849	6,943	7,014	19,722	21,397	12,674	4,741	2,492	90,063	22,907	7,505
Massachusetts	117	113	111	132	132	136	146	163	162	147	163	144	1,666	261	139
Michigan	365	365	369	368	369	1,105	964	1,391	2,919	3,040	1,978	742	13,975	4,014	1,165
Minnesota	.....	.....	4	4	4	4	10	180	285	28	24	2	545	285	45
Missouri	30	30	27	30	134	133	204	2,822	2,682	1,337	338	84	7,801	3,598	650
Nebraska	10	5	10	13	53	88	110	700	613	236	57	32	1,927	733	161
New Hampshire	8	8	8	8	8	8	11	3	63	44	47	17	233	91	19
New Jersey	214	274	297	305	397	1,219	1,116	4,930	7,756	5,037	1,924	433	23,902	8,355	1,992
New York	927	874	935	1,049	1,438	4,776	6,280	7,849	16,421	12,806	9,380	3,485	66,220	16,421	5,518
North Carolina	11	8	15	21	129	146	203	261	107	31	7	4	933	372	78
Ohio	193	195	266	284	349	1,034	2,176	5,805	5,322	2,619	740	319	19,299	6,980	1,608
Oregon	.....	.....	3	3	91	334	181	123	506	180	81	44	1,548	734	129
Pennsylvania	111	105	133	165	164	480	567	1,088	1,353	710	537	204	5,617	1,609	468
South Carolina	23	23	53	83	93	49	114	165	73	47	26	23	772	229	64
Tennessee	.....	.....	.....	.....	.....	54	287	424	457	130	43	.....	1,395	485	116
Texas	.....	.....	.....	15	68	209	400	382	116	96	32	8	1,326	548	111
Utah	.....	.....	.....	.....	.....	38	57	230	786	522	67	40	1,690	816	141
Vermont	23	23	23	23	26	26	26	377	412	193	123	51	1,326	487	111
Virginia	12	12	12	16	63	112	643	2,652	2,863	1,103	131	22	7,641	3,204	637
Washington	71	71	33	25	36	37	21	24	86	61	25	38	528	157	44
West Virginia	12	12	12	8	9	9	60	267	448	341	220	135	1,533	458	128
Wisconsin	78	76	49	149	179	715	2,003	2,357	1,437	834	162	73	8,112	2,575	676
All other states[1]	11	11	11	11	21	31	27	58	126	117	26	11	461	154	38

[1] Includes establishments distributed as follows: Florida, 2; Idaho, 2; New Mexico, 1; Rhode Island, 1.

(Footnote continued from page cvi.)

all months the establishment was in operation by 12, representing all the months in the year, and irrespective of whether the establishment was in operation throughout the year.

Another method is to divide the total number employed by the number of months that each individual establishment was in operation.

On the face of it the latter appears to be the fairer method, but its effect will be to increase the total average number employed in the country, and thus to increase the divisor, if one shall attempt to estimate the average wages paid by dividing the total average number employed into the total amount of wages. The result of this calculation might show a lower average than the real fact.

Both methods of calculating the average have been attempted in statistical work, but both of them, it would appear, can not be right.

I shall be greatly obliged if you can find time to look into this question and give me your judgment upon it. I am anxious for an early determination of the matter, in order that we may proceed to the editing of this portion of our schedules.

Very respectfully,

S. N. D. NORTH,
Chief Statistician for Manufactures.

UNITED STATES DEPARTMENT OF LABOR,
Washington, D. C., September 4, 1900.

S. N. D. NORTH, Esq.,
Chief Statistician, Division of Manufactures,
Census Office, Washington, D. C.

SIR: I am in receipt of yours of August 29, relative to the proper method of finding the average number of persons employed during the census year in the several establishments of the United States.

I believe in former censuses the first method named by you has been employed, and it is also in vogue in the Massachusetts census—that is to say, the method of dividing the total number employed in all months by 12, irrespective of whether the establishment was in operation throughout the year. I believe this method to be fairer in every respect than the second one named by you. Of course neither method is scientific in its nature, but a scientific method would involve more labor than the results would warrant. My judgment as to the most correct way of statistically handling this information would be to ascertain the number of days each man was employed during the year in each establishment. You would then get the aggregate number of days' work of all the persons employed, on which you could easily secure what might be called a true average, but this method would involve so much labor

An examination of table XXXVI reveals the fact that 74.8 per cent of the wage-earners are employed during the canning season of four months of the year, although the length of the season varies considerably in the several states. During the remaining months a relatively small number of operatives are engaged in making cans, usually before the opening of the canning season, and later in labeling, packing, and preparing the product for the market. These variations in the length of the canning season in the several states are due to climatic conditions, to the character of the product, and, in a few establishments, to the manufacture of a by-product during that part of the year when the power and machinery are not utilized in the manufacture of the principal product. In the Northern states the season is much shorter than in states with a milder climate in which a greater variety of fruits and vegetables is grown. For the United States as a whole the four months constituting the "busy season" were July, August, September, and October, and the average number employed each month during that period in 1900 was 81,643, including men, women, and children, which exceeded the average number for the entire year by 45,242. Thus, instead of a decrease of 26.9 per cent in the average number of wage-earners in this industry since 1890, which would appear to have taken place from a casual comparison of the two censuses, it is probable that there has been an increase in the average number of wage-earners consistent with the increase in wages and in the value of products.

The difference of method in estimating the average number of wage-earners in 1890 and 1900 resulted in statistics which are, so far as concerns wages, incomparable, not only for the different states, but even for the different industries in any one state, because of variations in the length of time during which the different establishments were in operation. To illustrate, suppose that three establishments in as many states in different sections of the United States are engaged in canning fruits and vegetables. The first establishment, located in Maine, employed 24 men two months; the second, in Maryland, employed 24 men three months; and the third, in California, employed 24 men five months. According to the method of computation employed in 1890, the average number of wage-earners for each establishment for the time in operation would have been 24, and (efficiency being the same) the results would have shown 24 men in Maine manufacturing a product two-thirds as large as that produced by the 24 men in Maryland, and two-fifths as large as the product of the labor of the same number of men in California. The average earnings for the several states would have shown a like proportion. According to the method adopted in the census of 1900, the average number of wage-earners for the establishment would have been as follows: Maine, 4; Maryland, 6; and California, 10. By this latter method of computation the product manufactured by the average operative in the different establishments in the states indicated would be comparable.

(Footnote continued from page cvii.)

and take so much time it would be impracticable in a Federal census. Not being able to do that, my judgment is that the method first stated is the better one.

A simple method, which is sometimes employed in the counting rooms of establishments themselves, is to take the highest and the lowest number employed in any one month, add them together, and then divide by 2; but this is not satisfactory, although in some cases the results would be precisely the same as if you added the number in each month and then divided by 12.

I am respectfully,

CARROLL D. WRIGHT,
Commissioner.

DEPARTMENT OF THE INTERIOR,
CENSUS OFFICE,
Avon, N. J., September 1, 1900.

MR. S. N. D. NORTH,
Chief Statistician, Division of Manufactures,
Census Office, Washington, D. C.

DEAR SIR: I have your letter of August 29, and have given careful thought to your inquiries. I return a memorandum on the subject, and thank you for asking my opinion in the matter.

Yours respectfully

WALTER F. WILLCOX,
Chief Statistici

MEMORANDUM ON METHOD OF DETERMINING AVERAGE NUMBER EMPLOYED DURING CENSUS YEAR.

The methods of computing an average vary according to the object in view, and in a given case like that under consideration no method can be declared uniformly sound irrespective of the use to which the result is to be put. The difficulty here seems to lie mainly in the fact that the average is wanted for different purposes and the best method to use when one purpose is in mind is not the best method for another purpose.

The purposes mentioned in the papers inclosed as those for which the average is desired are as follows, arranged, according to my present judgment, in the order of increasing importance: (1) To obtain the average number of employees in each establishment, (2) to obtain the average number of employees in the United States during the census year, and (3) to obtain the average annual wage of each employee. To obtain an average to be used for the first purpose the better method is to divide the number of employees by the number of months the establishment was in operation. A brickyard employing 100 persons for six months is more correctly classified, I believe, with establishments having 100 employees than with those having 50. But for the second and third ends named above this method of finding the average is clearly objectionable if not erroneous, and if these ends are more important than the first, as I believe, and if only one method of finding the average can wisely be adopted, the better method seems to be to divide the total number of employees for the twelve months by 12 regardless of whether the establishment ran all the year or not.

The main object in view seems to be not so much the actual number of persons working in industrial establishments as a measure of the amount of work done. The "person employed during the census year" is in my judgment an abstract unit (like the foot-pound) by which the amount of work done is roughly measured. If so, the "person employed during the census year" means the amount of work done by one person working the usual number of hours of each working day in the census year. Whether this amount of work is actually done in six months or six weeks makes in theory no more difference than it does whether the pound is lifted one foot in a minute or in a second.

WALTER F. WILLCOX.

The table above shows that the greatest number of persons employed in canning and preserving fruits and vegetables at any one time during the census year was 133,106. The average number of wage-earners for the month of September was 116,550, and for the month of February only 5,643, while the monthly average for the entire year was 36,401. The difference between the greatest number employed at any one time and the average number employed during the entire year was very marked, and illustrates the fact that a large number of the wage-earners employed in the "seasonal trades" find other employment for a part of the year. The change in the form of the report has, in a measure, obviated the many duplications which must have occurred in 1890.

As shown in the examination of a large number of the returns for 1900, the industrial year for the wage-earners engaged in the manufacture of brick and tile averaged 9.7 months, or 80.8 per cent of the census year; cheese, butter, and condensed milk, factory product, 8.8 months; cotton, ginning, 3.5 months; fish, canning and preserving, 8.5 months; flouring and grist mill products, 9.6 months; ice, manufactured, 7.3 months; lumber and timber products, 9.2 months; oysters, canning and preserving, 9.8 months; starch, 10.5 months; sugar and molasses, refining, 8.2 months; vinegar and cider, 8.4 months; and wool hats, 9.4 months.

Table XXXVII presents a comparative statement for 12 selected industries, showing the difference in results by the change of method of computing the average number of wage-earners in that class of industries in which the establishments were in operation only a portion of the year.

(Footnote continued from page cviii.)

DEPARTMENT OF THE INTERIOR,
CENSUS OFFICE,
Washington, D. C., August 29, 1900.

Mr. S. N. D. NORTH,
Chief Statistician for Manufactures.

DEAR SIR: Answering your request for my opinion as to the proper method of determining the average number of wage-earners employed during the census year, from the schedules which show the average number employed during each month the establishments were in operation, there appears but one practicable method, namely, that of dividing the sum of the total average number for each month by 12, the number of calendar months in the year.

It may be advisable to explain in the introductory text that the averages presented represent the average number of wage-earners required to perform the service and earn the wages on the basis of twelve months' work. Otherwise the census figures may, in some instances, be grossly misunderstood.

In industries where the work is performed in a few months of the year, the average number shown in the census reports, the average number required to do the work on the basis of 12 calendar months, would be less than the actual number employed during the time the establishment was in operation. In such cases the census figures would no doubt appear erroneous to those unfamiliar with the necessity of the adoption by the office of a uniform method for the treatment of all industries.

Average annual earnings of wage-earners for establishments in operation but a portion of the year might be equally in question, since the lessening of the average number, on a twelve-months' basis, correspondingly increases the annual earnings per employee.

The average monthly earnings, as prepared on a twelve-months' basis, would not differ from the monthly earnings if computed for the time a larger number were actually employed, but there would, of course, be a decided variance if the 1900 figures are compared with those for 1890, which were prepared on the basis of actual time employed, while failing to show what such time really was.

Undoubtedly to anyone having only one of the short-term industries in mind the average number of wage-earners would appear too small, while the average yearly earnings derived from employment therein would seem to be too large. Such industries being few and the wage-earners, comparatively speaking, not numerous, in my opinion the effect of these seeming inconsistencies would not appreciably affect the correctness of the census results as a whole.

Very respectfully,

F. L. SANFORD.

DEPARTMENT OF THE INTERIOR,
CENSUS OFFICE,
Washington, D. C., September 27, 1900.

Mr. S. N. D. NORTH,
Chief Statistician for Manufactures, Census Office.

DEAR SIR: I have carefully studied the question submitted to me in a copy of your letter of August 25 to Professor Willcox, and after testing the results of the two methods proposed by you, I am fully convinced that the first method of obtaining the average number employed during the year is that which exhibits the true result, and am therefore altogether in accord with both Professor Willcox and Colonel Wright, and also in accord with what I understand to be your own judgment.

Very respectfully,

EDWARD STANWOOD,
Expert Special Agent.

DEPARTMENT OF THE INTERIOR,
CENSUS OFFICE,
Washington, D. C., August 15, 1900.

Mr. S. N. D. NORTH,
Chief Statistician for Manufactures.

DEAR SIR: In compliance with instructions recently received from you relative to the manner in which the average number of employees during each year should be obtained from the schedule of manufactures, I have the honor to offer the following reasons in support of the position, that this average should be obtained by the division of the total number of each class of employees—men, women, and children—reported on the schedule, by 12, the number of months in the year, and not by the number of months the establishment was reported to have been in operation during the census year.

The following brief table, No. 1, offers a simple demonstration of the reasons for obtaining the average by this method:

TABLE No. 1.

	A.	B.	C.
January	12	4	16
February	10	4	14
March	12	4	16
April	13	4	17
May	16	4	20
June	10	4	14
		6)24	
		4	
July	14		14
August	12		12
September	14		14
October	15		15
November	17		17
December	11		11
	12)156	12)24	12)180
	13	2	15

In the above table one establishment, "A," is reported for 12 months, with a varying number of employees. This establishment

TABLE XXXVII.—TWELVE SELECTED INDUSTRIES, COMPARATIVE SUMMARY: 1890 AND 1900.

INDUSTRIES.	Year.	Number of establishments.	Capital.	AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.		Cost of materials used.	Value of products, including custom work and repairing.
				Average number.	Total wages.		
Total	1900	78,173	$1,239,593,182	475,473	$176,414,882	$1,204,209,624	$1,666,644,327
	1890	54,060	933,955,655	553,288	153,037,629	886,107,179	1,271,414,024
Brick and tile	1900	5,423	82,086,438	61,979	21,883,333	11,006,148	51,270,476
	1890	5,828	82,578,566	104,176	29,709,357	12,639,597	67,770,695
Cheese, butter, and condensed milk	1900	9,355	36,508,015	12,86[illegible]	6,170,670	109,151,205	131,199,277
	1890	4,712	16,624,163	12,601	4,422,101	51,364,574	62,686,043
Fish, canning and preserving	1900	348	19,514,215	13,410	4,229,638	13,232,001	22,253,749
	1890	110	3,186,975	5,020	1,128,143	4,710,709	6,972,268
Flouring and grist mill products	1900	25,258	218,714,104	37,073	17,703,418	475,826,345	560,719,063
	1890	18,470	208,473,500	47,403	18,138,402	434,152,290	513,971,474
Fruits and vegetables, canning and preserving	1900	1,808	27,743,067	36,401	8,050,793	37,524,297	56,668,313
	1890	886	15,315,185	49,762	4,651,317	18,665,163	29,862,416
Ice, manufactured	1900	775	38,019,507	6,880	3,402,745	3,312,393	13,780,978
	1890	222	9,846,468	2,826	1,095,996	940,699	4,900,983
Lumber and timber products	1900	33,035	611,611,524	288,260	104,640,591	317,923,548	566,832,984
	1890	22,617	557,881,054	311,964	87,934,284	242,562,296	437,957,382
Oysters, canning and preserving	1900	39	1,240,696	2,779	630,016	2,608,757	3,670,134
	1890	16	1,106,962	3,453	642,610	2,088,867	3,260,766
Starch	1900	124	11,671,567	2,655	1,099,696	5,806,422	9,232,984
	1890	80	4,929,155	2,903	959,108	5,153,677	8,934,517
Sugar and molasses, refining	1900	832	184,245,519	14,262	6,945,811	222,503,741	240,969,905
	1890	393	24,013,008	7,043	2,385,654	107,758,811	123,118,259
Vinegar and cider	1900	1,152	6,187,728	1,801	720,316	3,272,565	6,454,524
	1890	694	5,858,395	2,637	720,681	3,268,455	6,649,300
Wool hats	1900	24	2,050,802	2,108	937,855	2,042,202	3,591,940
	1890	32	4,142,224	3,500	1,249,976	2,802,041	5,329,921

(Footnote continued from page cix.)

was in operation during the entire 12 months of the census year. By the division of the total number employed, viz, 156, by 12, an annual average of 13 is obtained.

Following this establishment in the table is another establishment, designated "B," in operation for six months, and having a uniform number of employees for each month, viz, 4. The division of this total, 24, by the number of months in the year gives an average for the year of 2 employees. If the number of employees for the months in operation, 24, is divided by 6, it furnishes an average of 4 employees. While this average is the correct average number of wage-earners employed by this establishment, it is not the average number for the whole year. This can be proven by the hypothesis that these two establishments were united, making but one establishment. Combining these monthly averages, we have in the combined establishment, designated "C," a manufacturing plant running on full time throughout the year, with an average monthly number of employees ranging from 16 in January to 11 in December. In this case there is no doubt but that since the establishment was running for the full period of the census year, the division should be made by 12. This division being made of the total, 180, gives an annual average of 15, agreeing exactly with the sum of the annual averages of establishments "A" and "B," resulting from the division of the totals by 12. Had the annual average of establishment "A," viz, 13, been added to the average of establishment "B," resulting from the division of the total by 6, giving us 4, the result would have been an annual average for the two establishments of 17 employees, which is manifestly incorrect.

Another fact which should be taken into consideration in this connection is this, that employees working for a limited number of months in one establishment are liable, when the establishment ceases operations, to immediately find employment in another establishment engaged in a similar line of manufacturing, and if the division in such a case were made by the number of months in operation, instead of by the number of months in the year, it would without doubt result in a duplication of these employees in arriving at the annual average for the industry for the state, and hence for the United States, as can be seen by Table No. 1.

A second simple demonstration will, perhaps, throw light upon another phase of the subject.

In Table No. 2, following, there are three establishments, each in operation for six months during the census year:

TABLE No. 2.

	A.	B.	C.
January	12	5	10
February	15	6	16
March	16	8	14
April	14	10	5
May	15	12	10
June	12	14	12
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
	84	55	67
			6)206
			34

Establishments A, B, and C may be assumed to represent an entire industry. They were in full operation during the first six months of the census year, but owing to certain causes, such as industrial depressions, strikes, etc., were idle during the remainder of the census year. If the averages in the case of these three establishments were obtained by the division of the total number of employees by 6 it would result in an average for the industry of 34 and a fraction. This, while it might present a flattering statement, would not be correct, as we failed to take into consideration the fact that the establishments were idle during the balance of the year and the employees were engaged in no other occupations.

The foregoing is in brief a statement of my reasons for obtaining the annual average in the manner indicated.

Respectfully submitted,

JOSEPH D. LEWIS.

The figures of these industries exhibit most clearly the change effected by the different methods of computation. For the reason that no tabulation was made in 1890 showing the time in operation of the several plants or the average time of employment for wage-earners, it is impossible to present the exact comparative statistics for the industrial year for all industries. The cost and abundance or scarcity of materials used, the introduction of new and improved machinery, the lessened demand for a product due to changed conditions, and other causes, may increase or diminish the length of the industrial year to so great an extent that it is impracticable to make comparisons from one decade to another, or even from one year to another.

In the manufacture of brick and tile in 1900 the average number of wage-earners was 61,979, and the average length of the industrial year was 9.7 months. Computed on the basis of the time in operation, the method used in 1890, the number of wage-earners in this industry in 1900 would have exceeded 75,000.

In cheese, butter, and condensed milk factories the average time in operation was 8.8 months, and the average number of wage-earners for the entire year was 12,865. Computed on the basis of the time in operation, the average number of wage-earners would have exceeded 17,500.

In 25,258 establishments engaged in the manufacture of flouring and grist mill products, the average number of wage-earners for the census year was 37,073. The average time in operation was 9.6 months, or 80 per cent of the entire year. Computing the average on the basis of the time in operation, the average number of wage-earners in 1900 exceeded 46,000.

In the manufacture of lumber and timber products, including logging, timber camps, and saw and planing mills, the average time in operation was 9.2 months. The average number of wage-earners for the entire year was 283,260. The average number computed on the basis of the time of employment would have exceeded 369,400 wage-earners.

For the 12 industries presented in the table, the number of establishments increased 44.6 per cent; the capital, $305,637,527, or 32.7 per cent; the value of the product, $395,230,303, or 31.1 per cent; while the number of wage-earners apparently decreased 77,815, or 14.1 per cent.

The total average number of wage-earners in the 12 industries, computed on the basis of the time in operation, would have exceeded 650,000.

The change in the schedule which separated general superintendents and managers from the wage-earning class reduced the total number of wage-earners, the total wages, and the average wage, but did not produce so marked an effect on the average earnings as did the change in the method of computation of average number of wage-earners employed, which resulted in placing all industries and the various states on the same basis, and materially reducing the total average number of wage-earners and increasing the average earnings.

XXI.

WAGES.

1. *Difficulties of Wage Statistics.*—Associated with the question of employees is the question of wages, and the treatment of this question in a census involves difficulties and uncertainties as serious as those considered under "persons employed." The act providing for taking the Twelfth and subsequent censuses required (section 7) a return of the "number of employees and the amount of their wages." Drafted in pursuance of this law, the manufacturing schedules contained two inquiries designed to throw light upon wages. These were, first, the gross amount paid to labor in the form of wages; and, second, the number of wage-earners employed. Any distribution of wages dependent upon these factors alone presents two difficulties.

I. On account of the varying number of employees in a manufacturing establishment during a given year, due to change of employment and to seasonal trade conditions, it is becoming more and more difficult to establish a statistical term which will accurately represent the number of wage-earners to be used as a divisor into the total amount of wages paid in order to derive a quotient to serve as a wage average. The average number of persons stated in the schedule as employed by months during the census year is a variable and, to some extent, an arbitrary figure, not properly comparable with the total amount paid in wages during the same periods, which amount is a fixed sum paid, not to the average number of persons employed, but to all persons employed, many of them for a few weeks or days only.

II. After this wage average has been obtained the question arises how far this average can be regarded as a "rate of wages" as understood by the individual wage-earner. The wage-earner judges wages from the character of the work performed, the degree of skill involved, and the continuity of employment, but this average disregards such distinctions. In other words, the figures obtained by the Census Office are essentially a "labor cost," and the problem is to show the extent

to which this "labor cost" can be identified with the "rate of wages."[1]

The purpose of wage statistics is to show the welfare of the individual workman. The statistics obtained by the Census Office on the general manufacturing schedule indicate the share which labor received as a whole, without regard to its character, degree of skill involved, or continuity of employment. The existence of these factors, however, renders extremely slight the possibility of deriving from the sum representing wages paid to labor in the mass, a statistical term which can be advantageously applied to the individual workman. Indeed, the further use of the present inadequate term is questionable. Under modern conditions of manufacture operatives are grouped into a great number of classes, and are paid according to the work done and the degree of skill required. Thus, many different grades of wages are paid, at both time and piece rates, varying from the compensation of the skilled and responsible foreman or overseer to that of the common laborer or the child. An average obtained by dividing the number of wage-earners into the total amount of wages paid in any establishment thus becomes misleading. The argument that such an average is serviceable for purposes of comparison from one period to another must presuppose that the proportion of skilled and unskilled labor at the two periods for which the average is returned remains substantially the same.

The information given upon the schedule for 1900, compared with that for 1890, assists in demonstrating the impossibility of obtaining the average earnings of wage-earners from census figures. The sum total of wages paid in the census year, $2,322,333,877, was paid, not to the 5,308,406 who constituted the average number of employees, but to the number employed at one time or another during that year, and large numbers of these were undoubtedly counted more than once, as they found employment at different seasons of the year in different industries. On the other hand, there were periods when the least number of employees was receiving the wages. There were also many industries confined to seasons, as already shown, in which the total amount of wages was paid in two, three, or four months of the year—a consideration which the method of obtaining the average number could not wholly meet. So many perplexing factors have entered into the problem of obtaining the average number of employees, that the quotient of wages received by dividing total wages by average number of wage-earners can not be held fairly to represent the average earnings of the individual. It can not even be said whether this average wage represents a larger or a smaller sum than the true average; for it is affected by the actual time each workman or unit was employed; by the varying character of these units, and by the fact that the units represented in the greatest number may have been, at different periods of the year, all or nearly all represented in the average number. Thus, at the best, the average wage can not represent the potential earnings of any one of the units, but only the earnings for the period actually employed. In other words, it can have no relationship to the rates of wages which prevail in the several sections of the United States.

2. *Wages as Classified in 1890.*—The Eleventh Census attempted to ascertain by means of a classified wage table the actual distribution of wages among men, women, and children exclusive of piece workers. This table called for the number of employees in each establishment paid at specified weekly rates of wages running from under $5 per week up to $20 and over per week. The following form of inquiry was used:

Weekly rates of wages paid and average number of hands employed at each rate (not including those employed on piecework), 1890.

Rates per week.	Males above 16 years.	Females above 16 years.	Children.
Under $5.00			
$5.00 and over, but under $6.00			
6.00 and over, but under 7.00			
7.00 and over, but under 8.00			
8.00 and over, but under 9.00			
9.00 and over, but under 10.00			
10.00 and over, but under 12.00			
12.00 and over, but under 15.00			
15.00 and over, but under 20.00			
20.00 and over, but under 25.00			
25.00 and over			

This is an ideal treatment of the wage question, according to the matured statistical experience and experiment of many years, in many bureaus and many countries. If it could have been successfully carried out, it would have shown the actual number of employees in each wage group, and would have pre-

[1] In this connection the following translation of portions of a Critical Analysis of the Belgian Wage Census, by Dr. E. Waxweiler, (Conrad's "Jahrbücher für Nationalökonomie und Statistik," Folge III, Band 22), is of interest:

"The calculation of the average wage conceals the rise and fall in wages; that is, just the thing which forms the chief point of interest in wage statistics. * * * The inadequacy of the incomes is seen even clearer in the statistics of workmen's incomes, when used for a trade which is paid by the piece, or as is usually stated, by the quantity produced. In the first place, in this case the wages actually paid vary much more from person to person, since they change, leaving out of consideration the kind of work, according to the different grades of skill, diligence, speed; in a word, all the differences of productivity which workmen possess. On this account the average wage is still farther removed from the real conditions. The average wage which is obtained by dividing the total amount paid by the number of workmen is a fictitious rate, which, in comparison with the real rates from the census, has no significance whatever. * * * From these facts it is clear that the average wage can not answer at all the question regarding the distribution of income among the classes of workmen. The average wage is indeed void of all significance—and this is the basis of the misunderstandings between statisticians and industrial men; but its real significance, while suitable enough for the latter, is for the former wholly worthless. This remark is, moreover, applicable to the common theory of averages. The only way in which the distribution of incomes of workmen can be learned, is, therefore, by the collection and recording of the real wages actually paid to each workman. And there is only one way in which to do this that will insure full accuracy; that is to copy from the pay rolls of the employer, workman by workman. After these different wages are obtained they can be grouped in different categories and arranged in wage groups, making the limits of the groups as narrow as desired. This furnishes in reality the distribution of wages among the classes of workmen."

sented reliable approximations instead of the vague and meaningless average obtained by dividing the number of employees into the total amount of wages. But this classified method involved a statistical inquiry of such magnitude that it broke down of its own weight when the attempt was made to apply it to such an enormous volume of returns, secured through the methods which the census must employ. Comparatively few of the enumerators, in making their returns, gave the necessary amount of time and attention to answering the complicated questions. The mass of the returns was so defective in this respect that the Census Office abandoned the attempt to tabulate them for the country as a whole. In the cities withdrawn from the enumerators the returns were fairly well made and were tabulated, the results appearing in the table on page xxix of the introduction to the Report on Manufactures of the Eleventh Census, Part II, with the statistics of cities.

From this table it appears that returns were tabulated for 976,516 persons employed at specified weekly wages in 44,224 establishments. Excluding pieceworkers, there were 3,953,038 employees reported for the manufacturing and mechanical industries of the entire United States, and the number of employees whose weekly rates of wages were covered in this table, therefore represented 24.7 per cent of the total average number of employees in the country. This proportion was too small to justify conclusions regarding rates of wages in the country as a whole. Moreover, these statistics were vitiated by the fact that they were not the weekly rates of wage-earners proper, but included also the salaries of officers, firm members, and clerks.

In view of the partial failure of this inquiry in 1890, the classified wage return was reluctantly omitted from the schedule for 1900; for it is worse than useless to ask for information knowing that it can not be obtained in a form that will permit its use.

The Report on Manufactures of the Eleventh Census contains numerous computations of average earnings by states and by industries (see Part I, pages 20, 21, 22, 23, 28, 34, 35, etc.). It is stated in the report (Part I, page 19) that "the average annual earnings per employee, as obtained from the total for 1880, was $346.91, while the average obtained for all employees in 1890 was $484.49, and for the employees exclusive of the officers, firm members, and clerks, $444.83. Owing to the differences in the form and the scope of the inquiry in 1890, as compared with that of 1880, previously referred to, neither of these average annual earnings for 1890 should be accepted as the exact increase during the decade." Those who are familiar with the conditions of industry at the two periods above referred to are quite aware that neither the stated increase of average earnings, amounting to about 25 per cent, nor any increase approximating thereto, occurred. For the purpose of any such comparison the figures were worthless, owing to the general conditions under which such figures must always be obtained for a census, the radically different phraseology of the two schedules, and the different methods of computing the result.

3. *Comparisons, 1890 and 1900.*—In connection with the preceding tables, the changes in the form of report and methods used in computation have been discussed with a view to showing their effect on particular industries. Table XXXVIII presents comparative statistics of number of establishments, proprietors and firm members, salaried officials and salaries, wage-earners and wages, for 1890 and 1900, for the industries of the United States combined in 15 groups, with percentages of increase.

TABLE XXXVIII.—WAGE-EARNERS AND WAGES, BY GROUPS OF INDUSTRIES: 1890 AND 1900.

GROUP.	Year.	Number of establishments.	Proprietors and firm members.	SALARIED OFFICIALS, CLERKS, ETC.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.	
				Number.	Salaries.	Average number.	Total wages.
United States	1900	512,254	572,611	396,759	$403,711,233	5,308,406	$2,322,333,877
	1890	355,415		461,009	391,988,208	4,251,613	1,891,228,321
Per cent of increase		44.1		[1]13.9	3.0	24.9	22.8
Group 1: Food and kindred products	1900	61,302	66,643	46,732	39,313,664	313,809	129,910,070
	1890	41,296		48,113	33,354,171	249,821	90,373,450
Per cent of increase		48.4		[1]2.9	17.9	25.9	43.7
Group 2: Textiles	1900	30,048	35,652	44,502	49,982,357	1,029,910	341,734,399
	1890	16,847		33,971	35,496,486	824,138	278,167,769
Per cent of increase		78.4		31.0	40.8	25.0	22.9
Group 3: Iron and steel and their products	1900	13,896	12,965	49,828	58,090,781	733,968	331,875,499
	1890	11,169		30,943	36,583,536	531,823	285,351,714
Per cent of increase		24.4		61.0	58.8	38.0	33.8
Group 4: Lumber and its remanufactures	1900	47,079	59,173	31,110	28,982,927	546,953	212,201,768
	1890	35,586		41,292	30,863,184	547,776	201,558,706
Per cent of increase		32.3		[1]24.7	[1]6.1	[1]0.2	5.3
Group 5: Leather and its finished products	1900	16,989	19,093	14,036	14,186,690	238,202	99,759,885
	1890	12,918		17,782	15,348,267	212,727	98,432,593
Per cent of increase		31.5		[1]21.1	[1]7.6	12.0	1.3
Group 6: Paper and printing	1900	26,747	28,220	48,183	48,974,138	297,551	140,092,453
	1890	20,160		35,543	34,625,986	225,645	117,611,864
Per cent of increase		32.7		35.6	41.4	31.9	19.1

[1] Decrease.

TABLE XXXVIII.—WAGE-EARNERS AND WAGES, BY GROUPS OF INDUSTRIES: 1890 AND 1900—Continued.

GROUP.	Year.	Number of establishments.	Proprietors and firm members.	SALARIED OFFICIALS, CLERKS, ETC.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.	
				Number.	Salaries.	Average number.	Total wages.
Group 7:							
Liquors and beverages	1900	7,861	8,058	10,899	$16,893,405	63,072	$36,946,557
	1890	4,219		8,407	11,118,673	48,358	29,140,916
Per cent of increase		86.3		29.6	51.9	30.4	26.8
Group 8:							
Chemicals and allied products	1900	5,444	4,350	22,318	26,385,164	101,522	43,870,602
	1890	5,642		13,469	14,171,587	76,535	33,872,540
Per cent of increase		[1]3.5		65.7	85.8	32.6	29.5
Group 9:							
Clay, glass, and stone products	1900	14,809	17,298	13,571	13,718,996	244,987	109,022,582
	1890	11,711		13,511	11,370,622	221,367	90,541,771
Per cent of increase		26.5		0.4	20.7	10.7	20.4
Group 10:							
Metals and metal products	1900	16,305	18,898	13,973	16,059,194	190,757	96,749,051
	1890	10,019		14,824	14,924,917	123,289	64,055,044
Per cent of increase		62.7		[1]5.7	7.6	54.8	51.0
Group 11:							
Tobacco	1900	15,252	17,102	8,262	8,951,534	142,277	49,852,484
	1890	11,643		13,152	10,241,271	122,776	44,550,735
Per cent of increase		31.0		[1]37.2	[1]12.6	15.9	11.9
Group 12:							
Vehicles for land transportation	1900	10,113	10,259	16,369	15,191,444	316,214	164,614,781
	1890	10,175		13,251	11,172,134	221,125	118,212,379
Per cent of increase		[1]0.6		23.5	36.0	43.0	39.3
Group 13:							
Shipbuilding	1900	1,116	1,255	1,407	2,008,537	46,781	24,839,103
	1890	1,010		1,123	1,194,870	24,811	14,833,977
Per cent of increase		10.5		25.3	68.1	88.5	67.4
Group 14:							
Miscellaneous industries	1900	29,479	31,481	53,227	49,199,288	483,273	202,746,102
	1890	19,304		33,192	33,363,252	302,649	136,643,444
Per cent of increase		52.7		60.4	47.5	59.7	48.4
Group 15:							
Hand trades	1900	215,814	242,154	22,342	15,823,119	559,130	288,118,421
	1890	143,716		142,436	98,159,252	519,324	287,880,819
Per cent of increase		50.2		[1]84.3	[1]83.9	7.7	0.1

[1] Decrease.

4. *Deductions from Returns of Twelfth Census.*—Attempts have already been made, from the preliminary publications of the Census Office, to demonstrate that there has been a general reduction of wages in the United States, because, during the decade, the average number of wage-earners increased 24.9 per cent, while the total wages increased only 22.8 per cent. It will be at once perceived by the conscientious reader of the preceding remarks that such a conclusion is unwarranted from any of the data which appear in the general tables. The difference in the form of inquiry in 1890 and 1900 and the entirely different methods employed in computing the average number of employees render it impossible to make accurate comparisons between the data of the two censuses, with any certainty that the deductions are accurate.

Groups 1, 4, and 9 plainly show the effect of different methods of computation. Group 1, which comprises such industries as "cheese, butter, and condensed milk, factory products;" "fish, canning and preserving;" "oysters, canning and preserving;" "fruits and vegetables, canning and preserving;" "flouring and grist mill products;" "sugar and molasses, refining;" "vinegar and cider;" etc., well illustrates the effect of computing the average number of wage-earners on the basis of twelve months instead of the time of operation. Such a change results, as shown in the preceding tables, in increasing average wages. A similar condition is shown in Group 4, which comprises lumber and its remanufacture, including establishments engaged in logging, the manufactures of saw and planing mill products, etc.; and also in Group 9, which comprises establishments engaged in the manufacture of brick and tile, pottery, terra cotta, and fire-clay products, etc.

In Group 2, comprising the manufacture of textiles, the average number of wage-earners increased 205,772, or 25 per cent, and the amount paid in wages increased $63,566,630, or 22.9 per cent. In industries of the character contained in this group, a considerable number of general superintendents and managers were reported in 1890 in the wage-earners' class. In addition to the elimination of these high-salaried employees from the class of wage-earners in this and other groups of industries in 1900, there are other causes for the apparent decrease in the average wages.

One was the greater thoroughness with which the canvass of 1900 was made, causing a large increase in the number of wage-earners receiving low wages. The industry of cotton ginning is a convincing illustration. In this industry 1,637 establishments were reported in 1890, while in 1900, 11,369 establishments were reported in which ginned cotton was the only, or the predominating, product. Notwithstanding these figures, it is probable that there were more cotton gins in operation in 1890 than in 1900, as the tendency during the decade was toward larger plants, the use of improved

machinery, and the construction of larger ginneries operated in connection with cottonseed mills. Similar conditions may be shown in each of the other groups. Doubtless other causes operated to vary the rate of wages, but those mentioned are sufficient to show that the decrease was more apparent than real.

It may be said that upon a matter of such importance it is the first duty of census officials to preserve a basis of exact comparison; but the sufficient answer, in the present instance, is that the obvious inadequacy of the schedule and methods of 1890 made necessary the changes.

4. *Average Annual Earnings, by States.*—The above remarks have shown that the census returns are valueless for the purpose of indicating rates of wages in the different states and in the several industries. They are equally untrustworthy as a clew to the average earnings of the persons employed, but they are held by some statisticians to possess a certain value as indicating a wage mean for the nation. Viewed in this light, therefore, they would indicate that a wage mean of $346.91 in 1880 increased to $444.83 in 1890, and dropped again in 1900 to $437.96. That this showing is also untrustworthy, except in the most general way, will now be demonstrated.

Table XXXIX, computed by dividing the total amount paid in wages by the average number of employees, indicates the apparent average earnings by states and territories at the last three census periods. The computation is made for men, women, and children separately, except for the census of 1880, at which this division was not made.

The table is arranged for the purpose now in view, by geographic groups, and thus brings out some remarkably contradictory figures.

TABLE XXXIX.—AVERAGE ANNUAL EARNINGS: BY STATES AND TERRITORIES, ARRANGED GEOGRAPHICALLY, 1880, 1890, AND 1900.

STATES AND TERRITORIES.	Year.	Total.	Men.	Women.	Children.
United States	1900	$437.96	$490.90	$273.03	$152.22
	1890	444.83	498.71	267.97	137.53
	1880	346.91	.....	.....	.....
New England states	1900	443.74	507.12	307.34	187.15
	1890	436.84	509.33	293.43	158.01
	1880	350.30	.....	.....	.....
Maine	1900	381.31	435.46	255.65	139.80
	1890	326.29	380.27	232.35	100.02
	1880	257.53	.....	.....	.....
New Hampshire	1900	392.23	441.96	300.36	200.79
	1890	364.78	418.75	285.86	148.12
	1880	303.39	.....	.....	.....
Vermont	1900	415.47	446.19	260.49	167.33
	1890	381.01	399.64	285.67	144.79
	1880	294.44	.....	.....	.....
Massachusetts	1900	458.82	527.11	318.85	195.42
	1890	460.22	536.54	304.59	169.65
	1880	364.27	.....	.....	.....
Rhode Island	1900	416.08	485.14	304.38	180.63
	1890	409.80	501.47	288.96	158.99
	1880	339.64	.....	.....	.....
Connecticut	1900	468.42	530.03	302.15	191.73
	1890	473.02	545.05	296.25	176.38
	1880	385.26	.....	.....	.....
Middle states	1900	$461.52	$528.71	$280.75	$159.52
	1890	472.21	540.62	273.19	146.22
	1880	356.22	.....	.....	.....
New York	1900	481.54	558.09	298.18	166.92
	1890	492.48	573.39	286.63	156.11
	1880	373.70	.....	.....	.....
New Jersey	1900	455.70	519.38	276.44	167.15
	1890	477.30	550.61	264.60	149.74
	1880	365.63	.....	.....	.....
Pennsylvania	1900	452.52	511.13	262.25	160.18
	1890	461.74	513.33	268.37	151.80
	1880	346.33	.....	.....	.....
Delaware	1900	417.04	471.37	210.88	152.40
	1890	421.43	493.42	164.83	110.43
	1880	337.66	.....	.....	.....
Maryland	1900	357.70	437.66	206.37	129.84
	1890	352.13	431.90	189.53	92.84
	1880	252.25	.....	.....	.....
District of Columbia	1900	593.84	609.80	522.87	158.47
	1890	601.01	626.67	479.97	173.76
	1880	549.20	.....	.....	.....
Southern states	1900	300.81	334.96	188.91	107.20
	1890	328.23	364.88	193.63	99.84
	1880	237.66	.....	.....	.....
Virginia	1900	308.74	355.66	161.02	106.48
	1890	295.28	344.75	157.27	86.06
	1880	184.78	.....	.....	.....
Southern states—Continued. West Virginia	1900	$389.80	$418.30	$201.32	$154.37
	1890	357.38	383.44	176.07	134.15
	1880	301.44	.....	.....	.....
North Carolina	1900	196.52	235.20	153.06	96.01
	1890	194.85	232.09	145.95	80.89
	1880	151.35	.....	.....	.....
South Carolina	1900	196.45	232.08	172.80	99.23
	1890	240.67	271.03	195.15	95.97
	1880	179.19	.....	.....	.....
Georgia	1900	242.00	264.24	184.45	108.54
	1890	279.62	303.33	216.54	99.09
	1880	211.70	.....	.....	.....
Florida	1900	312.09	316.33	278.33	120.70
	1890	451.14	473.44	323.59	115.95
	1880	230.90	.....	.....	.....
Kentucky	1900	356.31	395.63	205.79	122.55
	1890	377.01	417.53	223.49	116.59
	1880	311.78	.....	.....	.....
Tennessee	1900	329.63	357.74	204.97	114.77
	1890	361.05	389.14	207.48	111.50
	1880	234.12	.....	.....	.....
Alabama	1900	286.00	309.10	180.63	101.57
	1890	346.84	367.38	223.50	106.73
	1880	249.58	.....	.....	.....
Mississippi	1900	282.83	297.57	181.93	116.62
	1890	289.79	311.55	211.59	101.19
	1880	204.68	.....	.....	.....
Arkansas	1900	327.77	334.84	228.32	159.85
	1890	328.78	340.10	199.53	102.34
	1880	203.06	.....	.....	.....
Louisiana	1900	364.50	397.48	204.26	121.95
	1890	356.72	422.99	174.06	115.15
	1880	358.38	.....	.....	.....
Indian Territory	1900	323.16	329.10	236.97	112.63
	1890	438.46	457.73	261.33	82.00
	1880	.....	.....	.....	.....
Oklahoma	1900	393.29	413.49	194.14	129.97
	1890	355.96	380.90	206.67	95.09
	1880	.....	.....	.....	.....
Texas	1900	426.81	445.08	253.13	139.54
	1890	435.38	456.10	264.07	125.37
	1880	274.95	.....	.....	.....
Central states	1900	446.51	488.51	249.45	166.21
	1890	436.16	470.84	237.42	138.61
	1880	353.27	.....	.....	.....
Ohio	1900	445.18	487.73	239.86	162.03
	1890	438.41	482.48	223.60	153.01
	1880	338.24	.....	.....	.....
Michigan	1900	409.39	445.26	226.88	149.33
	1890	369.82	389.96	211.59	124.88
	1880	326.25	.....	.....	.....

TABLE XXXIX.—AVERAGE ANNUAL EARNINGS: BY STATES AND TERRITORIES, ARRANGED GEOGRAPHICALLY, 1880, 1890, AND 1900—Continued.

STATES AND TERRITORIES.	Year.	Total.	Men.	Women.	Children.
Central states—Continued.					
Indiana	1900	$428.63	$466.54	$217.03	$166.10
	1890	385.00	418.39	197.99	123.35
	1880	315.95	.....	.....	.....
Illinois	1900	484.70	530.10	287.65	181.06
	1890	509.86	548.19	288.43	144.61
	1880	396.81	.....	.....	.....
Wisconsin	1900	411.10	449.19	218.43	157.25
	1890	357.97	382.50	191.05	122.88
	1880	329.46	.....	.....	.....
Minnesota	1900	459.44	491.95	256.61	160.95
	1890	435.18	451.65	287.48	129.17
	1880	405.38	.....	.....	.....
Iowa	1900	408.72	452.20	214.21	143.45
	1890	400.29	435.03	192.90	119.93
	1880	342.80	.....	.....	.....
Missouri	1900	499.86	504.97	255.12	167.67
	1890	480.21	532.41	251.62	146.77
	1880	379.87	.....	.....	.....
Western states	1900	543.98	577.09	273.48	175.07
	1890	529.79	565.91	267.78	116.91
	1880	381.55	.....	.....	.....
Montana	1900	787.77	806.67	349.24	271.36
	1890	692.54	698.26	584.12	237.10
	1880	551.49	.....	.....	.....
Idaho	1900	583.68	603.41	307.80	94.48
	1890	383.67	397.87	185.00	106.47
	1880	351.36	.....	.....	.....
Wyoming	1900	618.54	628.16	303.83	206.40
	1890	770.22	802.49	303.42	196.40
	1880	480.30	.....	.....	.....
North Dakota	1900	509.79	535.19	297.58	128.41
	1890	506.43	524.45	272.88	172.37
	1880	390.99	.....	.....	.....
South Dakota	1900	494.84	530.12	239.23	153.68
	1890	414.07	431.03	258.48	102.03
	1880	.....	.....	.....	.....
Nebraska	1900	473.30	510.46	257.55	186.47
	1890	502.27	537.02	255.91	121.69
	1880	363.51	.....	.....	.....
Western states—Continued.					
Nevada	1900	$693.40	$725.44	$301.72	$148.85
	1890	674.79	688.01	201.86	120.00
	1880	800.86	.....	.....	.....
Utah	1900	512.23	563.38	254.10	171.69
	1890	503.85	558.19	253.85	129.63
	1880	344.23	.....	.....	.....
Colorado	1900	612.61	638.63	354.56	204.47
	1890	657.46	688.51	418.86	187.00
	1880	456.13	.....	.....	.....
Kansas	1900	463.66	495.47	235.26	150.48
	1890	470.59	512.27	193.04	85.91
	1880	331.21	.....	.....	.....
Arizona	1900	725.37	736.28	366.52	206.80
	1890	659.71	674.83	492.78	86.89
	1880	505.36	.....	.....	.....
New Mexico	1900	519.46	531.04	255.13	177.41
	1890	554.02	563.70	433.38	154.80
	1880	392.69	.....	.....	.....
Pacific states	1900	526.90	577.11	278.09	181.62
	1890	571.01	620.39	288.61	160.80
	1880	481.55	.....	.....	.....
Washington	1900	565.19	577.55	315.76	202.51
	1890	589.60	598.01	386.26	175.66
	1880	464.01	.....	.....	.....
Oregon	1900	483.49	517.90	248.78	169.15
	1890	570.39	586.05	365.38	163.15
	1880	480.00	.....	.....	.....
California	1900	520.89	589.40	278.54	180.74
	1890	566.37	636.40	279.35	158.92
	1880	482.13	.....	.....	.....
Outlying districts	1900	479.19	488.38	165.11	143.20
	1890	238.78	238.78	.....	.....
Alaska	1900	616.75	616.84	405.00	.....
	1890	238.78	238.78	.....	.....
Hawaii	1900	411.33	422.57	163.52	143.2

It appears from table xxxix that there was an increase in the average annual earnings of the New England states from $436.84 in 1890 to $443.74 in 1900, accompanied by a slight decrease in the average earnings of men, a considerable increase in the earnings of women, and a notable increase in the earnings of children. It appears also that all the New England states show an increase in average earnings except Massachusetts and Connecticut, which show decreases, notwithstanding the fact that these are two states in which wage conditions are more sensitive and more susceptible to variations than any other of the New England states, except Rhode Island.

The group of Middle states shows an apparent falling off in average annual earnings from $472.21 in 1890 to $461.52 in 1900, and this all occurred among the male employees, the women and children showing an increase in the average. The three manufacturing states of New York, New Jersey, and Pennsylvania all show decreased average earnings, Maryland alone in this group showing an increase.

The Central states show an advance during the last decade in the average earnings from $436.16 to $446.51; but, alone among these states, Illinois shows a marked falling off, which occurs wholly among male employees, the average for women being practically stationary, and that for children showing an increase. Nothing in the statistics or outside of them affords any explanation of such an exceptional condition in that state, or warrants the conclusion that this exceptional condition actually existed in Illinois.

The group of Western states shows a marked advance in the average earnings in all states and territories except Wyoming, Nebraska, Colorado, Kansas, and New Mexico. No explanation can be found which will warrant the belief that average annual earnings in Wyoming were $770.22 in 1890 and $618.54 in 1900, or that annual average earnings in Nebraska were $502.27 in 1890 and $473.30 in 1900. These must be recorded as purely statistical eccentricities, for which the personal equation of the enumerator or special agent taking the returns, either at one census or the other, or at both, is in part responsible.

The Pacific group also shows a marked falling off in average earnings, and the observations already made apply here.

Among the Southern states only Virginia, West Virginia, North Carolina, and Louisiana show an increase in average annual earnings. In the remaining states a decrease appears, in some instances very marked, as in South Carolina, Florida, and Alabama.

Table XL shows a computation of average annual earnings for the United States at the three censuses, excluding the Southern states.

TABLE XL.—*Average annual earnings, United States, exclusive of the Southern states: 1880, 1890, and 1900.*

	Year.	Total.	Men.	Women.	Children.
United States without Southern states.	1900	$457.26	$513.96	$280.88	$167.64
	1890	457.34	513.78	273.15	146.54
	1880	356.63	.....	.....	.....

It appears, therefore, that, omitting the Southern states, the average annual earnings revealed by the census of 1900 were $457.26, against $457.34 in 1890; a remarkable coincidence; which can safely be called nothing but a coincidence. There appears to have been practically no change in average annual earnings between the two censuses. That the Southern states must be omitted from any computation of this kind which aims to elicit actual facts, will be shown by a consideration of the circumstances surrounding the gathering of the statistics in that section. Certain industries peculiar to these states were much more carefully canvassed at the census of 1900 than ever before, resulting in an enormous increase in the number of establishments. These industries were, as a rule, those in which exceptionally low wages were paid. Thus in the turpentine and rosin industry the number of establishments reported increased from 670 to 1,503, and the number of wage-earners from 15,266 to 41,864; the average wages paid in this industry were $200. It is thus apparent that in all the states where the production of turpentine and rosin is an important industry, the decrease in average earnings is due, not to an actual decrease in these earnings, but to the increase in the number of reports from establishments that paid low rates of wages for unskilled labor. The cotton ginning industry is another illustration of the same results following an increase in the number of establishments reporting, where the wages paid are extremely low. These circumstances show that the decreases indicated in the South are fictitious and can not be accepted as indicating any definite trend in wages.

Considerations of this character justify the Census Office in affirming with all possible emphasis that the attempt to obtain the average earnings from the census figures or to establish a wage mean at the several census periods through the use of these statistics is a false use of them, and is not justified under any circumstances.

6. *Average Annual Earnings, by Industries.*—The discrepancies and variations found to exist in the average earnings by states and not explainable from any economic point of view, are further emphasized by an examination of the variations in average earnings by industries. To show these variations, table XLI has been prepared, in which industries are arranged in two groups—the first group includes the industries in which an increase in the average earnings, as between 1890 and 1900, is shown; and the second group, which is much the larger, shows the industries in which a decrease in average earnings appears to have occurred.

TABLE XLI.—AVERAGE ANNUAL EARNINGS BY INDUSTRIES: 1890 AND 1900.

	Year.	Total.	Men.	Women.	Children.
All industries	1900	$437	$491	$272	$152
	1890	445	499	268	138
INDUSTRIES SHOWING INCREASE.					
Agricultural implements	1900	482	484	309	138
	1890	466	470	262	155
Ammunition	1900	490	625	285	196
	1890	449	563	251	183
Babbitt metal and solder	1900	551	552	313	578
	1890	487	490	313	.....
Bags, paper	1900	337	429	234	189
	1890	333	445	244	172
Belting and hose, rubber	1900	518	565	280	205
	1890	481	491	316	206
Bluing	1900	361	489	270	213
	1890	307	356	225	142
Bone, ivory, and lamp black	1900	542	542	.....	.....
	1890	471	494	.....	148
Boot and shoe findings	1900	377	463	257	169
	1890	286	413	173	147
Boot and shoe uppers	1900	491	516	343	177
	1890	450	547	344	166
Boots and shoes, rubber	1900	447	526	345	177
	1890	417	492	325	182
Brass	1900	610	617	.....	208
	1890	514	514	.....	.....
Brass and copper, rolled	1900	520	534	292	231
	1890	512	544	264	208
Brick and tile	1900	353	360	222	148
	1890	285	294	177	101
Brooms and brushes	1900	366	422	286	151
	1890	345	398	210	128
INDUSTRIES SHOWING INCREASE—Continued.					
Calcium lights	1900	$444	$461	.....	$150
	1890	427	427	.....	.....
Carpets and rugs, other than rag	1900	391	480	$330	171
	1890	387	477	325	181
Carpets, rag	1900	328	376	212	127
	1890	316	361	188	129
Carpets, wood	1900	596	598	312	208
	1890	443	443	475	.....
Cheese, butter, and condensed milk, factory product.	1900	480	502	278	144
	1890	348	359	196	110
Chemicals	1900	493	504	290	177
	1890	486	541	280	179
Cleansing and polishing preparations.	1900	412	483	272	205
	1890	340	390	237	131
Clothing, horse	1900	307	418	272	171
	1890	271	335	263	186
Clothing, men's, factory product.	1900	376	568	254	138
	1890	352	491	233	98
Clothing, men's, factory product, buttonholes.	1900	352	467	266	140
	1890	337	427	279	147
Clothing, women's, dressmaking.	1900	315	672	278	[1]120
	1890	270	584	265	119
Cotton, ginning	1900	137	137	128	73
	1890	94	95	57	42
Emery wheels	1900	555	555	468	.....
	1890	552	558	208	260
Engravers' materials	1900	583	583	.....	.....
	1890	550	555	280	125

[1] One child only.

TABLE XLI.—AVERAGE ANNUAL EARNINGS BY INDUSTRIES: 1890 AND 1900—Continued.

	Year.	Total.	Men.	Women.	Children.
INDUSTRIES SHOWING INCREASE—continued.					
Envelopes	1900	$386	$563	$311	$171
	1890	349	558	278	231
Explosives	1900	529	540	263	169
	[1]1890	527	538	183	161
Fire extinguishers, chemical	1900	513	519	148	.....
	1890	457	460	315	.....
Fish, canning and preserving	1900	315	384	146	110
	1890	225	261	144	52
Flouring and grist mill products.	1900	478	482	288	128
	1890	383	385	228	106
Food preparations	1900	374	466	216	124
	1890	352	429	217	161
Fruits and vegetables, canning and preserving.	1900	221	304	183	104
	1890	93	135	78	29
Furnishing goods, men's	1900	320	514	291	162
	1890	293	457	258	152
Furniture, cabinetmaking, repairing, and upholstering.	1900	549	579	336	162
	1890	536	561	330	155
Glass	1900	513	590	238	189
	1890	465	542	176	145
Glucose	1900	534	534	498	.....
	1890	523	524	305	.....
Glue	1900	423	443	248	227
	1890	398	416	197	141
Hammocks	1900	300	493	275	157
	1890	183	441	118	.....
Hand knit goods	1900	250	533	203	157
	1890	193	420	156	61
Hones and whetstones	1900	386	391	278	120
	1890	329	347	245	.....
Horseshoes, factory product	1900	542	584	.....	194
	1890	510	569	.....	224
Hosiery and knit goods	1900	292	420	266	141
	1890	278	407	245	136
Ice, manufactured	1900	495	497	449	110
	[2]1890	388	389	.....	91
Ink, writing	1900	450	571	266	151
	1890	395	504	251	125
Iron and steel	1900	543	547	249	217
	1890	531	534	283	193
Iron and steel, doors and shutters.	1900	732	753	250	130
	1890	669	694	.....	125
Iron and steel, nails and spikes, cut and wrought, including wire nails.	1900	456	505	274	206
	1890	430	453	260	183
Japanning	1900	472	503	257	150
	1890	433	490	329	191
Lapidary work	1900	1,001	1,047	310	171
	1890	687	665	.....	156
Lime and cement	1900	406	407	206	177
	1890	379	381	363	149
Linen goods	1900	316	472	269	140
	1890	291	406	229	181
Liquors, vinous	1900	384	398	144	130
	1890	286	287	292	91
Lumber and timber products	1900	369	373	191	157
	[3]1890	282	285	161	123
Malt	1900	594	595	800	.....
	1890	478	478	.....	.....
Mantels, slate, marble, and marbleized.	1900	648	649	.....	200
	1890	627	629	241	324
Matches	1900	299	388	227	147
	1890	279	406	175	127
Millstones	1900	566	566	.....	.....
	1890	532	532	.....	.....
Mucilage and paste	1900	427	503	244	225
	1890	388	430	183	25
INDUSTRIES SHOWING INCREASE—continued.					
Oil, castor	1900	$593	$598	$350	.....
	1890	578	578	.....	.....
Oil, cottonseed and cake	1900	286	286	251	$138
	1890	253	255	175	121
Oil, essential	1900	347	352	263	75
	1890	147	147	.....	.....
Oil, linseed	1900	522	523	336	234
	1890	518	519	260	.....
Oilcloth, enameled	1900	588	588	.....	.....
	1890	536	537	643	150
Optical goods	1900	446	537	234	156
	1890	403	470	220	164
Oysters, canning and perserving.	1900	227	309	157	117
	1890	186	205	186	85
Paper hangings	1900	497	556	281	186
	1890	454	519	250	143
Paper patterns	1900	314	772	246	193
	1890	265	765	201	156
Pens, steel	1900	293	411	274	274
	1890	266	425	208	159
Petroleum, refining	1900	551	559	236	141
	1890	515	532	311	165
Registers, cash	1900	607	633	353	.....
	1890	569	640	185	150
Rice, cleaning and polishing	1900	408	410	.....	295
	1890	345	351	147	94
Salt	1900	400	418	228	195
	1890	374	381	265	160
Sand and emery paper and cloth.	1900	526	555	254	173
	1890	506	530	239	.....
Sausage	1900	514	521	229	114
	1890	434	439	279	126
Scales and balances	1900	518	520	366	248
	1890	513	517	275	183
Screws, machine	1900	451	472	274	228
	1890	449	472	132	35
Screws, wood	1900	366	464	223	147
	1890	346	478	203	149
Sewing machines and attachments.	1900	584	599	804	175
	1890	538	557	356	297
Shirts	1900	297	487	261	134
	1890	295	470	259	131
Shoddy	1900	389	435	258	214
	1890	328	427	195	113
Slaughtering, wholesale, not including meat packing.	1900	634	637	384	142
	1890	618	621	265	219
Sporting goods	1900	384	480	235	165
	1890	352	489	203	194
Starch	1900	414	473	201	160
	1890	330	364	218	116
Straw goods, not elsewhere specified.	1900	266	375	198	132
	1890	248	325	218	221
Sugar and molasses, refining	1900	487	500	221	160
	1890	339	353	69	43
Tobacco, chewing, smoking, and snuff.	1900	244	312	206	91
	1890	233	307	193	76
Turpentine and rosin	1900	200	202	125	107
	[4]1890	190	192	73	51
Varnish	1900	644	660	304	150
	1890	640	650	282	182
Vinegar and cider	1900	400	418	230	114
	1890	273	289	63	43
Whalebone and rattan	1900	561	566	500	.....
	1890	551	665	289	.....
Wire	1900	536	545	203	197
	1890	508	509	312	156

[1] Includes "gunpowder" and "high explosives," separate classes in 1890.
[2] In 1890 reported as "ice, artificial."
[3] Includes "lumber and other mill products from logs or bolts," and "timber products, not manufactured at mill," separate classes in 1890.
[4] In 1890 reported as "tar and turpentine."

TABLE XLI.—AVERAGE ANNUAL EARNINGS BY INDUSTRIES: 1890 AND 1900—Continued.

	Year.	Total.	Men.	Women.	Children.
INDUSTRIES SHOWING INCREASE—continued.					
Wood, preserving	1900	$429	$430	.....	$150
	1890	366	366	.....	.....
Wool hats	1900	445	536	$301	148
	1890	357	441	224	115
Woolen goods	1900	359	417	294	166
	1890	340	405	278	153
Worsted goods	1900	352	441	303	172
	1890	348	442	298	166
All other industries[1]	1900	444	466	402	.....
	1890	329	486	213	130
INDUSTRIES SHOWING DECREASE.					
Artificial feathers and flowers	1900	293	501	278	132
	1890	334	437	318	124
Artificial limbs	1900	589	605	406	157
	1890	632	661	375	161
Artists' materials	1900	396	517	220	167
	1890	422	443	347	133
Awnings, tents, and sails	1900	463	579	298	156
	1890	505	643	270	154
Axle grease	1900	435	469	197	.....
	1890	489	520	232	200
Bags, other than paper	[2]1900	281	436	214	138
	1890	309	400	248	160
Baking and yeast powders	1900	370	507	239	132
	1890	399	496	252	159
Baskets and rattan and willow ware.	1900	291	339	185	140
	1890	304	362	187	100
Bells	1900	465	486	288	221
	1890	521	532	294	250
Belting and hose, leather	1900	548	561	292	180
	1890	582	597	271	136
Belting and hose, linen	1900	252	444	188	125
	1890	452	733	292	127
Bicycle and tricycle repairing.	1900	436	452	268	147
	1890	482	490	.....	159
Bicycles and tricycles	1900	467	476	339	203
	1890	546	556	249	198
Billiard tables and materials	1900	611	637	330	226
	1890	693	695	222	233
Blacking	1900	339	496	256	191
	1890	398	581	291	157
Blacksmithing and wheelwrighting.	1900	497	501	144	150
	1890	509	511	346	151
Bookbinding and blank book making.	1900	418	565	292	158
	1890	442	580	297	164
Boot and shoe cut stock	1900	362	449	228	160
	1890	379	464	236	181
Boots and shoes, custom work and repairing.	1900	426	432	275	132
	1890	437	442	308	149
Boots and shoes, factory product.	1900	414	475	319	178
	1890	454	513	336	151
Bottling	1900	467	486	251	217
	1890	497	511	246	178
Boxes, cigar	1900	312	402	244	144
	1890	352	433	267	146
Boxes, fancy and paper	1900	295	462	238	145
	1890	308	449	253	154
Boxes, wooden packing	1900	355	379	211	161
	1890	432	470	213	155
Brass castings and brass finishing.	1900	507	523	343	175
	1890	526	542	308	192
Brassware	1900	463	521	297	162
	1890	497	570	298	164
Bread and other bakery products.	1900	463	525	281	165
	1890	492	533	257	175
Bridges	1900	551	552	300	224
	1890	591	592	.....	138

[1] In 1900 includes "collars and cuffs, paper," "cotton, cleaning and rehandling," and "fuel, artificial;" in 1890 includes "fuel, artificial," "phonographs and graphophones," "racking hose," "rubber, vulcanized," "sugar and molasses, beet," and "tinfoil."

	Year.	Total.	Men.	Women.	Children.
INDUSTRIES SHOWING DECREASE—continued.					
Bronze castings	1900	$600	$604	$156	$144
	1890	722	733	253	183
Buttons	1900	325	429	242	161
	1890	368	522	271	148
Cardboard	1900	422	527	332	168
	1890	509	602	301	.....
Card cutting and designing	1900	416	512	276	176
	1890	425	468	307	162
Carpentering	1900	573	574	298	196
	1890	645	646	218	179
Carriage and wagon materials.	1900	389	395	250	145
	1890	437	447	293	173
Carriages and sleds, children's.	1900	400	415	284	180
	1890	424	451	250	138
Carriages and wagons	1900	477	481	295	176
	1890	508	513	288	174
Cars and general shop construction and repairs by steam railroad companies.	1900	553	554	292	206
	1890	565	565	307	230
Cars and general shop construction and repairs by street railroad companies.	1900	627	627	300	.....
	1890	702	703	.....	240
Cars, steam railroad, not including operations of railroad companies.	1900	508	510	303	249
	1890	513	517	298	178
Cars, street railroad, not including operations of railroad companies.	1900	544	547	436	181
	1890	611	613	390	260
Cheese and butter, urban dairy product.	1900	380	408	212	150
	1890	454	476	238	208
China decorating	1900	411	600	287	134
	1890	461	572	311	162
Chocolate and cocoa products.	1900	400	558	234	86
	1890	511	649	297	150
Clocks	1900	439	476	340	226
	1890	518	556	323	205
Cloth sponging and refinishing.	1900	502	507	400	155
	1890	567	572	300	182
Clothing, men's, custom work and repairing.	1900	486	572	285	144
	1890	509	602	281	171
Clothing, women's, factory product.	1900	389	605	293	157
	1890	394	670	309	173
Coffee and spice, roasting and grinding.	1900	389	548	205	136
	1890	482	559	280	175
Coffins, burial cases, and undertakers' goods.	1900	450	493	263	186
	1890	494	530	326	194
Coke	1900	417	418	.....	207
	1890	453	454	.....	152
Combs	1900	409	434	292	200
	1890	492	539	299	189
Confectionery	1900	324	460	209	138
	1890	358	473	225	141
Cooperage	1900	401	408	309	174
	1890	446	452	161	171
Cordage and twine	1900	314	376	258	152
	1890	321	397	256	154
Cordials and sirups	1900	323	399	196	98
	1890	395	457	254	190
Cork cutting	1900	294	445	187	124
	1890	315	461	220	184
Corsets	1900	298	546	273	198
	1890	321	489	291	141
Cotton, compressing	1900	269	270	175	102
	1890	374	376	.....	47
Cotton goods	[3]1900	286	351	266	183
	1890	302	380	274	131
Cotton waste	1900	302	420	178	.....
	1890	369	488	205	156
Crucibles	1900	374	486	207	.....
	1890	479	502	100	50

[2] Includes "bagging, flax, hemp, and jute," and "bags, other than paper," separate classes in 1890.

[3] Includes "cotton small wares" in 1900.

TABLE XLI.—AVERAGE ANNUAL EARNINGS BY INDUSTRIES: 1890 AND 1900—Continued.

	Year.	Total.	Men.	Women.	Children.
INDUSTRIES SHOWING DECREASE—continued.					
Cutlery and edge tools	1900	$470	$485	$289	$270
	1890	482	494	256	155
Dentists' materials	1900	500	605	350	109
	1890	537	618	308	146
Druggists' preparations, not including prescriptions.	1900	354	467	263	141
	1890	413	445	253	150
Drug grinding	1900	463	502	195	88
	1890	505	585	258	182
Dyeing and cleaning	1900	419	502	312	138
	1890	430	538	286	180
Dyeing and finishing textiles	1900	427	465	274	179
	1890	455	494	270	181
Dyestuffs and extracts	1900	478	486	169	132
	1890	492	494	234	98
Electrical apparatus and supplies.	1900	494	538	276	206
	1890	513	560	290	171
Electroplating	1900	456	477	318	175
	1890	505	528	333	203
Enameling and enameled goods	1900	294	324	221	153
	[1]1890	441	502	298	155
Engraving and diesinking	1900	554	602	289	162
	1890	596	619	245	140
Engraving, steel, including plate printing.	1900	608	753	367	171
	1890	687	866	422	175
Engraving, wood	1900	613	652	250	160
	1890	635	656	433	181
Fancy articles, not elsewhere specified.	1900	336	488	230	153
	1890	364	523	265	160
Felt goods	1900	381	419	290	180
	1890	412	490	265	169
Fertilizers	1900	361	362	301	198
	1890	379	382	294	134
Files	1900	404	435	281	175
	1890	500	521	325	178
Firearms	1900	567	573	313	175
	1890	592	595	292	187
Fireworks	1900	310	394	228	147
	1890	319	389	245	150
Flags and banners	1900	293	444	226	153
	1890	300	396	232	156
Flavoring extracts	1900	382	485	274	198
	1890	412	505	228	143
Flax, dressed	1900	218	235	233	94
	1890	400	528	322	83
Foundry and machine shop products.	1900	520	524	281	200
	[2]1890	559	563	283	198
Foundry supplies	1900	489	495	218	235
	1890	562	562	.....	.....
Fur goods	1900	498	642	360	155
	1890	501	704	349	159
Furniture, factory product	1900	408	422	251	153
	[3]1890	481	503	227	137
Furs, dressed	1900	573	594	384	322
	1890	597	605	214	260
Galvanizing	1900	429	434	240	182
	1890	476	479	220	332
Gas and lamp fixtures	1900	459	529	281	187
	1890	574	590	308	212
Gas and oil stoves	1900	461	462	301	200
	[4]1890	549	551	250	.....
Gas, illuminating and heating.	1900	554	554	426	269
	1890	654	656	.....	155
Gas machines and meters	1900	547	558	248	194
	1890	627	632	385	.....
Glass, cutting, staining, and ornamenting.	1900	487	515	301	304
	1890	589	609	333	197
INDUSTRIES SHOWING DECREASE—continued.					
Gloves and mittens	1900	$292	$461	$220	$129
	1890	326	502	226	133
Gold and silver leaf and foil	1900	429	570	287	196
	1890	497	675	311	155
Gold and silver, reducing and refining, not from the ore.	1900	646	649	260	200
	1890	709	710	321	231
Graphite, and graphite refining.	1900	470	470	.....	.....
	[5]1890	500	511	320	.....
Grease and tallow	1900	523	525	255	158
	1890	540	546	328	257
Grindstones	1900	349	350	.....	163
	1890	418	420	.....	90
Hairwork	1900	341	579	302	160
	1890	351	484	319	219
Hand stamps	1900	466	514	279	184
	1890	488	533	288	157
Hardware	1900	432	463	256	184
	1890	468	502	252	148
Hardware, saddlery	1900	414	434	240	184
	1890	432	460	226	140
Hat and cap materials	1900	317	394	225	119
	1890	440	512	277	269
Hats and caps, not including wool hats.	[6]1900	450	539	310	174
	1890	488	583	326	234
Hooks and eyes	1900	425	600	201	75
	1890	487	645	301	133
House furnishing goods, not elsewhere specified.	1900	352	419	264	182
	1890	441	496	298	195
Ink, printing	1900	583	594	268	191
	1890	710	721	481	.....
Instruments, professional and scientific.	1900	515	561	298	188
	1890	602	634	286	169
Iron and steel, bolts, nuts, washers, and rivets.	1900	391	421	259	193
	1890	432	462	278	191
Iron and steel, forgings	1900	546	554	267	183
	1890	550	558	245	190
Iron and steel, pipe, wrought	1900	451	454	.....	150
	1890	462	468	469	203
Ironwork, architectural and ornamental.	1900	538	541	259	196
	1890	597	600	347	188
Ivory and bone work	1900	397	443	240	181
	1890	477	510	300	152
Jewelry	1900	520	615	330	191
	1890	579	660	319	170
Jewelry and instrument cases	1900	394	547	264	188
	1890	491	616	227	170
Jute and jute goods	1900	262	360	233	146
	1890	309	485	274	136
Kaolin and other earth grinding.	1900	392	392	200	151
	1890	432	433	.....	126
Kindling wood	1900	372	393	302	187
	1890	381	410	201	170
Labels and tags	1900	384	492	216	163
	1890	468	597	241	96
Lamps and reflectors	1900	440	482	308	267
	1890	501	529	253	193
Lard, refined	1900	477	502	431	228
	1890	518	597	274	196
Lasts	1900	574	582	288	175
	1890	698	699	.....	208
Lead, bar, pipe, and sheet	1900	532	533	300	182
	1890	602	602	363	.....
Leather board	1900	343	411	316	.....
	1890	438	440	300	.....
Leather goods	1900	361	456	241	143
	[7]1890	411	496	263	185

[1] Includes "enameled goods" and "enameling," separate classes in 1890.
[2] Includes "cotton ties," "foundry and machine shop products," and "lightning rods," separate classes in 1890.
[3] Includes "furniture chairs," and "furniture, factory product," separate classes in 1890.
[4] Reported as "gas stoves" in 1890.
[5] Reported as "graphite" in 1890.
[6] Includes "fur hats" and "hats and caps, not including fur hats and wool hats," separate classes in 1900.
[7] Includes "bellows" and "leather goods," separate classes in 1890.

TABLE XLI.—AVERAGE ANNUAL EARNINGS BY INDUSTRIES: 1890 AND 1900—Continued.

	Year.	Total.	Men.	Women.	Children.
INDUSTRIES SHOWING DECREASE—continued.					
Leather, tanned, curried, and finished.	1900	$434	$439	$289	$209
	[1]1890	501	505	313	185
Liquors, distilled	1900	466	474	190	124
	1890	472	472	130	108
Liquors, malt	1900	653	666	263	187
	1890	685	697	223	180
Lithographing and engraving.	1900	580	597	267	171
	1890	606	690	258	180
Lock and gun smithing	1900	495	524	291	162
	1890	528	542	482	152
Looking-glass and picture frames.	1900	437	466	262	185
	1890	485	522	262	173
Lumber, planing mills products, including sash, doors, and blinds.	1900	444	450	255	175
	1890	528	536	286	153
Marble and stone work	1900	509	511	167	166
	1890	698	610	295	192
Masonry, brick and stone	1900	564	565	295	175
	1890	628	628	367	379
Mats and matting	1900	198	217	142	142
	1890	451	479	225	179
Mattresses and spring beds	1900	404	440	296	158
	1890	487	481	308	202
Millinery and lace goods	1900	345	592	300	164
	1890	407	575	358	205
Millinery, custom work	1900	287	551	286	130
	1890	307	383	308	116
Mineral and soda water	1900	464	482	274	165
	1890	470	484	237	133
Mirrors	1900	482	512	247	165
	1890	600	618	203	151
Models and patterns	1900	600	633	259	130
	[2]1890	618	641	292	152
Monuments and tombstones	1900	576	577	330	167
	1890	616	618	276	182
Musical instruments and materials, not specified.	1900	512	545	255	186
	1890	573	595	323	181
Musical instruments, organs and materials.	1900	501	511	354	212
	1890	580	587	402	188
Musical instruments, pianos and materials.	1900	549	566	279	200
	1890	673	679	384	177
Needles and pins	1900	399	512	298	177
	1890	404	502	281	234
Nets and seines	1900	297	652	256	135
	1890	808	583	252	.....
Oakum	1900	300	340	104	189
	1890	330	352	50	213
Oil, lard	1900	541	545	209	.....
	1890	566	566	.....	.....
Oil, not elsewhere specified	[3]1900	505	515	269	202
	1890	617	635	277	231
Oilcloth, floor	1900	488	495	302	289
	1890	490	501	335	120
Oleomargarine	1900	493	508	323	188
	1890	584	599	261	350
Ordnance and ordnance stores.	1900	622	626	312	.....
	1890	745	746	470	182
Painting and paper hanging	[4]1900	588	592	286	181
	1890	635	639	294	178
Paints	1900	482	505	282	171
	1890	507	529	272	155
Paper and wood pulp	1900	418	451	247	207
	[5]1890	425	477	252	150
Paper goods, not elsewhere specified.	1900	368	484	250	177
	1890	402	494	262	153
INDUSTRIES SHOWING DECREASE—continued.					
Patent medicines and compounds.	1900	$373	$499	$264	$142
	1890	419	532	255	140
Paving and paving materials	1900	427	428	313	187
	1890	434	434	312	126
Pencils, lead	1900	316	465	242	213
	1890	325	548	228	152
Pens, fountain and stylographic	1900	443	509	243	202
	1890	486	530	253	.....
Pens, gold	1900	608	643	330	100
	1890	616	644	302	104
Perfumery and cosmetics	1900	322	511	246	152
	1890	359	513	264	155
Photographic apparatus	1900	398	404	371	335
	1890	519	570	219	126
Photographic materials	1900	447	538	271	165
	1890	537	611	317	169
Photography	1900	450	532	324	155
	1890	498	572	348	159
Photolithographing and photoengraving.	1900	651	672	412	184
	1890	664	695	328	166
Pickles, preserves, and sauces	1900	317	426	197	125
	1890	324	437	188	130
Pipes, tobacco	1900	465	511	328	141
	1890	474	519	231	126
Plastering and stuccowork	1900	609	613	313	192
	1890	611	612	307	147
Plated and britannia ware	1900	483	523	286	169
	1890	507	556	288	171
Plumbers' supplies	1900	490	501	299	201
	1890	537	548	301	235
Plumbing, and gas and steam fitting.	1900	591	596	274	181
	[6]1890	618	624	294	192
Pocketbooks	1900	356	448	239	170
	1890	407	521	258	100
Pottery, terra cotta, and fireclay products.	1900	405	429	251	176
	[7]1890	467	505	247	163
Printing and publishing, book and job.	1900	496	561	304	160
	[8]1890	551	609	359	180
Printing and publishing, music.	1900	482	539	353	173
	1890	484	537	319	172
Printing and publishing, newspapers and periodicals.	1900	532	610	312	121
	1890	591	667	336	108
Printing materials	1900	416	436	254	228
	1890	473	580	187	194
Pulp, from fiber other than wood.	1900	235	237	232	84
	1890	453	457	.....	150
Pulp goods	1900	411	430	179	171
	1890	442	471	196	115
Pumps, not including steam pumps.	1900	391	397	.....	70
	1890	472	474	200	137
Refrigerators	1900	387	393	338	180
	1890	475	497	257	153
Regalia and society banners and emblems.	1900	300	471	242	142
	1890	355	521	276	126
Registers, car fare	1900	496	498	375	.....
	1890	595	601	.....	72
Roofing and roofing materials	1900	455	460	268	152
	1890	592	597	207	173
Rubber and elastic goods	1900	396	468	289	175
	1890	399	511	300	189
Rules, ivory and wood	1900	313	374	175	150
	1890	382	440	225	165
Saddlery and harness	1900	445	463	245	141
	1890	481	496	276	142

[1] Includes "leather, dressed skins," "leather, morocco," "leather, patent and enameled," and "leather, tanned and curried," separate classes in 1890.
[2] Includes "cigar molds" and "models and patterns," separate classes in 1890.
[3] Includes "oil, illuminating, not including petroleum refining" and "oil, lubricating," separate classes in 1890.
[4] Includes "painting, house, sign, etc.," and "paper hanging," separate classes in 1900.
[5] Includes "paper" and "pulp, wood," separate classes in 1890.
[6] In 1890 reported as "plumbing and gas fitting."
[7] In 1890 reported as "clay and pottery products."
[8] Includes "printing and publishing, book and job" and "printing, tip," separate classes in 1890.

TABLE XLI.—AVERAGE ANNUAL EARNINGS BY INDUSTRIES: 1890 AND 1900—Continued.

	Year.	Total.	Men.	Women.	Children.
INDUSTRIES SHOWING DECREASE—continued.					
Safes and vaults	1900	$500	$503	$175	$160
	1890	558	563	720	105
Saws	1900	527	546	275	213
	1890	592	626	247	177
Sewing machine cases	1900	402	419	288	149
	1890	468	495	409	185
Sewing machine repairing	1900	497	516	272	136
	1890	580	604	317	130
Shipbuilding	[1]1900	531	539	336	191
	1890	598	601	280	151
Show cases	1900	520	530	209	168
	1890	540	557	247	217
Silk and silk goods	1900	321	442	269	141
	1890	360	531	276	155
Silversmithing	1900	559	621	233	146
	1890	707	729	450	166
Silverware	1900	603	627	369	280
	1890	650	675	307	177
Slaughtering and meat packing, wholesale.	1900	480	496	290	219
	1890	541	555	289	185
Smelting and refining, not from the ore.	1900	541	555	322	318
	[2]1890	578	580	300	167
Soap and candles	1900	396	462	255	145
	1890	437	495	260	153
Soda water apparatus	1900	571	578	257	156
	1890	652	667	334	216
Springs, steel, car and carriage.	1900	505	506	360	175
	1890	555	563	.....	169
Stamped ware	1900	373	422	289	163
	[3]1890	389	459	223	161
Stationery goods, not elsewhere specified.	1900	316	439	235	114
	[4]1890	390	528	264	141
Steam fittings and heating apparatus.	1900	539	545	226	238
	1890	583	591	337	209
Steam packing	1900	458	482	241	172
	1890	482	514	277	205
Stencils and brands	1900	493	531	195	133
	1890	587	626	311	164
Stereotyping and electrotyping	1900	606	636	329	187
	1890	639	670	462	205
Surgical appliances	1900	493	538	287	180
	1890	492	635	306	164
Taxidermy	1900	506	553	310	164
	1890	515	556	252	172
Tinsmithing, coppersmithing, and sheet-iron working.	1900	486	513	262	190
	1890	498	521	229	165
INDUSTRIES SHOWING DECREASE—continued.					
Tobacco, cigars and cigarettes.	1900	$396	$482	$278	$129
	1890	419	486	296	130
Tobacco, stemming and rehandling.	1900	188	236	155	90
	1890	189	214	155	109
Tools, not elsewhere specified.	1900	497	514	261	194
	1890	543	555	349	179
Toys and games	1900	337	400	234	145
	1890	342	394	239	157
Trunks and valises	1900	400	426	265	169
	1890	463	483	265	167
Type founding	1900	564	652	323	140
	1890	575	661	466	165
Typewriters and supplies	1900	554	575	350	173
	1890	580	610	305	127
Umbrellas and canes	1900	332	437	268	177
	1890	404	503	316	170
Upholstering materials	1900	336	392	275	171
	[5]1890	378	438	277	152
Vault lights and ventilators	1900	588	588	.....	.....
	1890	665	669	600	100
Washing machines and clothes wringers.	1900	364	375	310	166
	1890	418	444	217	140
Watch and clock materials	1900	460	564	327	.....
	[6]1890	472	540	266	178
Watch cases	1900	493	561	304	170
	1890	516	577	272	165
Watch, clock, and jewelry repairing.	1900	559	584	284	146
	1890	594	609	329	157
Watches	1900	521	665	385	107
	1890	544	654	382	270
Wheelbarrows	1900	397	397	.....	.....
	1890	443	447	.....	147
Whips	1900	372	429	274	193
	1890	427	486	287	184
Windmills	1900	460	461	347	317
	1890	501	503	501	195
Window shades	1900	433	496	263	194
	1890	502	540	344	166
Wirework, including wire rope and cable.	1900	425	458	264	179
	1890	444	482	274	164
Wood, turned and carved	1900	378	391	183	152
	1890	450	473	164	148
Woodenware, not elsewhere specified.	1900	335	358	197	126
	1890	365	389	148	112
Zinc, smelting and refining	1900	484	485	421	234
	[7]1890	584	585	.....	233

[1] Includes "ship and boat building, wooden" and "shipbuilding, iron and steel," separate classes in 1900.
[2] In 1890 reported as "smelting and refining."
[3] Includes "fruit jar trimmings" and "stamped ware," separate classes in 1890.
[4] Includes "pencil cases" and "stationery goods, not elsewhere specified," separate classes in 1890.
[5] In 1890 reported as "upholstery materials."
[6] Includes "clock cases and materials" and "watch and clock materials," separate classes in 1890.
[7] A partial report of this industry was reviewed in 1890 under the classification "zinc."

TABLE XLI.—AVERAGE ANNUAL EARNINGS BY INDUSTRIES: 1890 AND 1900—Continued.

INDUSTRIES NOT COMPARABLE.	Year.	Total.	Men	Women.	Children.
Butter, reworking	1900 (1)	$458	$462	$575	$104
Celluloid and celluloid goods	(2) 1890	476	556	259	260
Charcoal	1900 (3)	242	242	.....	50
Coffins and burial cases, trimming and finishing.	(4) 1890	518	526	255	136
Collars and cuffs, paper	(5) 1890	428	529	244	.....
Copper, smelting and refining	1900 (1)	753	755	625	346
Cotton, cleaning and rehandling.	(5) 1890	221	273	188	50
Dentistry, mechanical	(4) 1890	517	565	314	164
Electric light and power	(4) 1890	716	717	240	250
Electrical construction and repairs.	1900 (6)	557	564	353	194
Hay and straw baling	(4) 1890	173	205	22	18
Lead, smelting and refining	1900 (1)	$612	$612	.....	$283
Oil, resin	(2) 1890	596	596	.....	.....
Phonographs and graphophones.	1900 (7)	480	507	$294	71
Sugar and molasses, beet	1900 (7)	554	556	421	354
Teasels	(4) 1890	298	294	312	312
Tin and terne plate	1900 (1)	515	568	276	184
Tinfoil	1900 (7)	391	539	255	214
Typewriter repairing	1900 (6)	628	646	384	135
Wool pulling	1900 (6)	522	522	.....	.....
Wool scouring	1900 (6)	470	491	293	.....

[1] No returns received for this industry in 1890.
[2] Included in other classification in 1900.
[3] Included in "timber products, not manufactured at mill," in 1890.
[4] Omitted in 1900.
[5] Included in "all other industries" in 1900.
[6] Included in other classification in 1890.
[7] Included in "all other industries" in 1890.

In the manufacture of woolen and worsted goods there has been an apparent increase in average earnings; and in cotton goods an apparent decrease. Where these industries exist side by side, as they do in many localities, wage conditions are much the same in both. The same influences which operate to cause a rise of wages in one operate similarly and simultaneously in the other. The person who would attempt to assert on the strength of these figures that there has been a considerable increase in the average earnings of wage-earners in woolen and worsted mills since 1890, and, at the same time, a considerable decrease in the average earnings of wage-earners in cotton mills, would be wide of the truth.

The table indicates that in establishments manufacturing boot and shoe uppers there was a notable increase in average earnings, while in establishments manufacturing boots and shoes there was an even greater decrease. The conditions which would operate to affect wages in one branch would necessarily operate similarly in the other, because the industries are so intimately associated that in many cases they are carried on in the same establishment, and always in establishments subject to the same local influences, trade organizations, etc. Other illustrations equally striking may be drawn from this table.

7. *Labor as Affected by Machinery.*—A factor that has had a real tendency to lower the actual average earnings of the wage-earner in many industries is the displacement of the skilled operative by machinery, which permits the substitution of a comparatively unskilled machine hand. This tendency is noticeable in many lines of industry. Its effects are twofold: to reduce the number of employees producing the same or an increased quantity of product, and hence to lower the total wages of the group; and to reduce the average rate of wages because of the lower degree of skill required. The effect of the introduction and improvement of machinery upon the condition of the skilled artisan is an economic question of the greatest importance. Although difficult to show statistically, the effect can, in some degree at least, be measured by the census figures. Table XLII shows, for certain selected industries, the value of machinery and tools, the number of wage-earners, the amount paid in wages, and the value of products at the censuses of 1890 and 1900.

TABLE XLII.—MACHINERY, TOOLS, AND IMPLEMENTS; NUMBER OF WAGE-EARNERS, TOTAL WAGES, AND VALUE OF PRODUCTS, BY SELECTED INDUSTRIES, 1890 AND 1900, WITH PERCENTAGES OF INCREASE.

INDUSTRIES.	Year.	Machinery, tools, and implements.	Average number of wage-earners.	Total wages.	Value of products.
United States, all industries	1900	$2,543,080,244	5,308,406	$2,322,333,877	$13,004,400,143
	1890	$1,584,276,390	4,251,613	$1,891,228,321	$9,372,437,283
Per cent of increase		60.5	24.9	22.8	38.8
Bags, paper	1900	$2,538,513	2,029	$683,783	$7,359,975
	1890	$695,371	1,200	$399,714	$5,023,793
Per cent of increase		265.1	69.1	71.1	46.5
Boots and shoes, factory product	1900	$16,957,305	142,922	$59,175,883	$261,028,580
	1890	$13,873,364	133,690	$60,667,145	$220,649,358
Per cent of increase		22.2	6.9	[1]2.5	18.3
Boots and shoes, rubber	1900	$3,700,050	14,391	$6,426,579	$41,089,819
	1890	$1,386,595	9,134	$3,813,073	$18,632,060
Per cent of increase		166.8	57.6	68.5	120.5
Carriages and wagons	1900	$11,028,188	62,540	$29,814,911	$121,537,276
	1890	$8,901,488	64,259	$32,665,301	$114,551,907
Per cent of increase		23.9	[1]2.7	[1]8.7	6.1
Food preparations	1900	$5,170,121	8,154	$3,051,718	$38,457,651
	1890	$1,378,273	3,478	$1,222,913	$14,105,485
Per cent of increase		275.1	134.4	149.5	172.6
Hosiery and knit goods	1900	$24,036,431	83,387	$24,358,627	$95,482,566
	1890	$15,109,207	59,588	$16,578,119	$67,241,013
Per cent of increase		59.1	39.9	46.9	42.0
Leather, tanned, curried, and finished	1900	$15,022,239	52,109	$22,591,091	$204,038,127
	1890	$8,044,639	42,392	$21,249,989	$172,136,092
Per cent of increase		86.7	22.9	6.3	18.5
Paper and wood pulp	1900	$60,351,066	49,646	$20,746,426	$127,326,162
	1890	$32,218,288	31,050	$13,204,828	$78,937,184
Per cent of increase		87.3	59.9	57.1	61.3
Rubber and elastic goods	1900	$7,317,776	20,405	$8,082,738	$52,627,030
	1890	$3,273,025	9,183	$3,663,976	$18,708,917
Per cent of increase		123.6	122.2	120.6	181.3
Silk and silk goods	1900	$20,750,449	65,416	$20,982,194	$107,256,258
	1890	$14,181,680	49,382	$17,762,441	$87,298,454
Per cent of increase		46.3	32.5	18.1	22.9
Sugar and molasses, refining	1900	$47,495,218	14,262	$6,945,811	$240,969,905
	1890	$7,727,889	7,043	$2,385,654	$123,118,259
Per cent of increase		514.6	102.5	191.1	95.7

[1] Decrease.

These industries have been selected for presentation in the table because they indicate most clearly the tendency under discussion.

In the tanning of leather, by reason of improved machinery, there has been a constantly decreasing demand for skilled workmen. Women and girls are now performing work formerly done by men. In 1890 a "shaver," who had to serve an apprenticeship of several years before he became a skilled workman, received as high as $6 per day at hand work. In 1900 he had been quite generally supplanted by the "handy man," who did the same work by machinery, accomplished four times as much, and received perhaps a third of the pay. From the table it appears that to produce an increase of 18.5 per cent in value of products there was required an increase of 86.7 per cent in value of machinery and tools employed, 22.9 per cent in number of wage-earners, and only 6.3 per cent in wages. These statistics indicate that the increase in production has been accomplished very largely through the utilization of new and improved machinery without a corresponding increase in the number of wage-earners and wages paid.

In the boot and shoe industry an increase of 18.3 per cent in value of products resulted from an increase of 22.2 per cent in value of machinery and tools used, with only 6.9 per cent increase in number of wage-earners and an apparent decrease of 2.5 per cent in wages paid.

In the manufacture of carriages and wagons there has been an increase since 1890 of 6.1 per cent in value of products with an increase of 23.9 per cent in the value of machinery and tools, accompanied by a decrease of 2.7 per cent in number of wage-earners, and of 8.7 per cent in amount paid in wages. Mr. John Kennedy, an organizer of the American Federation of Labor, stated before the United States Industrial Commission that in the great wagon making plants very few skilled workmen are any longer needed; that the machinery utilized in this industry has been developed to such an extent that wagons formerly manufactured by skilled workmen, who commanded high wages, were made in 1900 by comparatively unskilled men.

It may be noted that the returns for "machinery" constitute the item of capital upon which the greatest reliance can be placed.

There has been a notable development recently in industries that have never required a high grade of labor. The clothing industry may be cited as an illustration. The emigrants of eastern Europe, who have lately comprised an increasing proportion of the emigration to this country, are generally without mechanical skill; but large numbers of them find employment in such manufactures as clothing sweat shops, iron and steel works, slaughtering and meat packing establishments, sugar refineries, etc. The industries cited are notable for their relatively large proportion of foreign labor. The proportion of foreign born labor in the textile industries of New England and the Middle states is large, and is constantly increasing.

7. *Special Wages Inquiry.*—Impressed with the impossibility of securing from the schedules any conclusive data regarding the trend of wages during the decade from 1890 to 1900, and feeling that the public would rightfully look to the census for such data, the Director, on the recommendation of the Chief Statistician for Manufactures, instituted in September, 1901, a special investigation of this particular subject, which was committed to the charge of Davis R. Dewey, Ph. D., of the faculty of the Massachusetts Institute of Technology.

Dr. Dewey was especially well qualified for this branch of the work by reason of his long theoretical study of statistics, and by the practical experience gained in service as a member of the Massachusetts State Commission, to inquire into the causes of nonemployment, the report of which commission was published in 1895. Eight field agents, carefully selected by reason of their familiarity with manufacturing conditions and experience in the work, were placed at the disposal of Dr. Dewey and sent to the chief manufacturing centers of all parts of the country, with a special schedule upon which they were instructed to secure, from representative establishments in the leading lines of industry, copies of the actual pay rolls for corresponding months of the years 1890 and 1900. These pay rolls exhibit the actual rates of wages and the actual amounts earned per day, per week, or per month, as the case may be, by all the employees of the establishments whose pay rolls were examined. They afford not merely a true exhibit of the rates of wages and of the earnings under these rates, but also a basis of comparison of these rates and earnings at the two census decades, thus promoting a definite determination of the question whether wages have tended to increase or decrease during the decade in question. The mass of data accumulated in this investigation will be condensed, classified, and summarized in a special report to appear in a supplementary census volume.

XXII.

THE EMPLOYMENT OF WOMEN AND CHILDREN IN MANUFACTURING.[1]

1. *Difficulty of Comparison.*—The employment of women and children has for many years been a subject of great economic and sociological interest in the United States. Before the discussion which follows in connection with the tables, covering the employment of women and children in manufacturing industries, some of the reasons may be stated which render exact comparisons not always possible, although it is believed they are not sufficient to invalidate the general conclusions.

The limitations connected with the taking of a great national census preclude proper care upon the question of child employment. There is great uncertainty as to the accuracy of a mass of information of this character taken by enumerators and special agents, who either do not appreciate the importance of the investigation or find it impracticable to devote the time to the inquiry necessary to secure good results. Again, the answer to the question, "average number of children, under 16 years of age," may have been inconsiderately given, or if considered, answered more as the word "children" was construed by the individual than according to the interpretation intended by the schedule to be placed upon it. The word "children" to manufacturers has many meanings, in accordance with the geographical location of their plants or the character of the work performed. There is also uncertainty as to the methods of ascertaining the number of employees, and their wages, in 1870 and 1880, together with the certainty that the method used in 1890 was sufficiently unlike that of 1900 to prevent exact comparison.

In the text and tables which follow men are considered only so far as is necessary for a proper presentation of the two other classes of wage-earners. The number of children wage-earners was not separately reported until the census of 1870; comparative figures, therefore, are not possible for an earlier census.

Table XLIII is a comparative summary in two parts, A and B, which should be considered together. A shows the average number of wage-earners—men, women, and children—employed in the manufactures of the United States from 1870 to 1900, with the percentage that each class is of the total; B shows the absolute increase and the percentage of increase for each decade.

[1] This section was prepared by Frank L. Sanford, of the division of manufactures.

TABLE XLIII.—*Comparative summary, wage-earners: 1870 to 1900.*

A.—*Average number of wage-earners, men, women, and children, with percentage each class is of total: 1870 to 1900.*

YEAR.	AVERAGE NUMBER OF WAGE-EARNERS.				PER CENT EACH CLASS IS OF TOTAL.		
	Total.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.	Men.	Women.	Children.
1900[1]	5,308,406	4,110,527	1,029,296	168,583	77.4	19.4	3.2
1890	4,251,613	3,327,042	803,686	120,885	78.3	18.9	2.8
1880	2,732,595	2,019,035	531,639	181,921	73.9	19.4	6.7
1870	2,053,996	1,615,598	323,770	114,628	78.6	15.8	5.6

[1] Exclusive of statistics for Hawaii and for 85 governmental establishments in the District of Columbia.

B.—*Absolute increase and percentage of increase, men, women, and children: 1870 to 1900.*

DECADE.	INCREASE IN NUMBER OF WAGE-EARNERS.				PER CENT OF INCREASE.			
	Total.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.	Total.	Men.	Women.	Children.
1890 to 1900	1,056,793	783,485	225,610	47,698	28.1	23.5	24.9	39.5
1880 to 1890	1,519,018	1,308,007	272,047	[1]61,036	55.6	64.8	51.2	[1]33.6
1870 to 1880	678,599	403,437	207,869	67,293	33.0	25.0	64.2	58.7

[1] Decrease.

Naturally with the tremendous progress in manufactures all classes of employees show an absolute increase from 1870 to 1900, but it is interesting and instructive to study the proportion that the number in each class formed of the total, as they varied considerably. It appears conclusive that the employment of women has increased faster than that of the two other classes, their per cent of the total number of wage-earners having advanced from 15.8 in 1870 to 19.4 in 1900, while the proportion of men decreased from 78.6 to 77.4 per cent, and children from 5.6 to 3.2 per cent.

The number of women was greatest in 1900, but their percentage of the total wage-earners was the same as in 1880. The number of children was greatest in 1880, and in that year they constituted their greatest percentage of the total wage-earners, 6.7. In 1890 there was the smallest per cent of children of total wage-earners, 2.8, their number being but slightly greater than in 1870. It will be seen from these figures that there was a steady increase in the number of men and women employed, but that in the case of children for one decade—from 1880 to 1890—there was a pronounced decrease, from 181,921 to 120,885, a decline of 61,036, or 33.6 per cent.

Table XLIV is a comparative statement showing for the years 1870 and 1900 the population over 10 years of age and average number of wage-earners, separated into men, women, and children; the percentage that each class of wage-earners is of the same class of population, and the absolute increase and per cent of increase of each class during the thirty years.

TABLE XLIV.—COMPARATIVE STATEMENT, POPULATION OVER 10 YEARS OF AGE, WITH AVERAGE NUMBER OF WAGE-EARNERS, MEN, WOMEN, AND CHILDREN, ABSOLUTE AND PER CENT OF INCREASE, AND PER CENT THAT EACH CLASS OF WAGE-EARNERS IS OF THE SAME CLASS OF POPULATION, 1870 AND 1900.

	POPULATION.				AVERAGE NUMBER OF WAGE-EARNERS.				PER CENT, BY CLASSES, OF WAGE-EARNERS TO POPULATION.			
	Total.	Men.	Women.	Children, 10 to 15 years, inclusive.	Total.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.	Total.	Men.	Women.	Children.
1900	57,949,824	24,851,013	23,485,559	9,613,252	5,314,539	4,114,348	1,031,608	168,583	9.2	16.6	4.4	1.8
1870	28,228,945	11,823,281	11,619,475	4,786,189	2,053,996	1,615,598	323,770	114,628	7.3	13.7	2.8	2.4
Increase	29,720,879	13,027,732	11,866,084	4,827,063	3,260,543	2,498,750	707,838	53,955	.....	.....	.....	.....
Per cent of increase	105.3	110.2	102.1	100.9	158.7	154.7	218.6	47.1	.....	.....	.....	.....

Table XLIV still further emphasizes the statement that the proportion of women employed in manufactures is increasing more rapidly than that of men and children. During the thirty years there has been no great difference in the per cent of increase in population of men, women, and children—110.2, 102.1, and 100.9, respectively—but the per cent of increase of the three classes of wage-earners differs widely, the per cent of increase of men being 154.7, of women 218.6, and of children but 47.1.

2. *Comparison by Selected Industries.*—Table XLV is a comparative summary of the average number of wage-earners, men, women, and children, for 10 industries in which women and children are largely employed, with the per cent that each class of wage-earners formed of the total of the class from 1870 to 1900.

TABLE XLV.—COMPARATIVE SUMMARY, WAGE-EARNERS, MEN, WOMEN, AND CHILDREN, IN 10 SELECTED INDUSTRIES, WITH THE PER CENT OF EACH CLASS OF WAGE-EARNERS OF THE TOTAL NUMBER, 1870 TO 1900.

INDUSTRY.	Year.	AVERAGE NUMBER OF WAGE-EARNERS.				PER CENT EACH CLASS IS OF TOTAL.		
		Total.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.
Total	1900	1,097,793	569,066	432,158	96,569	51.8	39.4	8.8
	1890	932,175	496,159	365,970	70,046	53.2	39.3	7.5
	1880	688,996	360,616	242,573	85,807	52.3	35.2	12.5
	1870	348,723	159,471	136,044	53,208	45.7	39.0	15.3
Cotton manufactures	1900	302,861	135,721	126,882	40,258	44.8	41.9	13.3
	1890	218,876	88,837	106,607	23,432	40.6	48.7	10.7
	1880	174,659	61,760	84,558	28,341	35.4	48.4	16.2
	1870	135,369	42,790	69,637	22,942	31.6	51.4	17.0
Wool manufactures	1900	159,108	83,371	64,141	11,596	52.4	40.3	7.3
	1890	154,271	78,550	64,944	10,777	50.9	42.1	7.0
	1880	132,672	67,942	49,107	15,623	51.2	37.0	11.8
	1870	105,071	53,400	39,150	12,521	50.8	37.3	11.9
Boots and shoes, factory product	1900	142,922	91,215	47,186	4,521	63.8	33.0	3.2
	1890	133,690	91,406	39,849	2,435	68.4	29.8	1.8
	1880	111,152	82,547	25,122	3,483	74.3	22.6	3.1
	1870	.....	.....	.....	.....	.....	.....	.....
Tobacco, chewing, smoking, and snuff, and cigars and cigarettes	1900	132,623	76,292	49,352	6,979	57.5	37.2	5.3
	1890	116,790	74,394	34,778	7,618	63.7	29.8	6.5
	1880	86,053	54,985	19,884	11,184	63.9	23.1	13.0
	1870	47,848	31,997	7,794	8,057	66.9	16.3	16.8
Printing and publishing, newspapers and periodicals[1]	1900	94,604	73,653	14,815	6,136	77.8	15.7	6.5
	1890	85,975	70,424	9,587	5,964	81.9	11.2	6.9
	1880	58,478	45,880	6,759	5,839	78.4	11.6	10.0
	1870	13,180	11,343	718	1,069	86.4	5.5	8.1
Hosiery and knit goods	1900	83,387	21,154	53,565	8,668	25.4	64.2	10.4
	1890	69,588	14,846	40,826	3,916	24.9	68.5	6.6
	1880	28,885	7,517	17,707	3,661	26.0	61.3	12.7
	1870	14,788	4,252	7,991	2,545	28.8	54.0	17.2
Silk manufactures	1900	65,416	24,206	34,797	6,413	37.0	53.2	9.8
	1890	49,382	17,602	28,914	2,866	35.6	58.6	5.8
	1880	31,337	9,375	16,396	5,566	29.9	52.3	17.8
	1870	6,649	1,734	3,529	1,386	26.1	53.1	20.8
Glass	1900	52,818	42,173	3,529	7,116	79.8	6.7	13.5
	1890	44,892	36,064	1,885	6,943	80.3	4.2	15.5
	1880	24,177	17,778	741	5,658	73.5	3.1	23.4
	1870	15,367	11,092	703	3,572	72.2	4.6	23.2
Fruits and vegetables, canning and preserving	1900	36,401	13,542	19,699	3,160	37.2	54.1	8.7
	1890	49,762	18,469	25,714	5,579	37.1	51.7	11.2
	1880	31,905	10,638	15,463	5,804	33.3	48.5	18.2
	1870	5,869	1,658	3,434	777	28.3	58.5	13.2
Boxes, fancy and paper	1900	27,653	7,789	18,192	1,722	28.0	65.8	6.2
	1890	18,949	5,567	12,866	516	29.4	67.9	2.7
	1880	9,678	2,194	6,836	648	22.7	70.6	6.7
	1870	4,632	1,205	3,088	339	26.0	66.7	7.3

[1] In 1880 includes book and job and music printing.

This table shows that for the total of these 10 industries the number of men and women increased during each decade, while the number of children increased 32,578 from 1870 to 1880, decreased 15,740 from 1880 to 1890, and from 1890 to 1900 increased 26,523. In the industry of boots and shoes, from 1890 to 1900, there was a remarkable increase in the number of women and children, while the number of men showed an actual decrease from 91,406 to 91,215. The number of women increased from 39,849 to 47,186, a gain of 7,337, or 18.4 per cent, and the number of children from 2,435 to 4,521, a gain of 2,086, or 85.7 per cent. Women are largely taking the places of men in this industry in the operation of the lighter kinds of machinery, and children, to a considerable degree, are succeeding to the places made vacant by women. On the basis of the per cent that each class of wage-earners was of the total, this industry is the only one showing a percentage of increase in the employment of children from 1870 to 1900, and the lack of significance of this increase, one-tenth of 1 per cent, becomes evident when it is considered that their percentages of the total number of wage-earners decreased as follows: 3.7 in cotton manufactures; 4.6 in wool manufactures; 11.5 in tobacco; 1.6 in printing and publishing; 6.8 in hosiery and knit goods; 11 in silk manufactures; 9.7 in glass; 4.5 in fruits and vegetables; and 1.1 in boxes, fancy and paper. From 1890 to 1900, in the several branches of the textile industry, the percentual ratio of women decreased, while that of men and children increased.

During the period from 1870 to 1900, women showed an increase in all industries except in cotton manufactures, fruits and vegetables, and boxes, fancy and paper, the percentages of decrease in the latter being 9.5, 4.4, and nine-tenths of 1 per cent, respectively. Increases occurred in the remaining industries, the percentages varying from one-tenth of 1 per cent in silk to 20.9 in tobacco. Cotton manufacture employs the largest number of wage-earners, and is, therefore, presented in fuller details, by geographic divisions, with per cent of all wage-earners, in table XLVI.

TABLE XLVI.—WAGE-EARNERS IN THE COTTON MANUFACTURE.

GEOGRAPHIC DIVISIONS.	AVERAGE NUMBER OF WAGE-EARNERS.											
	Total.				Men, 16 years and over.				Women, 16 years and over.			
	1900	1890	1880	1870	1900	1890	1880	1870	1900	1890	1880	1870
United States	302,861	218,876	174,659	135,369	135,721	88,837	61,760	42,790	126,882	106,607	84,558	69,637
New England states	164,944	147,359	127,185	94,775	79,014	63,749	46,897	30,203	74,882	73,445	62,568	50,805
Middle states	37,050	31,841	28,867	28,974	15,012	11,580	9,161	8,466	17,584	16,240	13,188	14,126
Southern states	97,559	36,415	16,741	10,173	40,555	12,517	5,056	3,640	32,545	15,083	7,587	4,190
Western states	3,308	3,261	2,366	1,447	1,140	991	646	481	1,871	1,839	1,215	516

GEOGRAPHIC DIVISIONS.	AVERAGE NUMBER OF WAGE-EARNERS.				PER CENT OF ALL WAGE-EARNERS.											
	Children, under 16 years.				Men.				Women.				Children.			
	1900	1890	1880	1870	1900	1890	1880	1870	1900	1890	1880	1870	1900	1890	1880	1870
United States	40,258	23,432	28,341	22,942	44.8	40.6	35.4	31.6	41.9	48.7	48.4	51.4	13.3	10.7	16.2	17.0
New England states	11,048	10,165	17,720	13,767	47.9	43.3	36.9	31.9	45.4	49.8	49.2	53.6	6.7	6.9	13.9	14.5
Middle states	4,454	4,021	6,018	6,382	40.5	36.4	32.3	29.2	47.5	51.0	46.5	48.8	12.0	12.6	21.2	22.0
Southern states	24,459	8,815	4,098	2,343	41.6	34.4	30.2	35.8	33.3	41.4	45.3	41.2	25.1	24.2	24.5	23.0
Western states	297	431	505	450	34.5	30.4	27.3	33.2	56.5	56.4	51.4	35.7	9.0	13.2	21.3	31.1

3. *Comparison by Geographic Divisions.*—Table XLVI shows that in the New England, Middle, and Western divisions there has been a marked decrease in the percentual ratio of the employment of children from 1870 to 1900. The percentage decreases for these groups, in the order named, from 1870 to 1900 were as follows: 14.5 to 6.7 per cent; 22 to 12 per cent; and 31.1 to 8.9 per cent. The Southern division increased their percentage of children of all wage-earners during the thirty years from 23 to 25.1.

Women on the other hand showed for the same period the largest per cent of decrease in the Southern group, from 41.2 to 33.3, compared with a decrease in New England from 53.6 to 45.4 and from 48.8 to 47.5 in the Middle states, while in the Western states, where, in 1900, the value of products of the cotton manufacture was only about 1 per cent of the total for the United States, there was an increase from 35.7 to 56.5 per cent. Men show a varying increase in each division.

Table XLVII is a comparative summary of wage-earners—men, women, and children—by geographic divisions, with the per cent that each class of wage-earners is of the total of each division at the several censuses, and the per cent that the classes in each of the 6 divisions formed of the total for the United States.

TABLE XLVII.—COMPARATIVE SUMMARY, WAGE-EARNERS, MEN, WOMEN, AND CHILDREN, BY GEOGRAPHIC DIVISIONS, WITH PER CENT OF EACH TOTAL, FOR EACH DIVISION AND OF EACH DIVISION, TO TOTAL FOR UNITED STATES: 1870 TO 1900.

GEOGRAPHIC DIVISIONS.	Year.	NUMBER OF WAGE-EARNERS.				PER CENT OF EACH CLASS OF TOTAL, FOR EACH DIVISION.			PER CENT OF EACH DIVISION OF TOTAL FOR UNITED STATES.			
		Total.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.	Total.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.
United States	1900	5,314,589	4,114,348	1,031,608	168,583	77.4	19.4	3.2	100.0	100.0	100.0	100.0
	1890	4,251,535	3,326,964	803,686	120,885	78.3	18.9	2.8	100.0	100.0	100.0	100.0
	1880	2,732,595	2,019,035	531,639	181,921	73.9	19.4	6.7	100.0	100.0	100.0	100.0
	1870	2,053,996	1,615,598	323,770	114,628	78.6	15.8	5.6	100.0	100.0	100.0	100.0
New England states	1900	947,645	662,163	260,295	25,187	69.9	27.5	2.6	17.8	16.1	25.2	14.9
	1890	821,499	559,528	239,894	22,077	68.1	29.2	2.7	19.3	16.8	29.8	18.3
	1880	647,373	420,788	185,329	41,306	65.0	28.6	6.4	23.7	20.8	34.8	22.7
	1870	526,969	345,960	149,886	31,123	65.7	28.4	5.9	25.7	21.4	46.3	27.1
Middle states	1900	1,979,693	1,473,175	445,293	61,225	74.4	22.5	3.1	37.3	35.8	43.2	36.3
	1890	1,634,930	1,238,356	350,961	45,613	75.7	21.5	2.8	38.5	37.2	43.7	37.7
	1880	1,139,372	798,139	262,115	79,118	70.1	23.0	6.9	41.7	39.5	49.3	43.5
	1870	806,094	628,135	128,398	49,561	77.9	15.9	6.2	39.2	38.9	39.6	43.2
Southern states	1900	656,169	529,679	83,452	43,038	80.7	12.7	6.6	12.3	12.9	8.1	25.5
	1890	411,971	336,591	52,319	23,061	81.7	12.7	5.6	9.7	10.1	6.5	19.1
	1880	223,376	181,587	22,150	19,639	81.3	9.9	8.8	8.2	9.0	4.2	10.8
	1870	186,470	161,299	13,581	11,590	86.5	7.3	6.2	9.1	10.0	4.2	10.1
Central states	1900	1,472,128	1,225,357	212,797	33,974	83.2	14.5	2.3	27.7	29.8	20.6	20.2
	1890	1,197,500	1,030,388	141,349	25,763	86.0	11.8	2.2	28.2	31.0	17.6	21.3
	1880	646,158	550,066	56,977	39,115	85.1	8.8	6.1	23.6	27.3	10.7	21.5
	1870	488,813	435,977	30,713	21,623	89.3	6.3	4.4	23.8	27.0	9.5	18.9
Western states	1900	116,815	104,881	9,449	2,485	89.8	8.1	2.1	2.2	2.5	0.9	1.5
	1890	77,502	69,218	6,100	2,184	89.3	7.9	2.8	1.8	2.1	0.8	1.8
	1880	28,003	25,804	1,025	1,174	92.1	3.7	4.2	1.0	1.3	0.2	0.6
	1870	16,848	16,409	251	188	97.4	1.5	1.1	0.8	1.0	0.1	0.2
Pacific states	1900	142,089	119,093	20,322	2,674	83.8	14.3	1.9	2.7	2.9	2.0	1.6
	1890	108,133	92,883	13,063	2,187	85.9	12.1	2.0	2.5	2.8	1.6	1.8
	1880	48,313	42,701	4,043	1,569	88.4	8.4	3.2	1.8	2.1	0.8	0.9
	1870	29,302	27,818	941	543	94.9	3.2	1.9	1.4	1.7	0.3	0.5

In 1870 the order of the several geographic groups in the number and percentage of child employment was as follows: Middle states, 49,561, or 6.2 per cent; New England states, 31,123, or 5.9 per cent; Central states, 21,623, or 4.4 per cent; Southern states, 11,590, or 6.2 per cent; Pacific states, 543, or 1.9 per cent; and Western states, 188, or 1.1 per cent. In 1900 the figures were as follows: Middle states, 61,225, or 3.1 per cent; Southern states, 43,038, or 6.6 per cent; Central states, 33,974, or 2.3 per cent; New England states, 25,187, or 2.6 per cent; Pacific states, 2,674, or 1.9 per cent; and Western states, 2,485, or 2.1 per cent. The Southern and Western divisions show percentages of increase in child labor from 6.2 in 1870 to 6.6 in 1900 for the Southern, and from 1.1 to 2.1 for the Western. The Pacific states show the same per cent for the two censuses, 1.9. The Middle and Central divisions, while increasing the absolute number of children employed, show percentages of decrease from 6.2 to 3.1, and 4.4 to 2.3, respectively. The New England group shows the only absolute decrease in the number of children—from 31,123 to 25,187, or from 5.9 per cent to 2.6 per cent.

The decrease from 1880 to 1890 in the percentage of child employment is due in part to the enactment of laws either prohibiting their employment under a certain age or compelling their attendance at school for a part of the year.

From 1880 to 1890, in several of the geographic divisions, there were notable decreases in the number of children employed, as follows: In the New England states from 41,306 to 22,077; in the Middle states from 79,118 to 45,613; and in the Central states from 39,115 to 25,763. In each of these divisions, from 1890 to 1900, this decrease was followed, though in a lesser degree.

In all the geographic divisions there are laws restricting, either specifically or by virtue of their own inherent effects, the employment of children, but these laws are wanting in most of the Southern states. A potent influence against the enactment of such laws in that section is the rise of the Southern states into the ranks of manufacturing states. Naturally very little is permitted to stand in the way of the fullest employment of labor under the new conditions. A greater proportion of the native children in the Southern states are necessarily employed in the mills than is the case in the New England and Middle states, where there is a large floating foreign population from which to draw. The South has no such resource for any part of the labor required. The increased demand for labor in that section, it is believed, actually necessitated the large proportionate employment of children.

From the general distribution and the large percentage of the decrease in the country at large, from 1880 to 1890, other causes than legislation must be credited with the effect. A difference in the method of ascertaining the average at the two censuses may have contributed to this falling off.

4. *Comparison by States.*—Table XLVIII is a comparative summary of states ranked by number of wage-earners—men, women, and children—amount of capital, and value of products, 1870 to 1900.

TABLE XLVIII.—COMPARATIVE SUMMARY, STATES AND TERRITORIES, RANKED BY WAGE-EARNERS, MEN, WOMEN, AND CHILDREN, AMOUNT OF CAPITAL, AND VALUE OF PRODUCTS: 1870 TO 1900.

STATES AND TERRITORIES.	Year.	TOTAL WAGE-EARNERS		MEN, 16 YEARS AND OVER.		WOMEN, 16 YEARS AND OVER.		CHILDREN, UNDER 16 YEARS.		CAPITAL.		PRODUCTS.	
		Rank.	Number.	Rank.	Number.	Rank.	Number.	Rank.	Number.	Rank.	Amount.	Rank.	Value.
United States[1]	1900	.....	5,314,539	.....	4,114,348	.....	1,031,608	.....	168,583	.....	$9,831,486,500	.....	$13,010,036,514
	1890	.....	4,251,535	.....	3,326,964	.....	803,686	.....	120,885	.....	6,525,050,759	.....	9,372,378,843
	1880	.....	2,732,595	.....	2,019,035	.....	531,689	.....	181,921	.....	2,790,272,606	.....	5,369,579,191
	1870	.....	2,053,996	.....	1,615,598	.....	323,770	.....	114,626	.....	2,118,208,769	.....	4,232,325,442
Alabama	1900	23	52,902	22	45,530	28	3,898	17	3,474	27	70,370,081	30	80,741,449
	1890	25	31,137	24	27,848	31	1,864	24	1,425	24	46,122,571	27	51,226,605
	1880	31	10,019	30	8,368	29	842	27	809	30	9,668,008	32	13,565,504
	1870	28	8,248	29	7,196	26	664	28	388	28	5,714,032	29	13,040,644
Arizona	1900	42	3,266	42	3,186	49	42	43	38	42	10,157,408	41	21,815,189
	1890	48	458	48	440	48	9	46	9	48	616,629	48	947,647
	1880	47	220	46	216	44	2	45	2	47	272,600	47	618,365
	1870	47	84	47	84	.....	.....	.....	.....	46	150,700	46	185,410
Arkansas	1900	33	26,501	32	25,158	40	700	33	643	37	35,960,[illegible]	38	45,197,731
	1890	38	14,143	37	13,277	40	463	33	403	37	14,971,[illegible]	37	22,659,179
	1880	37	4,557	36	4,307	39	90	37	160	39	2,953,[illegible]	37	6,756,159
	1870	34	3,206	34	3,077	36	47	34	82	40	1,782,[illegible]	38	4,629,234
California	1900	14	91,047	13	71,648	15	17,285	22	2,114	12	205,895,025	12	302,874,761
	1890	14	72,696	14	59,065	16	11,774	20	1,857	11	146,797,102	12	213,403,996
	1880	16	43,693	13	38,311	16	3,922	22	1,460	13	61,243,784	12	116,218,973
	1870	19	25,392	17	24,040	25	873	26	479	14	39,728,202	16	66,594,556
Colorado	1900	35	24,725	35	22,588	34	1,894	38	243	30	62,825,472	27	102,830,137
	1890	36	15,016	36	13,521	36	1,223	35	272	36	26,651,840	28	42,480,205
	1880	35	5,074	33	4,652	34	266	38	156	36	4,311,714	31	14,260,159
	1870	41	876	41	874	40	2	.....	.....	36	2,885,605	39	2,852,820
Connecticut	1900	7	176,694	9	130,610	7	42,605	16	3,479	8	314,696,736	11	352,824,106
	1890	8	140,514	10	101,818	6	36,111	14	3,085	9	227,004,496	10	248,336,364
	1880	7	112,915	7	75,619	4	28,851	7	8,445	6	120,480,275	7	185,697 211
	1870	5	89,523	6	61,684	4	20,810	4	7,029	5	95,281,278	8	161,065,474

[1] Exclusive of Alaska and Hawaii.

TABLE XLVIII.—COMPARATIVE SUMMARY, STATES AND TERRITORIES, RANKED BY WAGE-EARNERS, MEN, WOMEN, AND CHILDREN, AMOUNT OF CAPITAL, AND VALUE OF PRODUCTS: 1870 TO 1890—Continued.

STATES AND TERRITORIES.	Year.	TOTAL WAGE-EARNERS.		MEN, 16 YEARS AND OVER.		WOMEN, 16 YEARS AND OVER.		CHILDREN, UNDER 16 YEARS.		CAPITAL.		PRODUCTS.	
		Rank.	Number.	Rank.	Number.	Rank.	Number.	Rank.	Number.	Rank.	Amount.	Rank.	Value.
Dakota	[1]1900												
	[1]1890												
	1880	41	868	40	854	41	8	43	6	43	$771,428	41	$2,373,970
	1870	46	91	46	89			39	2	47	79,200	47	178,570
Delaware	1900	38	22,203	38	17,765	29	3,579	29	859	35	41,203,239	37	45,387,630
	1890	30	20,479	34	16,219	27	2,890	25	1,370	29	33,695,400	35	37,571,848
	1880	27	12,638	28	10,250	24	1,426	25	962	24	15,655,822	28	20,514,438
	1870	27	9,710	27	7,705	21	1,199	21	806	26	10,839,098	27	16,791,382
District of Columbia	1900	36	24,693	37	20,415	27	4,162	40	116	34	41,981,245	35	47,667,622
	1890	32	20,406	31	17,114	26	3,159	39	133	34	28,865,089	32	39,331,437
	1880	32	7,146	31	5,496	25	1,389	34	261	33	5,552,526	34	11,882,316
	1870	33	4,685	33	4,333	30	216	32	136	32	5,021,925	33	9,292,173
Florida	1900	29	34,230	28	32,188	37	1,668	34	374	40	33,107,477	40	36,810,243
	1890	39	13,119	39	11,539	34	1,312	36	268	39	11,110,304	39	18,222,890
	1880	34	5,504	34	4,564	30	558	33	382	37	3,210,680	38	5,546,448
	1870	37	2,749	37	2,670	38	20	36	59	41	1,679,930	37	4,685,403
Georgia	1900	15	83,842	15	66,540	19	10,929	8	6,373	23	89,789,656	26	106,654,527
	1890	20	52,298	19	42,779	21	5,998	10	3,521	21	56,921,580	25	68,917,020
	1880	20	24,875	21	18,937	17	3,619	19	2,319	22	20,672,410	22	36,440,948
	1870	23	17,871	23	15,078	19	1,498	19	1,295	23	18,930,125	22	31,196,115
Idaho	1900	49	1,477	49	1,395	47	59	46	23	46	2,941,524	48	4,020,532
	1890	46	667	46	629	45	21	42	17	46	1,048,916	46	1,396,096
	1880	46	388	45	374	41	8	43	6	44	677,215	45	1,271,317
	1870	45	265	45	264			40	1	45	742,300	44	1,047,624
Illinois	1900	4	395,110	4	325,713	4	58,978	4	10,419	4	776,829,598	3	1,259,730,168
	1890	5	280,218	5	241,882	7	32,910	6	5,426	4	502,004,512	3	908,640,280
	1880	5	144,727	5	120,558	10	15,233	6	8,936	5	140,652,066	4	414,864,673
	1870	6	82,979	5	73,045	11	6,717	9	3,217	6	94,868,057	6	205,620,672
Indiana	1900	9	155,956	8	133,009	13	19,266	15	3,681	11	234,481,528	8	378,120,140
	1890	11	110,590	11	94,960	15	12,315	12	3,315	12	131,605,366	11	226,825,082
	1880	10	69,508	9	62,072	18	3,615	13	3,821	12	65,742,962	10	148,006,411
	1870	10	58,852	10	54,412	15	2,272	15	2,168	11	52,052,425	11	108,617,278
Indian Territory	1900	48	1,714	48	1,625	45	73	48	16	48	2,624,265	49	3,892,181
	1890	49	167	49	157	49	3	47	7	49	204,329	49	248,932
	1880												
	1870												
Iowa	1900	22	58,553	20	48,417	23	8,248	23	1,888	20	102,733,103	17	164,617,877
	1890	21	51,037	18	44,210	23	5,183	22	1,644	19	77,513,097	17	125,049,183
	1880	19	28,372	19	25,382	23	1,431	21	1,559	18	33,987,886	19	71,045,926
	1870	20	25,032	19	23,395	24	951	22	686	18	22,420,183	18	46,534,322
Kansas	1900	28	35,193	29	31,171	31	3,162	28	860	29	66,827,362	16	172,129,398
	1890	27	28,237	25	24,846	29	2,510	28	881	25	43,926,002	18	110,219,805
	1880	30	12,062	27	11,139	32	392	30	531	29	11,192,315	24	30,343,777
	1870	31	6,844	31	6,599	33	118	33	127	35	4,319,060	30	11,775,833
Kentucky	1900	21	62,962	19	51,101	22	9,174	18	2,687	18	104,070,791	18	154,166,365
	1890	18	56,558	17	46,015	18	8,280	18	2,263	17	79,811,980	16	126,719,857
	1880	18	37,891	16	30,949	19	3,529	16	2,913	17	45,813,039	17	75,483,377
	1870	16	30,636	15	27,687	22	1,159	16	1,790	17	29,277,809	17	54,625,809
Louisiana	1900	27	42,210	26	35,531	25	5,448	25	1,231	17	113,084,294	22	121,181,683
	1890	26	28,377	27	20,967	19	6,798	32	612	27	34,754,121	26	57,806,713
	1880	28	12,167	29	10,171	26	1,335	29	661	27	11,462,468	25	24,205,183
	1870	17	30,071	18	23,637	12	4,210	13	2,224	21	18,315,974	23	24,161,905
Maine	1900	17	74,816	18	53,701	14	18,913	20	2,202	16	122,918,826	21	127,361,485
	1890	15	70,374	16	46,881	10	21,051	16	2,442	16	80,419,809	19	95,689,500
	1880	14	52,954	15	35,431	11	13,777	14	3,746	16	49,988,171	15	79,829,793
	1870	12	49,180	12	34,310	6	13,448	18	1,422	13	39,796,190	12	79,497,521
Maryland	1900	12	108,325	12	72,824	8	29,617	9	5,884	15	163,147,260	14	242,552,990
	1890	12	97,808	12	67,261	8	26,432	9	4,115	15	119,667,316	14	171,842,593
	1880	9	74,945	12	46,698	6	21,700	9	6,547	14	58,742,384	13	106,780,563
	1870	13	44,860	13	34,061	10	8,278	11	2,521	15	36,438,729	14	76,593,613
Massachusetts	1900	3	497,448	3	341,783	2	143,109	3	12,556	3	823,264,287	4	1,035,198,989
	1890	3	447,270	3	305,151	2	133,452	3	8,667	3	630,032,341	4	888,160,403
	1880	3	352,255	3	228,834	2	105,976	3	17,445	3	303,806,185	3	631,135,284
	1870	3	279,380	3	179,032	1	86,229	3	14,119	3	231,677,862	3	553,912,568
Michigan	1900	8	162,355	7	136,627	11	23,092	19	2,636	9	284,097,133	10	356,944,082
	1890	7	148,674	6	133,176	13	12,857	15	2,641	6	262,412,240	8	277,896,706
	1880	8	77,591	8	68,445	15	4,784	11	4,362	8	92,930,959	9	150,715,025
	1870	9	63,694	7	58,347	14	2,941	12	2,406	9	71,712,283	9	118,394,676
Minnesota	1900	16	77,234	14	66,889	21	9,553	31	792	14	165,832,246	13	262,655,881
	1890	16	69,790	13	63,522	22	5,508	30	760	13	127,686,618	13	192,033,478
	1880	22	21,247	21	18,937	22	1,636	28	674	19	31,004,811	16	76,065,198
	1870	26	11,290	25	10,892	29	259	31	139	24	11,993,729	25	23,110,700
Mississippi	1900	34	26,418	34	23,643	36	1,726	26	1,049	38	35,807,419	39	40,431,386
	1890	37	14,465	38	12,320	35	1,236	27	909	38	14,896,884	38	18,705,834
	1880	33	5,827	32	4,887	31	413	31	527	35	4,727,600	36	7,518,302
	1870	32	5,941	32	5,500	31	191	30	250	33	4,501,714	34	8,154,758
Missouri	1900	11	134,975	11	106,782	10	23,683	12	4,510	10	249,888,581	7	385,492,784
	1890	9	124,203	9	102,418	12	18,294	11	3,491	10	189,558,546	7	324,561,993
	1880	11	63,995	10	54,200	14	5,474	12	4,321	11	72,507,844	8	165,386,205
	1870	8	65,354	9	55,904	13	3,884	8	5,566	7	80,257,244	5	206,213,423

[1] See North Dakota and South Dakota.

TABLE XLVIII.—COMPARATIUE SUMMARY, STATES AND TERRITORIES, RANKED BY WAGE-EARNERS, MEN, WOMEN, AND CHILDREN, AMOUNT OF CAPITAL, AND VALUE OF PRODUCTS: 1870 TO 1900—Continued.

STATES AND TERRITORIES.	Year.	TOTAL WAGE-EARNERS.		MEN, 16 YEARS AND OVER.		WOMEN, 16 YEARS AND OVER.		CHILDREN, UNDER 16 YEARS.		CAPITAL.		PRODUCTS.	
		Rank.	Number.	Rank.	Number.	Rank.	Number.	Rank.	Number.	Rank.	Amount.	Rank.	Value.
Montana	1900	40	10,117	40	9,718	41	287	42	112	36	$40,945,846	34	$57,075,824
	1890	41	2,386	41	2,300	43	75	45	11	41	4,293,794	42	5,507,573
	1880	42	578	41	574	43	3	46	1	42	899,390	43	1,835,867
	1870	42	701	42	697	40	2	39	2	39	1,794,300	41	2,494,511
Nebraska	1900	37	24,461	36	21,059	33	2,626	32	776	25	71,982,127	19	143,990,102
	1890	31	20,450	29	18,263	32	1,473	31	714	26	37,569,508	20	93,037,794
	1880	36	4,793	35	4,464	36	120	36	209	34	4,881,150	33	12,627,336
	1870	38	2,665	38	2,558	34	81	37	26	37	2,169,963	36	5,738,512
Nevada	1900	50	601	50	563	50	18	47	20	50	1,472,784	50	1,643,675
	1890	47	558	47	543	47	14	49	1	45	1,211,269	47	1,105,063
	1880	43	577	42	556	42	5	40	16	41	1,323,300	42	2,179,626
	1870	36	2,859	35	2,856	39	3	.....	.....	31	5,127,790	28	15,870,539
New Hampshire	1900	20	70,419	21	46,847	12	21,921	24	1,651	21	100,929,661	24	118,709,308
	1890	17	60,111	21	37,509	11	20,933	21	1,669	18	79,375,160	22	85,770,549
	1880	15	48,831	17	29,356	9	16,184	15	3,291	15	51,112,263	18	73,978,028
	1870	15	40,783	16	25,829	7	12,775	14	2,179	16	36,023,743	15	71,038,249
New Jersey	1900	6	241,582	6	181,879	6	51,661	7	8,042	6	502,824,082	6	611,748,933
	1890	6	173,778	7	131,370	5	37,095	7	5,313	7	250,805,745	6	354,573,571
	1880	6	126,038	6	86,787	5	27,099	5	12,152	7	106,226,593	6	251,380,236
	1870	7	75,552	8	58,115	9	11,198	5	6,239	8	79,606,719	7	169,237,782
New Mexico	1900	44	2,600	44	2,499	46	72	45	29	47	2,698,786	46	5,605,795
	1890	45	849	45	818	46	16	44	15	47	965,938	45	1,516,195
	1880	44	557	43	553	.....	.....	44	4	45	463,275	44	1,284,846
	1870	44	427	44	423	41	1	38	3	42	1,450,695	43	1,489,868
New York	1900	1	849,056	1	605,686	1	230,181	2	13,189	1	1,651,210,220	1	2,175,726,900
	1890	1	752,066	1	545,453	1	194,350	2	12,263	1	1,130,161,195	1	1,711,577,671
	1880	1	531,533	1	364,549	1	137,455	2	29,529	1	514,246,575	1	1,080,696,596
	1870	1	351,860	1	267,378	2	63,795	1	20,627	2	366,994,320	1	785,194,651
North Carolina	1900	19	70,570	23	44,549	17	15,644	5	10,377	24	76,503,894	28	94,919,663
	1890	24	33,625	26	22,665	20	6,227	8	4,733	31	32,745,995	31	40,375,450
	1880	23	18,109	25	12,818	20	2,939	18	2,352	26	13,045,639	29	20,095,037
	1870	24	13,622	24	11,339	20	1,422	20	861	27	8,140,473	26	19,021,327
North Dakota	1900	45	2,398	46	2,168	43	193	44	37	44	5,396,490	44	9,188,114
	1890	43	1,499	43	1,398	42	85	43	16	43	2,894,553	43	5,028,107
	[1]1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	[1]1870	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio	1900	5	345,869	5	287,789	5	58,711	13	4,369	5	605,792,266	5	832,438,113
	1890	4	292,982	4	244,900	4	41,581	4	6,551	5	402,793,019	5	641,688,064
	1880	4	183,609	4	152,217	7	18,563	4	12,829	4	188,939,614	5	348,298,390
	1870	4	137,202	4	119,686	8	11,575	6	5,941	4	141,928,964	4	269,713,610
Oklahoma	1900	47	2,054	47	1,876	44	140	43	38	45	3,352,064	45	7,083,988
	1890	50	147	50	133	49	3	45	11	50	95,519	50	180,445
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1870	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon	1900	39	17,236	39	15,120	35	1,821	35	295	39	33,422,393	36	46,000,587
	1890	35	16,760	35	15,754	37	806	38	200	38	32,122,051	30	41,432,174
	1880	38	3,473	37	3,280	38	96	39	97	32	6,312,056	35	10,931,282
	1870	35	2,884	36	2,753	35	67	35	64	34	4,370,849	35	6,877,887
Pennsylvania	1900	2	783,884	2	574,606	3	126,093	1	33,185	2	1,551,548,712	2	1,894,790,860
	1890	2	570,893	2	460,939	3	87,035	1	22,419	2	991,243,115	2	1,331,794,901
	1880	2	387,072	2	284,359	3	78,046	1	29,667	2	474,510,993	2	744,818,445
	1870	2	319,487	2	256,543	3	43,712	2	19,282	1	406,821,845	2	711,894,344
Rhode Island	1900	13	98,813	16	64,508	9	29,269	11	5,036	13	183,784,587	15	184,074,378
	1890	13	81,111	15	49,684	9	25,602	5	5,825	14	126,483,401	15	142,500,625
	1880	12	62,878	14	37,060	8	18,270	8	7,548	9	75,575,943	14	104,163,621
	1870	11	49,417	14	28,804	5	14,752	7	5,861	10	66,557,322	10	111,418,354
South Carolina	1900	26	48,135	30	29,823	20	9,752	6	8,560	28	67,356,465	32	58,748,731
	1890	28	22,748	33	16,664	24	3,775	17	2,309	33	29,276,261	36	31,926,681
	1880	25	15,828	28	13,687	28	1,028	28	1,118	28	11,205,894	30	16,788,008
	1870	29	8,141	30	7,099	27	578	27	464	29	5,400,418	32	9,558,981
South Dakota	1900	43	3,121	43	2,776	42	231	41	114	43	7,578,895	43	12,231,289
	1890	42	2,011	42	1,846	41	129	41	36	42	3,207,796	41	5,682,748
	[1]1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	[1]1870	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	1900	24	50,504	25	42,492	24	5,841	21	2,171	26	71,814,038	25	108,144,565
	1890	22	37,487	22	32,644	25	3,278	23	1,570	22	51,475,092	23	72,355,286
	1880	21	22,445	20	19,575	27	1,196	20	1,674	23	20,092,845	21	37,074,886
	1870	21	19,412	21	17,663	23	1,089	23	660	22	15,595,295	21	34,362,636
Texas	1900	25	48,158	24	44,199	32	2,913	27	1,041	22	90,433,882	28	119,414,982
	1890	23	34,794	23	31,845	30	1,977	26	972	23	46,815,181	24	70,433,551
	1880	29	12,159	26	11,645	37	116	32	398	31	9,245,561	27	20,719,928
	1870	30	7,927	28	7,450	32	157	29	520	30	5,284,110	31	11,517,302
Utah	1900	41	6,615	41	5,579	39	813	39	218	41	14,650,948	42	21,156,183
	1890	40	4,349	40	3,657	38	485	37	207	40	6,583,022	40	8,911,647
	1880	39	2,495	38	2,042	35	221	35	232	40	2,656,657	39	4,324,992
	1870	39	1,534	39	1,465	37	43	37	26	43	1,391,898	42	2,343,019
Vermont	1900	32	29,455	33	24,714	26	4,478	37	263	33	48,547,964	33	57,623,815
	1890	29	22,119	28	18,985	28	2,745	34	389	30	32,763,291	34	38,340,066
	1880	24	17,540	22	14,438	21	2,271	26	831	21	23,265,224	23	31,354,366
	1870	22	18,686	22	16,301	18	1,872	25	513	19	20,329,637	21	32,184,606

[1] See Dakota.

TABLE XLVIII.—COMPARATIVE SUMMARY, STATES AND TERRITORIES, RANKED BY WAGE-EARNERS, MEN, WOMEN, AND CHILDREN, AMOUNT OF CAPITAL, AND VALUE OF PRODUCTS: 1870 TO 1890 Continued.

STATES AND TERRITORIES.	Year.	TOTAL WAGE-EARNERS.		MEN, 16 YEARS AND OVER.		WOMEN, 16 YEARS AND OVER.		CHILDREN, UNDER 16 YEARS.		CAPITAL.		PRODUCTS.	
		Rank.	Number.	Rank.	Number.	Rank.	Number.	Rank.	Number.	Rank.	Amount.	Rank.	Value.
Virginia	1900	18	72,702	17	56,341	18	12,197	14	4,164	19	$103,670,988	20	$132,172,910
	1890	19	53,566	20	40,664	17	9,655	13	3,247	20	63,456,799	21	88,363,824
	1880	17	40,184	18	28,779	13	6,144	10	5,261	20	26,968,990	20	51,780,992
	1870	18	26,974	20	22,175	16	2,259	10	2,540	20	18,455,400	19	38,364,322
Washington	1900	30	33,806	27	32,325	38	1,216	36	265	32	52,649,760	29	86,795,051
	1890	34	18,677	30	18,064	39	483	40	130	28	34,369,735	29	41,768,022
	1880	40	1,147	39	1,110	40	25	41	12	38	3,202,497	40	3,250,134
	1870	40	1,026	40	1,025	41	1	.....	.....	38	1,893,674	40	2,851,052
West Virginia	1900	31	33,272	31	29,083	30	3,349	30	840	31	55,904,238	31	74,838,330
	1890	33	19,340	32	17,074	33	1,455	29	811	35	28,118,030	33	38,702,125
	1880	26	14,311	24	12,900	33	346	24	1,065	25	13,883,390	26	22,867,126
	1870	25	11,672	26	10,728	28	287	24	657	25	11,084,520	24	24,102,201
Wisconsin	1900	10	142,075	10	120,131	16	16,266	10	5,679	7	330,568,779	9	360,818,942
	1890	10	120,066	8	105,320	14	12,751	19	1,935	8	246,515,404	9	248,546,164
	1880	13	57,109	11	48,255	12	6,241	17	2,613	10	78,821,802	11	128,255,480
	1870	14	48.910	11	40,296	17	2,114	17	1,500	12	41,981,872	13	77,214,326
Wyoming	1900	46	2,241	45	2,179	48	47	49	15	49	2,411,435	47	4,301,240
	1890	44	1,022	44	957	44	60	44	5	44	1,411,184	44	2,367,601
	1880	45	391	44	380	.....	.....	42	11	46	364,673	46	898,494
	1870	43	502	43	500	41	1	40	1	44	889,400	45	765,424

Pennsylvania ranked first in 1900 in the number of children wage-earners, having 33,135, but was second in total number of wage-earners and in men, and third in women. This ranking is to be expected in a state which was second in value of products. In 1890 Pennsylvania occupied the same position in all these particulars as in 1900. In 1870 the state was second in number of children wage-earners, having 19,232, and at that time it was also second in total wage-earners, and in men, and third in women, being second in value of products. This was also its rank in 1890. Measured by value of products, therefore, it has improved relatively in the employment of children. Pennsylvania has a prohibitory law, but the minimum age limit is lower than in some of the other states.

New York was second in 1900 in children wage-earners, having 13,189, but was first in total number of wage-earners, first in number of men, first in number of women, and first also in value of products. In 1870 the state was first in number of children, with 20,627, and first in all of the other items, except in number of women, its rank in that particular being second; so that the showing for 1900 is particularly satisfactory in its bearing upon the displacement of child labor. New York has both prohibitory and educational statutes.

The state ranking third in child labor in 1900 was Massachusetts, with 12,556 children employed. The state was also third in total number, and in men, and second in women. In value of products it ranked fourth. These are but repetitions of its rank in 1890. Massachusetts held third rank in child labor in 1870, with 14,119 children, while it was also third in value of products. The state ranked third in number of men and first in number of women. The increase in manufactures necessary to enable Massachusetts to maintain a high rank in value of products has not increased its rank in children wage-earners. This state has long been known as one in which laws have been enacted prohibiting the employment of children below a certain age, and providing for a given amount of schooling every year for children whose employment is permitted.

Illinois was fourth in 1900 in children wage-earners, having 10,419; and fourth also in total number, in men and in women. But the state was third in value of products—as good a relative showing, therefore, as the states mentioned above. In this state also there are prohibitory and restrictive laws. In 1890 Illinois was sixth in number of children employed, seventh in women, and fifth in men and in total number of wage-earners, while third in value of products. In 1870 its rank in child labor was ninth, with 3,217, yet it was sixth in value of products.

North Carolina was fifth in 1900 in children wage-earners, of whom it had 10,377. In total number of wage-earners it was nineteenth, in men twenty-third, and in women seventeenth. In value of products it was twenty-eighth. This, relatively, is not so good a showing for child labor as is made by some of the other states, but the various phases of the problem in the South ought to be carefully considered. In 1890 North Carolina was eighth in number of children employed, twentieth in women, twenty-sixth in men, twenty-fourth in total number of wage-earners, and thirty-first in value of products. In 1870 the state was twentieth in child labor, with 861, but its specialized manufactures had not developed, for it ranked only twenty-sixth in value of products. North Carolina has no prohibitive or restrictive legislation.

South Carolina was sixth in 1900, with 8,560 children wage-earners, while the state was twenty-sixth in total wage-earners, thirtieth in men, and twentieth in women. Its rank in value of products was thirty-second. In

1890 South Carolina was seventeenth in number of children employed, twenty-fourth in women, thirty-third in men, and twenty-eighth in total number of wage-earners, while it was thirty-sixth in value of products. In 1870 the state was twenty-seventh in child labor, with 464, and it was thirty-second in value of products. This great growth illustrates, as in Georgia and North Carolina, the development of the cotton manufacture in the South. The state has no prohibitory or restrictive statutes.

New Jersey was seventh in number of children wage-earners in 1900, with 8,042. Its rank in total wage-earners and in men and in women was sixth. The state ranked sixth, also, in value of products, being, therefore, one of the leading states in manufactures. Its proportion of children wage-earners is, as will be seen, relatively low. There are statutes prohibiting the employment of children under a given age and also educational restrictions. In 1890 New Jersey was also seventh in number of children employed, while it was fifth in women, seventh in men, sixth in total number of wage-earners, and sixth in value of products. In 1870 the state had a greater proportion of the children wage-earners of the United States, for it ranked fifth, with 6,239, although seventh in value of products.

Georgia was eighth in child labor in 1900, with 6,373. It was fifteenth in total wage-earners and in men, and nineteenth in women. In value of products it ranked twenty-sixth. Here, then, is another relatively high proportion of children to total wage-earners, due, primarily, to the sudden rise of a specialized industry requiring children. Georgia has no prohibitory statute and no restrictive educational law. In 1890 the state ranked tenth in number of children employed, twenty-first in women, nineteenth in men, and twentieth in total number of wage-earners, while in value of products it was twenty-fifth. In 1870 Georgia was nineteenth in child labor, with 1,295, and ranked twenty-second in value of products.

The ninth state in child labor in 1900 was Maryland, with 5,884, while in total wage-earners and in men it was twelfth, and in women eighth. In value of products the state was fourteenth. In 1890 the state occupied the same rank in all particulars. In 1870 Maryland ranked eleventh in child labor, having 2,521 children wage-earners, while it ranked fourteenth in value of products. In this state there is a prohibitory statute, but the minimum age is lower than in most of the other states.

Wisconsin ranked tenth in 1900, with 5,679 children wage-earners; it ranked tenth also in total and in men, while it was sixteenth in women. In value of products it was ninth. There is a prohibitory law in this state, but it is more favorable toward the employment of children than in most states having restrictive legislation. In 1890 the state was nineteenth in number of children employed, fourteenth in women, eighth in men, tenth in total number of wage-earners, and ninth in value of products. In 1870 Wisconsin was seventeenth, with 1,500 children, while in value of products it ranked thirteenth.

5. *Conclusions.*—A general conclusion derived from a study of the statistics relating to wage-earners during the past thirty years is that the proportion of children employed in factories to total child population in the United States and to total wage-earners employed has decreased. The exceptions are few indeed, either of states or industries employing a large number, in which this tendency is not marked.

The Southern states, it is true, have as a whole increased their proportion of child labor during the thirty years, but this is due to the rapid development of their manufactures within that period; to the absence of prohibitory statutes and of compulsory school laws; and to the peculiar conditions of the population, wholly native and permanent, from which their child labor is necessarily drawn.

The effect of prohibitory statutes and educational requirements in reducing the number of children wage-earners is shown in a marked manner for the decade ending in 1890.

The proportion of women to total wage-earners has increased, and the proportion of men and of children has decreased, confirming the assertion that women have, to a considerable extent, in many industries, displaced both men and children.

XXIII.

MONTHS IN OPERATION.

The manufacturing schedule contained a question calling for the number of months in operation, during the census year, on full time; on three-quarters time; on one-half time; on one-quarter time and the number of months idle.

This question was inserted in the schedule in order to obtain data which would be of assistance in computing the average number of employees from the answer to the previous question relating to employment, and these data were of great value to the Census Office in these computations. It did not seem possible, however, to tabulate the information received in any manner that would possess statistical significance. To show that a certain number of establishments in a particular industry worked full time, a certain number three-quarters time, etc., would signify nothing unless accompanied by further data relating to the actual capacity, either in machinery or production, of all the establishments in the industry in question. By an analysis based on such facts it would become possible to show what proportion of the whole productive machinery of the country in any industry was employed to manufacture the product of the year.

It seems feasible to obtain this information in future censuses in a manner that will render the above computation possible for certain selected and highly organized industries, like iron and steel, the cotton manufacture, etc. Valuable data might thus be elicited, indicating to what extent, if any, the productive capacity of the country in the industry selected was in excess of the actual product, or, in other words, how elastic to a demand for increased production was the existing equipment of the selected industry. No figures contained in this report throw any satisfactory light upon this question. It is stated in the special report on the boot and shoe industry that the machinery capacity employed in that industry was sufficient to produce in seven months of the year all the boots and shoes for the normal annual consumption. But in boots and shoes, as in other industries, the consumption demand holds no fixed relation to the producing capacity of the country, on account of the great variation in that consumption which arises as between seasons or years of unusual business activity and times of depression.

XXIV.

MISCELLANEOUS EXPENSES.

The schedule used at the census of 1890 was the first to contain separate inquiries concerning the amount paid as "miscellaneous expenses." The inquiry required separate amounts to be reported for the following items: (1) Amount paid for rent of tenancy, power, and heat; (2) for taxes; (3) for insurance; (4) for repairs, ordinary, of buildings and machinery; (5) for commissions and expenses of sales department; (6) for interest on cash used in business; (7) for all other sundries not elsewhere reported. In the schedule for 1900 the items were as follows: (1) Amount paid for rent of works, if any; (2) for rent of power and heat; (3) for taxes, not including internal revenue; (4) for rent of offices, and for interest, insurance, internal-revenue tax and stamps, ordinary repairs of buildings and machinery, advertising, and all other sundries not reported under the head of materials; and (5) the amount, if any, paid for contract work.

The inquiry at the two censuses covered the same items, with the exception of "commissions and expenses of sales department," reported for 1890, and the specific addition of "contract work" in 1900. The rearrangement for 1900 was made for the purpose of condensation.

In 1890 the amount paid for rent of tenancy was separated from the amount paid for power and heat by estimating the latter amount. The amount of tax included internal revenue. Contract work was reported under the head of "paid for commissions and expenses of sales department," and the total amount segregated by the office so as to show the cost of such work.

The amounts reported for each item, in reply to the inquiries in 1890, were shown separately in Part I, in the statistics for certain selected industries; in Part II, in the statistics for cities; and in Part III, in the special reports on important industries. The statistical totals for the United States, however, in Part I, contained only the total for all miscellaneous expenses, which aggregated $631,225,035, and represented 7.81 per cent of the total cost of manufacturing as returned on the schedules.

The following table shows the total amount of miscellaneous expenses as returned at the census of 1900, together with the various component items, and the percentual ratio of each to the whole:

TABLE XLIX.—*Miscellaneous expenses.*

ITEMS.	1900	
	Amount.	Per cent of total.
Total	$1,027,755,778	100.0
Rent of works	95,708,226	9.3
Taxes, not including internal revenue	47,198,238	4.6
Rent of offices, insurance, interest, etc.	713,937,348	69.5
Contract work	170,911,966	16.6

The total miscellaneous expenses, $1,027,755,778, represent 9.3 per cent of the total cost of manufacturing in 1900, as shown by these reports. Of this sum, $47,198,238, or 4.6 per cent, was the amount paid by manufacturing establishments for taxes to state, county, and municipal authorities, exclusive of internal-revenue taxes and customs duties on imported materials. The sum of $95,708,226, representing 9.3 per cent of the miscellaneous expenses, was paid for rent of mills, factories, workshops, etc., leased or rented by manufacturing establishments. If 8 per cent be taken as the average gross rent return, the amount paid for rent represents properties having a value of $1,196,000,000, an enormous sum which is omitted from the capital invested in manufacturing as shown in the tables at this census. The aggregate of other miscellaneous expenses, $713,937,348, which represented 69.5 per cent of the whole amount, was chiefly paid for interest, insurance, and repairs, although the other items included, such as rent of offices and advertising, formed a large amount of the total. The amount paid for contract work, $170,911,966, or 16.6 per cent of the total, represents the amount paid to contractors to whom were let certain portions of the work carried on by various manufacturing establishments. From this amount the contractors paid for their labor and incidental materials, and obtained their profits. This total, so far as it represents wages, appears in the total amount paid for wages, wherever returns were secured from the contractors in question.

While the inquiry for miscellaneous expenses was explicit in character and was intended to secure a return of every manufacturing expense not included under the head of wages or materials, it is nevertheless a fact that the aggregate return for these three items does not represent the total cost of manufacture. The Twelfth Census found it impracticable to take cognizance of such items of business bookkeeping as depreciation or

maintenance charges, insurance against mercantile and trade risks, and the cost of selling products, and therefore, as explained at length elsewhere in this report, no accurate estimate of the profits of manufacture in gross or in detail can be made by subtracting from the total value of product the items of cost herein shown.

XXV.

MATERIALS.

The most important item of expense in manufacturing is the cost of materials. The total sum expended for materials during the census year was $7,345,413,651, or 66.2 per cent of the total cost of manufactures, as compared with $2,726,045,110 for wages and salaries, and $1,027,755,778 for miscellaneous expenses.

1. *Three Classes.*—The materials represented in this value may be roughly divided into three classes:

(*a*) Materials purchased in the raw state.

(*b*) Materials purchased in a partially manufactured form.

(*c*) Fuel, freight, etc.

Materials of the first class include agricultural products, raw cotton and wool, live stock, fish, standing timber, and ores of all kinds. Materials of the second class include cotton, woolen, and other yarns, pig iron, lumber, etc., not to mention the numerous more highly finished products which are used as materials in certain establishments. The mill supplies of every description which are required in manufacturing processes are also included in the second class. Some of these supplies, such as dyestuffs, become component parts of the products, while others, such as lubricating oil, are merely a necessary expense attached to machine production. This last is also true of fuel, which is included with materials of the third class. Included also with the materials of the third class is the amount paid by manufacturers for freight, where this amount was reported separately from the cost of the materials purchased. The item of freight is a troublesome one, and its separation from the cost of the materials was in many cases impossible.[1]

[1] The amount paid for freight on materials was presumably included in the total cost of materials as reported by the manufacturers at censuses previous to 1890. At that census it was included either in the total cost of materials or in the "amount paid for sundries," under miscellaneous items of expense. In order to secure a more definite report in regard to what part of the total cost is paid for freight, the schedule of the census of 1900 required the amount paid as freight on materials to be reported as a separate item under the head of "materials used," and the instructions required the cost of materials to be reported exclusive of freight charges; but if such a separation was not practicable, the manufacturers were allowed to include the freight charges in the total cost of materials, stating that such charges were so included. Many of the establishments were apparently able to make a separation of the amount paid for freight during the year, the total amount so reported being $106,160,757. In a number of instances, however, the total cost of materials as reported included the amount of freight paid, and therefore it was impracticable to make a complete segregation; so that the amount shown above as paid for freight can not be accepted as the total amount paid for this item by all the manufacturers during the census year.

The total cost of materials in 1900, divided among these three classes, was as follows:

Materials purchased in the raw state	$2,389,140,942
Materials purchased in partially manufactured form	4,633,804,967
Fuel, freight, etc	322,467,742

It is a fact worthy of note in this connection that the value of the crude materials consumed in manufactures is slightly in excess of the total amount paid out in wages during the census year.

2. *Sources of Raw Materials.*—By means of the distinction between raw and partially manufactured materials, it is possible to trace the materials used in manufactures to their original sources, and thus to indicate the proportion which each of the soil industries contribute toward the final total value of manufactured products. Table L shows the cost of raw materials, classified by their source, used in 1900 in each of the 15 generic groups into which the Twelfth Census divides the manufactures of the country.

TABLE L.—*Cost of raw materials, distributed by sources, and by groups of industries: 1900.*

SOURCE OF RAW MATERIALS.	Cost of raw materials.
All sources	$2,389,140,942
Farm	1,940,727,048
Forest	118,803,115
Mines	319,975,108
Sea	9,635,671
Farm	1,940,727,048
Group 1—Food and kindred products	1,271,145,225
Group 2—Textiles	314,089,230
Group 5—Leather and its finished products	134,809,625
Group 7—Liquors and beverages	36,976,104
Group 8—Chemicals and allied products	60,743,579
Group 11—Tobacco	86,709,511
Group 14—Miscellaneous industries	35,783,256
Group 15—Hand trades	470,518
Forest	118,803,115
Group 4—Lumber and its remanufactures	64,504,346
Group 6—Paper and printing	11,396,844
Group 8—Chemicals and allied products	2,951,860
Group 12—Vehicles for land transportation	1,297,072
Group 14—Miscellaneous industries	37,479,567
Group 15—Hand trades	1,173,426
Mine	319,975,108
Group 3—Iron and steel and their products	74,781,646
Group 7—Liquors and beverages	364,304
Group 8—Chemicals and allied products	90,774,893
Group 9—Clay, glass, and stone products	18,971,906
Group 10—Metal and metal products other than iron and steel	98,737,311
Group 12—Vehicles for land transportation	45,730
Group 14—Miscellaneous industries	29,092,100
Group 15—Hand trades	7,207,218
Ocean, lake, and river	9,635,671
Group 1—Food and kindred products	8,305,163
Group 14—Miscellaneous industries	1,330,508

The sources of raw materials used are, as a rule, distinctly indicated by the nature of the product. Thus in the group "food and food products" all the raw materials are derived from the farm, except the small quantity represented in the industry of "fish and oyster canning and preserving," which comes from the ocean, lakes, and rivers. The raw materials of the textile industries, the leather industries, and the tobacco industry are all products of the farm, plantation, or ranch. The raw materials of group 3, "iron and steel and their

products;" of group 9, "clay, glass, and stone products;" and group 10, "metals and metal products other than iron and steel," are all products of the mining industry. The raw materials of group 4, "lumber and its remanufactures," and group 6, "paper and printing," are all products of the forest, except a small proportion of the materials used in the paper manufacture. Certain of the groups derive their materials from two or more of the soil industries. Thus group 8, "chemicals and allied products," depends for raw materials upon the farm, the forest, and the mine. Group 12, "vehicles for land transportation," depends upon the forest and the mine; and group 14 contains miscellaneous industries deriving their crude materials in nearly equal proportions from the farm, forest, and mine, with a small additional quantity coming from the ocean, lakes, and rivers. It appears from table L that agriculture is the most important source of the raw materials used in manufactures, contributing materials costing $1,940,727,048, or 81.2 per cent of the total. The mining industries rank next, contributing materials which cost $319,975,108, or 13.4 per cent of the total; followed by the forest, contributing materials which cost $118,803,115, or 5 per cent of the total; and the ocean, lakes, and rivers, etc., contributing materials which cost $9,635,671, or 0.4 per cent of the total.

This analysis of the original sources of raw materials of manufacture indicates more effectively than it has been possible to do heretofore in a census, the interdependence of our agricultural and manufacturing industries, and demonstrates how largely the development of the latter has been due to the abundance and the variety of our agricultural resources.

3. *Partially Manufactured Materials.*—The second group of materials mentioned above, that comprising partially manufactured products derived from materials contained in the first group, had a value of $4,633,804,967. The increased value of these materials over the value of the raw materials which enter into them was almost wholly the result of additional labor bestowed upon these materials. The whole of this sum is practically duplicated in the gross value of the manufactured products, which includes an additional value attributable to the final processes. The true value of manufactured products can, therefore, be approximately indicated by subtracting from the gross value, the value of materials purchased in partially manufactured form. This deduction leaves $8,370,595,176, which represents the value of all crude materials entering into the products, plus the value added by the various processes of manufacture in the ascending scale.[1]

4. *Relation of Materials to Products.*—The relation of materials to products presents an interesting study in another important particular, which must be carefully considered in order to avoid a misunderstanding of the true significance of the statistics of manufactures. At the census of 1880 Superintendent Walker divided the manufacturing and mechanical industries of the country into four groups, arranged in accordance with the relation of raw materials to finished products. These groups were described as follows:[2]

> First. Those industries in which the subject-matter is of a distinct and immediate commercial value, but the property does not reside in the person who treats it. In these cases, still, the value of the subject-matter treated is not embraced in the return of the materials. A familiar illustration is that of horseshoeing. It would be the height of absurdity for the smith, for example, to return the value of unshod horses among his "materials," and the value of the same when shod in his product. The census assigns as the materials of his industry merely the coal, iron, steel, etc., used, and as the value of his product merely the price of the personal service he renders, plus the cost of those materials. In the same category are many of the trades. The returns in respect to the industries of painting, plastering, and plumbing, for example, do not take into account the value of the houses, stores, factories, etc., before and after these operations, but regard only the added value given as the product, and, in the same way, only the paints, the plaster, and the lime, the tubing, iron, and brassware, etc., used, as the "materials" of these industries.
>
> Second. Those industries in which the entire value of the subject-matter is carried into the value of "materials," and appears again in the product, enhanced by the value of labor, by the charges for the use of capital, for rent, freight, etc., but in which the value of such subject-matter is small, compared with the cost of labor. The cabinetmaker takes a few dollars' worth of wood, coarse or fine, and works up this material into articles bearing ten times the value. The cutler takes a few pounds of steel and produces edged or pointed instruments of high cost, because of the time and skill required in their fabrication. In all these cases the value of the product is not greatly enhanced by the fact that the entire subject-matter of the industry is included.
>
> Third. Industries which are otherwise under the same conditions as those of the second class, but in which the value of the materials approaches, or even moderately exceeds, the value of the labor employed, and becomes thus an important element in the final value of the product as reported, enhancing the apparent production of the industry in a high degree. Here comes in the great body of the industries known technically as the "manufactures" of the country, the mill and factory industries, whose productions appear oftentimes enormous as compared with those bodies of craftsmen more skilled and receiving higher wages, and do so merely because of the high cost of the materials consumed in the former case.
>
> Fourth. Industries in which the value of the materials far exceeds all the other elements in the cost of production combined, and thus carries up the apparent product of these industries to a very high point, although, in fact, comparatively little value has been added by these operations, and only a small number of artisans or laborers supported. The reduction of gold and silver, calico printing, bleaching and dyeing, the currying of leather, the packing of meat, the refining of sugar and molasses, and the production of flour and meal, are among the most important industries of this class.

The significance of this grouping with respect to the materials of the several industries appears in table LI, in which are shown the proportions of the value of raw and partially manufactured materials to the gross value of products, and the ratio of the value of raw materials to the net value of the products for each of the 15 industry groups.

[1] For fuller discussion see explanation of gross and net value of products, page cxxxix.

[2] Tenth Census, 1880; Manufactures, folio 12.

TABLE LI.—GROSS AND NET VALUE OF PRODUCTS IN EACH OF THE 15 GROUPS OF INDUSTRIES IN COMPARISON WITH COST OF MATERIALS USED, SHOWING PER CENT OF COST OF RAW AND PARTLY MANUFACTURED MATERIALS TO VALUE OF PRODUCTS: 1900.

Group number.	Groups of industries.	COST OF MATERIALS USED.				VALUE OF PRODUCTS, INCLUDING CUSTOM WORK AND REPAIRING.				PER CENT OF COST OF MATERIALS TO GROSS VALUE OF PRODUCTS.		Per cent of cost of materials purchased in raw state to net value of products.
		Total.	Purchased in raw state.	Purchased in partially manufactured form.	Fuel, freight, etc.	Gross.		Net.		Purchased in partially manufactured form.	Purchased in raw state.	
						Rank.	Amount.	Rank.	Amount.			
	United States	$7,345,413,651	$2,389,140,942	$4,633,804,967	$322,467,742	.....	$13,004,400,143	.....	$8,370,595,176	35.6	18.4	28.5
1	Food and kindred products	1,839,256,143	1,279,450,388	524,530,790	35,274,965	1	2,277,702,010	1	1,753,171,220	23.0	56.2	73.0
2	Textiles	895,984,796	314,089,230	555,523,236	26,372,330	3	1,637,484,484	2	1,081,961,248	33.9	19.2	29.0
3	Iron and steel and their products	987,198,370	74,781,646	809,668,990	102,747,734	2	1,793,490,908	3	983,821,918	45.1	4.2	7.6
4	Lumber and its remanufactures	561,501,302	64,504,346	483,556,059	13,440,897	5	1,030,906,579	6	547,350,520	46.9	6.3	11.8
5	Leather and its finished products	395,551,232	134,809,625	254,116,050	6,625,557	9	583,781,046	11	329,614,996	43.5	23.1	40.9
6	Paper and printing	214,158,423	11,396,844	186,519,667	16,241,912	8	606,317,768	7	419,798,101	30.8	1.9	2.7
7	Liquors and beverages	122,218,073	37,340,408	76,346,549	8,531,116	12	425,504,167	10	349,157,618	17.9	8.8	10.7
8	Chemicals and allied products	356,192,334	154,470,332	180,299,070	21,422,932	10	552,891,877	8	372,592,807	32.6	27.9	41.5
9	Clay, glass, and stone products	94,615,281	18,971,906	48,117,117	27,526,258	13	293,564,285	14	245,447,118	16.4	6.5	7.7
10	Metal and metal products, other than iron and steel	496,979,368	98,737,311	377,641,018	20,601,039	7	748,795,464	9	371,154,446	50.4	13.2	26.6
11	Tobacco	107,182,656	86,709,511	19,023,973	1,449,172	14	283,076,546	12	264,052,573	6.7	30.6	32.8
12	Vehicles for land transportation	268,278,205	1,342,802	257,965,433	8,969,970	11	508,649,129	13	250,683,696	50.7	0.3	0.5
13	Shipbuilding	33,486,772	.....	32,085,640	1,401,132	15	74,578,158	15	42,492,518	43.0	.....	.....
14	Miscellaneous industries	490,073,705	103,685,431	365,900,756	20,487,518	6	1,004,092,294	5	638,191,538	36.4	10.3	16.2
15	Hand trades	482,736,991	8,851,162	462,510,619	11,375,210	4	1,183,615,478	4	721,104,859	39.1	0.7	1.2

It appears from table LI that materials purchased in a raw state constituted 18.4 per cent, and materials purchased in partly manufactured form 35.6 per cent, of the gross value of products of all industries. Materials purchased in a raw state constituted 28.5 per cent, of the net value of products. That is to say, the value of raw materials constituted more than one-quarter of the total final value of manufactured products reported in 1900. It would be interesting to compare this proportion with that shown for each of the 15 groups of industries and for various separate industries, but a comparison upon the same basis is impossible. The returns for each industry indicate merely the value of material purchased in the raw state by establishments engaged in that industry, and not the total value of raw materials which enter into its products. For the group "vehicles for land transportation," for example, only a small amount of raw material was reported, since most of the material purchased—lumber, iron, etc.—was the result of previous processes of manufacture. It is impossible, therefore, to determine from table LI how much of the value reported for this group is attributable to the crude materials which enter into the products, and how much to the subsequent processes of manufacture. The figures given in tables L, LI, and LII, except the totals for the United States, should be interpreted with this limitation in mind.

The table also shows that the cost of the materials purchased in the raw state constituted 73 per cent of the net value of all the products of the group embracing manufactured foods, a much larger proportion of the net value than is shown for any other group. This is due to the fact that the manufacturing processes required to prepare many products of the farm for consumption are relatively slight, involving little additional expense for labor. In the chemical industries the cost of crude raw materials purchased comprised 41.5 per cent of the net value of products, and in the leather industries 40.9 per cent. In the tobacco industries the cost of crude materials purchased comprised 32.8 per cent of the net value of products, the amount of labor required to convert the tobacco leaf into the form required for final consumption being relatively small; while in the paper and printing group of industries the cost of these materials constituted but 2.7 per cent of the net value, being small in comparison with the value imparted by the manual labor and the brains of men. For group 13, "shipbuilding," no raw material was reported, since all materials purchased, lumber, iron, etc., were the result of previous processes of manufacture. In the clay, glass, and stone industries the cost of raw materials represented but 7.7 per cent of the net value of the products, and in the hand trades, but 1.2 per cent.

The most striking differences in this regard appear in table LII, which shows the same percentages for certain selected industries.

TABLE LII.—*Ratio of cost of partially manufactured and raw materials to value of products, by selected industries: 1900.*

SELECTED INDUSTRIES.	PER CENT OF COST OF MATERIALS TO GROSS VALUE OF PRODUCTS.		Per cent of cost of materials purchased in raw state to net value of products.
	Purchased in partially manufactured form. (Including mill supplies.)	Purchased in raw state.	
All industries	35.6	18.4	28.5
Agricultural implements	40.2	(1)	0.1
Boots and shoes, factory product	64.1	0.0	0.0
Clothing, men's, factory product	51.9	0.0	0.0
Cotton goods	12.0	37.5	42.6
Flouring and grist mill products	3.7	79.6	82.6
Iron and steel	46.2	9.0	16.7
Petroleum refining	13.2	64.9	74.8
Salt	27.9	0.0	0.0
Silk and silk goods	19.4	38.0	47.1
Slaughtering and meat packing, wholesale	14.5	71.3	83.4
Woolen goods	24.7	32.8	43.6
Worsted goods	24.1	38.5	50.7

[1] Less than one-tenth of 1 per cent.

Table LII indicates that in the flouring and grist mill industry the cost of raw materials purchased constituted 82.6 per cent of the net value of products, and in the slaughtering and meat packing industry 83.4 per cent, while in both of these industries the percentage of the cost of partially manufactured materials to the gross value is small. These industries have heretofore been spoken of as lying on the border line between agriculture and manufacture. So uncertain is it as to which branch of industry their products may be most accurately assigned that the Bureau of Statistics of the United States Treasury Department classes exports of both flouring and grist mill products and slaughtering and meat packing products under the head of agricultural products. Practically no material purchased in the raw state was used in the factory manufacture of boots and shoes and of men's clothing, the cost of partially manufactured materials constituting in the one industry 64.1 per cent of the gross value of products, and in the other 51.9 per cent.

Other striking demonstrations of the importance of considering Superintendent Walker's classification with reference to relationship of materials to products may be extracted from the above table. As a general rule, those industries in which the percentage of the cost of partially manufactured products to the gross value of products is the highest, are the industries in which the processes of manufacture are the most intricate, and in which the amount of labor represented in the value of products is the greatest.

XXVI.

THE STANDARD OF MEASUREMENT.

The census of manufactures is limited to a standard of measurement which is unsatisfactory and unscientific. It is confined to value as its standard of measure, and to the dollar as the unit of that standard. It is the only unit possible in treating of manufacturing industries as a whole, the use of incommensurable quantities being out of the question in considering a great variety of different industries. This standard of measurement is variable and untrustworthy in two respects, viz: the dollar has not always represented the same value at the different census periods, and it never stands for the same quantity of the same goods as between any two censuses.

1. *Changes in the Unit of Value.*—The census of 1860 was taken on the basis of the gold dollar. The census of 1870 was taken on the basis of the paper dollar, which had, at that time, an average value in gold of 79.81 cents. The census of 1880 was taken immediately after the resumption of specie payments by the United States Government; and the censuses of 1890 and 1900 were again taken on a normal monetary basis—the gold dollar. At the census of 1880 an attempt was made to make the figures comparable by reducing the value of manufactured products reported for 1870 to a gold basis. The effect of this treatment was to reduce to $3,385,860,354 a product returned as worth $4,232,325,442. It is doubtful if comparison between the censuses is materially aided by this arbitrary treatment of the figures of 1870. Superintendent Walker, in reporting the figures for that year, calculated that they should be increased by a sum exceeding $600,000,000, measured in the currency of the day, in order to account for many omissions in the returns to which he called attention. In view of these omissions, which did not occur to any corresponding extent in subsequent censuses, the figures are in themselves defective, without regard to the value which they represent.

2. *Changes in Prices.*—The elimination, moreover, of the inflated value of the dollar in 1870 can not bring the statistics of the several censuses to a satisfactory basis of comparison, because it takes no cognizance of another element of variation which prevents exact comparison, viz, the difference in the quantity of product represented by a dollar, due to changes in prices. These differences are so great and so variable as to make exact comparison impossible, even if the standard of measure of value itself were fixed and uniform.

One of the striking phenomena of manufacturing development has been the constantly increasing quantity of goods represented by a dollar, as the result of the cheapening of production. Improvements in the production of raw materials lower their prices to manufacturers. Improved means of transportation operate in the same direction, while improvements in machinery and processes employed in manufacturing tend to lower the price of finished products. Improvements along all these lines have been very great since 1870, and constitute one cause at least for the fall in general prices during the decades from 1870 to 1880 and from 1880 to 1890. There is no doubt that there were equally marked improvements, between 1890 and 1900, in production,

transportation, etc., but their effect was not so marked during this decade, being obscured by various other influences which affect prices. Certain special products, however, show a very much lower price in 1900, and here the change is plainly attributable to improvements either in production of raw materials, in transportation, or in manufacturing processes.

Table LIII shows the quantity and value of pig iron, steel rails, and cut nails manufactured in 1890 and 1900, with the average apparent value per ton, and the per cent of increase in quantity and value.

TABLE LIII.—*Quantity and value of certain products: 1890 and 1900.*

CLASSES.	Year.	Unit of quantity.	Quantity.[1]	Value.	Average value per unit of quantity.	PER CENT OF INCREASE IN—	
						Quantity.	Value.
Pig iron	1900	Tons[1]	[2]14,447,791	$205,512,755	$14.29	63.3	41.8
	1890	Tons[1]	[3]8,845,185	145,612,983	16.46	.....	.....
Steel rails	1900	Tons[1]	2,250,457	46,501,979	20.66	21.4	[4]22.8
	1890	Tons[1]	1,853,862	60,272,575	32.51	.....	.....
Cut nails	1900	Kegs[5]	1,658,448	3,292,068	1.99	[4]71.7	[4]73.3
	1890	Kegs[5]	5,857,030	12,333,603	2.11	.....	.....

[1] 2,240 pounds to a ton.
[2] Not including 1 penal establishment having a product of 4,443 tons, valued at $66,645.
[3] Including 1 penal establishment.
[4] Decrease.
[5] Kegs of 100 pounds.

The decrease in the average value per ton of the products included in the statement was attended by a decrease in the average cost of the raw material—iron ore. In 1890 there were 14,048,571 tons of domestic iron ore, costing $57,607,945, or $4.10 per ton, reported as used in blast furnaces, and in 1900, 24,612,511 tons, costing $61,795,473, or $2.51 per ton. Measured by quantity, the increase in the manufacture of pig iron in 1900 over 1890 was 63.3 per cent, as compared with 41.8 per cent in value; of steel rails, an increase of 21.4 per cent, as compared with a decrease of 22.8 per cent in value; of cut nails, a decrease of 71.7 per cent, as compared with a decrease of 73.3 per cent in value. The average value of the products given should not be accepted as indicating the price at points of consumption, but as the average value at the works.

That in other staple industries the quantity of manufactured products represented by a dollar has increased by the cheapening of production, through improved machinery, processes, etc., is abundantly shown by a comparison of the detailed statistics of certain special industries for 1900 with 1890. The figures for such comparison may be found in the Report on Manufactures, Parts III and IV. This cheapening of production is frequently shown in an improvement in the quality of goods; this, however, is but another side or phase of the main proposition.

It is impossible to state, even approximately, the extent to which the comparative statistics of the several censuses are affected by the above causes. Only the general trend can be indicated. Prices are determined, in a measure, by other considerations, such as the amount of money in circulation, the rapidity of that circulation, the relation of cash to credit transactions, the relation of supply and demand, modifications in the rates of duty on imported merchandise, the time required for the movement of commodities from the factory to the consumer, and facilities of communication for the transaction of business. These are all factors of greater or less importance in determining prices, and therefore affect the census standard of measurement.

XXVII.

'GROSS' AND 'NET' VALUE OF PRODUCTS.

1. *Gross Value of Products.*—The value of manufactured products reported at the present census, $13,004,400,143, is a gross value, and does not represent the final value of the manufactured products of the country. This gross value, however, does fairly represent the total volume of commercial transactions involved in manufacturing enterprises. It represents these transactions between manufacturers in much the same way as the total transactions of the bank clearing house of a city represent the actual banking transactions of that city.

Wholesale and retail trade in the products of manufactures represents another series of transactions involving values much greater than the gross value of products; it consists of the distribution, selling, and reselling of these products as they pass directly, or through middlemen, into the possession of the ultimate consumers. The total volume of these transactions in the United States is unquestionably greater than that of the international trade of the principal countries of the world, which amounts to the sum of $20,005,884,354[1] (exports and imports added together), and which likewise represents, very largely, the duplicated value of articles in various stages of manufacture sold twice or thrice.

2. *Duplications.*—The analysis of the value of products involves an attempt to eliminate duplications which have occurred in the compilation of the gross total value, obtaining as a result what may be described as the net value of manufactured products. As the finished products of one branch of manufacture are constantly used as materials in other branches, in the ascending scale of modern industry, it follows that they are counted over and over again, swelling in this manner the gross total value of products. Thus, in the cotton manufacture, the product of the yarn mill manufacturing yarns for sale is the material for the cloth mill, and the product of the cloth mill is the mate-

[1] Progress of the United States in Its Material Industries, 1800–1900, page 46. The United States Treasury Department: Annual Report on Commerce and Navigation for 1901.

rial for the clothing manufacturer; so that by the time the aggregate is made the value of the yarn has been counted three times and the value of the cloth twice. That is to say, in this instance the gross value of products would include three items. For the sake of illustration these may be given assumed values:

1. The value of the yarn made in the yarn mill	$10,000
2. The value of the cloth made in the cloth mill (in which value is included the value—$10,000—of the yarn which was bought and used as material)	15,000
3. The value of the clothing made in the clothing factory (in which value is included the value—$15,000—of the cloth which was bought and used as material)	20,000
Gross value of the products of the three establishments	$45,000

It is apparent that the value of the products of these three establishments is not $45,000, but $20,000, the value which would have been reported had these three operations been performed by one establishment, as is often the case.

Duplications and reduplications of this sort run all through the total value of products as reported by this office. In a strict statistical sense, therefore, the gross value of products for the United States is a fictitious total, and all percentages reckoned thereon, in relation to the other items returned by the census, or to the total value of imports or exports of manufactured articles, are necessarily erroneous and misleading.

3. *Net Value of Products, 1870, 1880, and 1890.*—At the censuses of 1870, 1880, and 1890 attempts were made to secure the net value of products by deducting from the gross value the cost of all materials consumed. Thus, at the census of 1890 the gross value of products was $9,372,437,283, and the total cost of materials $5,162,044,076. The difference between these two sums ($4,210,393,207) was described by the census as the net value of products. By this process the net value of the products for the United States was made to appear less than the cost of the materials consumed in the manufacture of these products, which is a statistical absurdity.[1]

4. *Net Value of Products, 1900.*—The net value of anything is that value which remains after deducting whatever may properly be charged against it. In this case the census has heretofore deducted much more than could properly be taken away, and, instead of securing a net value of products, has obtained simply the value added to materials by the manufacturing processes. The net value of products is not the gross value, nor is it the added value obtained by deducting the cost of materials, but it is this added value, plus the sum originally paid for all materials in the crude form in which they first appear in any factory. For clearness, this may be stated in another way. The net value of products is the value of the output of the factories of the United States during the census year, all duplications of value having been eliminated. It thus includes (1) the value of all raw materials which have entered into this output; (2) the entire value added to these raw materials by manufacturing processes from the time they first entered any factory up to the close of the census year.

At the present census an attempt was made to obtain the net value of manufactured products by a strict classification of the materials consumed. The schedule provided for a return of materials under two heads—(1) "purchased in a raw state," and (2) "purchased in a partially manufactured form."

Under the first head were entered raw wool, raw cotton, raw silk, grain, cattle, fish, iron and other ores, etc., and under the second head all materials which had been advanced more or less in value by processes of manufacture. Included under this head were pig iron, lumber, flour, cloth, refined silver, etc., not to mention numerous more highly manufactured products which were used as materials in certain establishments. Mill supplies consumed in the process of manufacture were also included under this head. Theoretically, at least, the cost of all materials reported under the second head had been reported upon the schedules of other establishments as the value of their products, and upon this theory the cost of materials entered under the second head represents the sum total of all duplications in the gross value of products. The net or true value of products is found, therefore, by subtracting from the gross value the cost of all materials purchased in a partially manufactured form. In 1900 the cost of these materials was $4,633,804,967, and the net value of products was, therefore, $8,370,595,176. The net value of products may be further subdivided into $2,389,140,942, the sum paid for raw materials; $322,467,742, the sum paid for fuel, freight, etc.; and $5,658,986,492, the value added to raw materials by the various processes of manufacture.

This net value of products does not include the value of partially manufactured materials imported, and utilized by the manufacturers in their various processes, and to this extent it is too small. Wherever imported manufactured materials were used they were reported upon the schedules under the second head of materials, and were, therefore, deducted in ascertaining the net value of products by the method just described, although they had never been reported as products upon any census schedule, and so constitute no duplication. It is easy, however, to estimate the value of these materials, and to add this sum to the net value of products. There were imported and entered for consumption during the census year, for use as materials, partially manufactured

[1] The phrase adopted by the census of 1890 makes it appear that in that year the "net value" of products of the slaughtering and meat packing industry in Kansas was the bare cost of killing and packing the cattle, i. e., $8,560,847, whereas the materials required to produce this value cost $36,031,824. In 1890, in the manufacture of coffee, spices, etc. (i. e., their roasting, grinding, and preparation for market), the cost of materials used was $65,961,465 and the value of products $75,042,010, so that the "net value" as thus ascertained was only $9,080,545. In the lard industry the "net value" of products was reduced to $2,820,488, although the cost of materials was $12,654,360.

articles to the value of $97,667,988, duty paid. These materials consisted of such articles as indigo, muriate of potash, nitrate of soda, coal-tar colors, chloride of lime, glycerine, tin plates, wire rods, cotton thread and yarn, flax thread and yarn, spun and thrown silk, leather, etc. The net value of products, increased by the value of these imported manufactured articles utilized as materials in the mills of the country during the census year, was $8,468,263,164.

5. *Defects in the Method of Finding Net Value of Products.*—The net value of products, even after this correction, still contains several imperfections which are unavoidable under census methods.

In the first place, it is not possible to make a hard and fast division between raw and partially manufactured materials to which no exception can be taken. For instance, scrap iron, which is an important material in the iron industry, is sometimes regarded as a raw material, and sometimes as partially manufactured. In some cases the value given to it by the original manufacture has been entirely consumed, and it is fit only to be charged into the blast furnace—i. e., it is on a par with iron ore, a raw material. In other cases much of the original value remains, as when old rails are purchased to be cut up into iron bars. On the assumption that these latter cases are the more important, scrap iron has been classed as a partially manufactured material. In these cases the office has followed a conservative policy, including the doubtful materials usually under the "partially manufactured" heading, and thus reducing rather than exaggerating the net value of products. For example, there are numerous materials included among "mill supplies" and "all other materials," which come to the mill or factory in absolutely raw condition, but which can not be separated from the larger mass of partially manufactured supplies and materials. These have all been classed as partially manufactured.

In the second place, the net value of products is defective in that there is deducted from the gross value of products, in order to obtain a net value, a sum larger than that reported on the various schedules as the value of partially manufactured products. The manufacturers of these products have reported them to the Census Office at their cost value, that is to say, their value at the mill. When they reappear in other schedules as materials used, the value given is that paid by the consumers, including in addition to the values reported in the first instance the profits of their producer and the costs of transportation and sale. In other words, the value of the partially manufactured materials used is larger, probably by many millions of dollars, than the value of the same commodities reported as products by the establishments producing them. The value of partially manufactured materials, which is deducted from the gross value of products, is, therefore, too great, and the net value of products too small, by this amount. Here also, however, the error is on the side of conservatism.

The two above-named defects in the net value of products apply to the total for the United States, $8,468,263,164, obtained after making the necessary correction for the value of imported manufactured materials. Much more serious defects, however, appear in the net value of products shown for each of the 354 industries and for each of the states and territories. It is impossible, for reasons which are stated below, to ascertain for any state or for any except a few of the industries, the net value of products, as this value has been defined with reference to the United States.

6. *Net Value of Products for Separate Industries.*—Table LIV illustrates the difficulty as it appears in the cotton and the hosiery and knit-goods industries.

TABLE LIV.—*Method of ascertaining the net value of products in the cotton and the hosiery and knit-goods industries.*

Cotton goods:		
Gross value of products		$332,806,156
Cost of partially manufactured materials purchased—		
Manufactured in cotton mills (i. e., cotton yarn)	$15,749,536	
Manufactured in other establishments	24,077,861	
Total		39,827,397
Net value of products		292,978,759
Hosiery and knit goods:		
Gross value of products		95,482,566
Cost of partially manufactured materials purchased—		
Manufactured in hosiery and knit-goods mills	None.	
Manufactured in other establishments	$40,937,567	
Total		40,937,567
Net value of products		54,544,999

It appears from table LIV that all partially manufactured materials used in the hosiery and knit goods manufacture were produced by establishments outside of that industry. Not being reported as products on hosiery and knit goods schedules, their value has never been added into the gross value of products for that industry, and has never constituted a duplication in that gross value. It is manifestly an error, therefore, to deduct the value of these materials from the gross value of products in order to get the net value of products for the industry.

Moreover, it will be seen that the net value of products given for the hosiery and knit goods industry does not conform to the conception of net value of products, just explained with reference to the United States as a whole, i. e., the value of all crude materials which enter into the products, plus all the value added to such materials by manufacturing processes. The net value of products shown in table LIV for the knit goods industry includes the value of a part only of the crude materials which enter into these products, the value of all the raw wool and cotton made into yarns in cotton and woolen mills, and sold to hosiery and knit goods mills, having been deducted by deducting the value of these yarns.

For these reasons the net value of products of the hosiery and knit-goods industry is very much reduced below the true net value. In the case of the cotton-goods industry the error is much smaller, for only about three-fifths of the partially manufactured materials used were made outside of cotton mills. The other two-fifths represent real duplications of value, and are, therefore, properly deducted.

It thus appears that this error in method affects the two industries in unequal degrees, discriminating against the hosiery and knit-goods industry in favor of the cotton-goods industry. These two industries have been chosen as illustrations, because it is possible to show the exact amount of error involved, and to note the effect of this error upon the relative position of the two industries. The true net value of products, ascertained by deducting only the value of the partially manufactured materials made within the industry in question, is $317,056,620 for the cotton-goods industry, and $95,482,566 for the hosiery and knit-goods industry. Table LV presents for each of these industries the gross value of products in comparison with the net value of products and with the corrected or true net value of products.

TABLE LV.—*Gross, net, and corrected net value of products in the cotton and the hosiery and knit-goods industries.*

INDUSTRY.	Gross value of products.	Net value of products.	Corrected net value of products.
Cotton goods	$332,806,156	$292,978,759	$317,056,620
Hosiery and knit goods	95,482,566	54,544,999	95,482,566

The extent to which the net value of products discriminates against the knit-goods industry on account of the defect in the method used in ascertaining it, is shown more clearly in table LVI, in which the values shown in table LV are reduced to a ratio in which the value for the hosiery and knit goods industry is 100 in each case.

TABLE LVI.—*Ratios between the gross, net, and corrected net value of products in the cotton and the hosiery and knit-goods industries.*

INDUSTRY.	Gross value of products.	Net value of products.	Corrected net value of products.
Cotton goods	349	537	332
Hosiery and knit goods	100	100	100

It appears from table LVI that the true relative importance of the cotton and the hosiery and knit-goods industries, based on the corrected net value of products, is represented by the ratio of 332 to 100, while their relative importance according to the net value of products, as ascertained by the usual method, is 537 to 100.

In the industries used as illustrations and in a few other leading industries the detailed inquiries regarding materials used make it possible to obtain the real net value of products in the manner indicated above. But for the great majority of industries there is no way to ascertain from the census figures how much of the partially manufactured materials used were made in establishments within the industry in question, and how much in establishments in other industries. For this reason the more exact figures for the net value of products can not be given. In using the figures presented it should always be borne in mind that they understate the true real value of products in each industry by an amount equal to the value of partially manufactured goods made in other industries and used as materials in the industry in question.

7. *Net Value of Products for Separate States, Territories, or Cities.*—The above argument applies with equal force to the net value of products for a separate state, territory, or city. Table LVII illustrates the difficulty as it appears in the state of New York.

TABLE LVII.—*Method of ascertaining the net value of products for New York state.*

Gross value of products		$2,175,726,900
Cost of partially manufactured materials:		
Manufactured in New York state	$250,428,021	
Manufactured in other states	600,000,000	
Total		850,428,021
Net value of products		1,325,298,879

The impossibility of showing the true net value of products for this or any other state is due to the fact that there is no way to ascertain what part of the partially manufactured materials used in New York state was made outside of the state. An arbitrary division is assumed in table LVII, and if this represented the actual conditions, only the $250,428,021 should be deducted, for only this value was duplicated in the New York state gross value of products. The true net value of products would therefore be $1,925,298,879 instead of $1,325,298,879, a difference of 45.3 per cent. There is an error, due to this fact, in the net value of products shown for each of the states and territories, and there is no way even to estimate its magnitude or to ascertain in which states it chiefly occurs.

In most of the 15 groups of industries the error due to this cause is small. It is marked in the groups shipbuilding and vehicles for land transportation and probably also in the groups hand trades and miscellaneous industries, but in the remaining 11 groups the error may be neglected. The textile industries, for example, consume scarcely any partially manufactured materials except those made in textile mills. The duplications are all within the group and are properly eliminated in the figures given for the net value of products.

Finally, as has been explained before, the error is reduced to a minimum in the grand total of industries for the United States, in which total all the offsetting conditions above referred to have adjusted themselves.

XXVIII.

THE FIFTEEN GROUPS OF INDUSTRIES.

The manufacturing industries of the United States may now be considered from the point of view of their interdependence or relationship to one another. Previous censuses have made no attempt to combine industries allied to each other through similarity in the raw materials which lie at their base, or in the uses which their products subserve. In the way of classification, these censuses have differentiated the more important specialties of each branch of manufacture and grouped them with reference to the character of the product, irrespective of the materials employed, and, with some notable exceptions, have stopped with this classification. Such a classification, covering 369 different varieties of products in 1890 and 354 in 1900, although necessary and proper, is not sufficient to present a clear, intelligible, and scientific view of the general character and distribution of our manufacturing industries. It results, on the contrary, in an alphabetical arrangement or grouping, which may be described as a statistical conglomerate, through which the student of the figures has to pick his way, making his own combinations as he goes.

To remedy this defect, the Twelfth Census has brought the industries of the country together into 15 grand groups. In making this generic grouping the effort has been to follow lines distinct and well recognized in common practice. The hand trades are set off into one group and the true manufacturing industries are collected into groups distinguished either by similarity of the chief components employed as raw material, or by similarity in the use of the products, or by both. The grouping founded upon these lines is found to include all but a comparatively small number of industries, which are classed together as an independent group.

Statistics, like other branches of investigation, reaches the point where it may properly be called scientific, when the fundamental resemblances of individual phenomena are noticed, and the former haphazard knowledge becomes organized knowledge. The 354 industries of the census correspond, in a measure, to the "species" of natural history, while the 15 great groups of industries are analogous to the "genera," the whole making the great "order" of manufacturing industry. Thus viewed, we have as the subject of investigation the great order of manufacturing industry, made up of the 15 genera or groups of industries, each utilizing a common material or subserving a common purpose. These family groups ramify into the 354 various industries, each in turn made up of the individual establishments.

As industrial art advances, the interdependence of species or branches of industries belonging to the same genus becomes more intimate. This tendency, described as the tendency toward specialization, is one of the most striking phases of machine or factory methods of manufacture, but it is not yet as fully developed in America as abroad. Specialization is shown in the textile industry by certain mills which manufacture only yarns; by other mills which weave only yarns purchased for that purpose; and by still other mills which merely dye and finish the products of yarn-spinning or weaving mills. Dependent upon these mills are the establishments engaged in the manufacture of wholesale clothing, of collars, cuffs, shirts, etc., and all the multitudinous subsidiary industries into which textile goods enter. One advantage of this specialization lies in the fact that it permits the successful utilization of smaller capital in a particular mill than would be required if the same establishment began with the raw material and carried it forward to completion. The processes are fewer and the turn-over quicker, and less machinery is required in each of the several mills. Through specialization, therefore, an increasing number of comparatively small establishments is enabled to exist and to flourish side by side with the increasing number of very large establishments.

Some branches of manufacture have become so completely specialized that establishments now exist whose sole function is the assembling of the several parts of a machine or instrument into a completed machine or instrument, none of the parts being made in the factory which assembles them. The bicycle industry and the manufacture of electrical supplies afford illustrations.

This tendency was marked during the last decade in glass manufacture, particularly in the production of certain lines of glassware and bottles, and it is alluded to in the special report on glass manufacture in the Report on Manufactures, Part III, in the following terms: "Specialization is the prevailing characteristic. A few years ago it was customary for each establishment to manufacture a large variety of ware, and the workman as a rule was accustomed to make a little of everything; but it is now the tendency to restrict the output of the factory to a particular article, and the workman is an expert in one branch of his trade, the general workman having given way to the specialist capable of maintaining the highest speed."

A somewhat different phase of specialization in manufacturing industries, and the one, perhaps, from which the chief economical advantage is derived, is that usually called the "division of labor." This is a specialization of processes in one factory and not in separate factories, and it largely increases production by the greater skill and facility acquired by the workman through concentrating his energy upon one process. In many industries where it was formerly the custom for the workman to be thoroughly skilled in all branches of his craft, being equally proficient in performing each of the processes employed in the factory or workshop, or in making each of the various products manufactured, it is now the practice to restrict the workman to one machine, one process, or one product. While this devel-

opment has extended over many years, it has been especially pronounced during the last decade in certain industries. The boot and shoe manufacture exemplifies this phase of development as completely as any that might be mentioned.

Having formulated a grouping of the various industries which shows their relation and interdependence, it becomes possible so to apply the rule of selection and aggregation to the results of prior censuses as to show comparative statistics for each of the groups of industries. Table LVIII shows a comparison, for each of the groups, of the manufacturing statistics of the censuses of 1880, 1890, and 1900, derived from General Table 2, on page 19 of this volume.

The order of grouping of the first four groups of industries was based on the value of products for 1890, each of these four groups showing a value of products exceeding $500,000,000.

TABLE LVIII.—COMPARATIVE SUMMARY, FIFTEEN GROUPS OF INDUSTRIES: 1880 TO 1900.

GROUPS.	Year.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.	
				Number.	Salaries.	Total number.	Total wages.
United States	1900	512,254	$9,817,434,799	396,759	$403,711,233	5,308,406	$2,322,333,877
	1890	355,415	6,525,156,486	461,009	391,988,208	4,251,613	1,891,228,321
	1880	253,852	2,790,272,606	.....	.....	2,732,595	947,953,795
Group 1.—Food and kindred products	1900	61,302	940,889,838	46,782	39,313,664	313,809	129,910,070
	1890	41,296	507,678,328	[1] 48,113	[1] 33,354,171	249,321	90,373,450
	1880	38,427	318,800,209	[2]	[2]	174,410	51,840,649
Group 2.—Textiles	1900	30,048	1,366,604,058	44,502	49,982,357	1,029,910	341,784,399
	1890	16,847	1,008,050,288	[1] 33,971	[1] 35,496,486	824,138	278,167,769
	1880	14,137	594,922,784	[2]	[2]	710,493	198,456,573
Group 3.—Iron and steel and their products	1900	13,896	1,528,979,076	49,828	58,090,781	733,968	381,875,499
	1890	11,169	997,872,438	[1] 30,943	[1] 36,583,536	531,823	285,351,714
	1880	8,823	487,870,983	[2]	[2]	379,491	160,865,294
Group 4.—Lumber and its remanufactures	1900	47,079	946,116,515	31,110	28,982,927	546,953	212,201,768
	1890	35,586	844,418,472	[1] 41,292	[1] 30,863,184	547,776	201,558,706
	1880	42,336	313,615,888	[2]	[2]	319,661	96,267,031
Group 5.—Leather and its finished products	1900	16,989	343,600,513	14,036	14,186,690	238,202	99,759,885
	1890	12,918	246,795,713	[1] 17,782	[1] 15,348,267	212,727	98,432,593
	1880	16,208	139,850,821	[2]	[2]	181,772	70,539,442
Group 6.—Paper and printing	1900	26,747	557,610,887	48,183	48,974,138	297,551	140,092,453
	1890	20,160	344,008,723	[1] 35,543	[1] 34,625,986	225,645	117,611,864
	1880	6,044	135,367,497	[2]	[2]	119,388	53,371,147
Group 7.—Liquors and beverages	1900	7,861	534,101,049	10,899	16,893,405	63,072	36,946,557
	1890	4,219	310,002,635	[1] 8,407	[1] 11,118,673	48,358	29,140,916
	1880	3,880	134,997,731	[2]	[2]	38,747	17,148,760
Group 8.—Chemicals and allied products	1900	5,444	498,390,219	22,318	26,335,164	101,522	43,870,602
	1890	5,642	322,543,674	[1] 13,469	[1] 14,171,587	76,535	33,372,540
	1880	2,914	113,887,551	[2]	[2]	45,448	17,271,308
Group 9.—Clay, glass, and stone products	1900	14,809	350,902,367	13,571	13,718,996	244,987	109,022,582
	1890	11,711	217,386,297	[1] 13,511	[1] 11,370,622	221,367	90,541,771
	1880	10,418	83,142,840	[2]	[2]	132,615	39,929,100
Group 10.—Metal and metal products other than iron and steel	1900	16,305	410,646,057	13,973	16,059,194	190,757	96,749,051
	1890	10,019	204,285,820	[1] 14,824	[1] 14,924,917	123,239	64,055,644
	1880	9,801	87,580,051	[2]	[2]	85,278	38,907,126
Group 11.—Tobacco	1900	15,252	124,089,871	8,262	8,951,534	142,277	49,852,484
	1890	11,643	96,094,753	[1] 13,152	[1] 10,241,271	122,775	44,550,735
	1880	7,674	39,995,292	[2]	[2]	87,587	25,054,457
Group 12.—Vehicles for land transportation	1900	10,113	396,778,672	16,369	15,191,444	316,214	164,614,781
	1890	10,175	248,224,770	[1] 13,251	[1] 11,172,184	221,125	118,212,379
	1880	4,472	55,317,091	[2]	[2]	68,677	27,764,713
Group 13.—Shipbuilding	1900	1,116	77,362,701	1,407	2,008,587	46,781	24,839,168
	1890	[3] 1,010	53,393,074	[1] 1,123	[1] 1,194,870	24,811	14,833,977
	1880	2,188	20,979,874	[2]	[2]	21,345	12,713,813
Group 14.—Miscellaneous industries	1900	29,479	1,348,920,721	53,227	49,199,283	483,273	202,746,162
	1890	19,304	768,870,920	[1] 33,192	[1] 33,363,252	302,649	136,643,444
	1880	11,149	180,245,046	[2]	[2]	188,774	66,088,451
Group 15.—Hand trades	1900	215,814	392,442,255	22,342	15,823,119	559,130	288,118,421
	1890	143,716	355,535,601	[1] 142,436	[1] 98,159,252	519,324	287,880,819
	1880	75,381	83,699,048	[2]	[2]	178,914	71,740,931

[1] Includes proprietors and firm members with their salaries; number only reported in 1900, but not included in this table.
[2] Not reported separately.
[3] Includes 4 governmental establishments in 1890. (See special report on Shipbuilding in the Report on Manufactures, Part IV.)

TABLE LVIII.—COMPARATIVE SUMMARY, FIFTEEN GROUPS OF INDUSTRIES: 1880 TO 1900—Continued.

GROUPS.	Year.	AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES—continued.			Miscellaneous expenses.	Cost of materials used.	Value of products, including custom work and repairing.
		Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.			
United States	1900	4,110,527	1,029,296	168,583	$1,027,755,778	$7,345,413,651	$13,004,400,143
	1890	3,327,042	803,686	120,885	631,225,035	5,162,044,076	9,372,437,283
	1880	2,019,035	531,639	181,921	.....	3,396,823,549	5,369,579,191
Group 1.—Food and kindred products	1900	237,950	64,639	11,220	77,986,185	1,839,256,143	2,277,702,010
	1890	191,200	49,021	9,100	52,936,982	1,318,963,880	1,636,197,191
	1880	140,976	23,276	10,158	.....	1,002,453,074	1,171,165,325
Group 2.—Textiles	1900	440,175	512,712	77,023	128,481,214	895,984,796	1,637,484,484
	1890	356,071	421,550	46,517	78,404,675	705,004,909	1,261,672,504
	1880	288,810	351,482	70,201	.....	569,610,545	971,274,539
Group 3.—Iron and steel and their products	1900	712,195	13,777	7,996	91,492,127	987,198,370	1,793,490,908
	1890	517,092	7,804	6,927	57,694,853	617,554,226	1,144,056,537
	1880	355,937	4,585	18,969	.....	369,142,796	659,411,131
Group 4.—Lumber and its remanufactures	1900	521,177	13,678	12,098	42,142,321	561,501,302	1,030,906,579
	1890	524,133	13,337	10,306	45,510,782	462,658,350	877,954,920
	1880	294,280	7,008	18,378	.....	282,809,519	489,368,139
Group 5.—Leather and its finished products	1900	175,926	55,970	6,306	22,942,594	395,551,232	583,731,046
	1890	163,398	45,786	3,543	18,587,831	294,446,011	487,556,030
	1880	147,141	29,019	5,612	.....	293,884,529	425,901,191
Group 6.—Paper and printing	1900	211,560	73,922	12,069	76,069,663	214,158,423	606,317,768
	1890	165,451	50,831	9,363	59,524,277	149,507,579	445,587,430
	1880	80,187	29,702	9,439	.....	91,792,937	198,312,617
Group 7.—Liquors and beverages	1900	60,608	1,095	1,369	188,754,387	122,218,073	425,504,167
	1890	47,134	437	787	117,046,590	100,880,410	341,155,361
	1880	38,034	131	582	.....	102,360,561	167,306,052
Group 8.—Chemicals and allied products	1900	86,384	14,310	828	49,825,945	356,192,334	552,891,877
	1890	66,572	8,649	1,314	29,508,992	239,915,794	380,056,497
	1880	40,245	3,730	1,468	.....	112,763,633	170,076,312
Group 9.—Clay, glass, and stone products	1900	225,007	9,336	10,644	19,185,657	94,615,261	293,564,235
	1890	204,284	4,551	12,532	14,094,740	68,990,146	229,806,003
	1880	115,547	2,213	14,855	.....	40,064,200	103,010,252
Group 10.—Metals and metal products, other than iron and steel	1900	158,984	26,975	4,798	21,295,406	496,979,368	748,795,464
	1890	104,329	16,157	2,763	14,731,078	179,169,940	316,908,150
	1880	70,718	9,224	5,336	.....	99,597,745	173,273,848
Group 11.—Tobacco	1900	80,990	53,374	7,913	79,495,422	107,182,656	283,076,546
	1890	78,198	36,419	8,158	37,561,681	92,304,317	211,746,623
	1880	55,552	20,480	11,555	.....	65,334,407	118,670,166
Group 12.—Vehicles for land transportation	1900	312,651	2,239	1,324	19,842,332	268,278,205	503,649,129
	1890	218,437	1,542	1,146	9,460,374	174,624,639	344,476,243
	1880	66,124	391	2,162	.....	56,128,359	104,968,728
Group 13.—Shipbuilding	1900	45,744	34	1,003	3,685,661	33,486,772	74,578,158
	1890	24,628	9	174	1,892,551	16,925,109	40,342,115
	1880	21,388	.....	7	.....	19,736,358	36,800,327
Group 14.—Miscellaneous industries	1900	383,634	89,999	9,590	81,933,611	490,073,705	1,004,092,294
	1890	236,852	60,537	5,260	49,025,323	300,231,851	645,574,453
	1880	130,737	47,894	10,148	.....	171,370,479	311,427,194
Group 15.—Hand trades	1900	457,492	97,236	4,402	124,623,253	482,736,991	1,183,615,478
	1890	429,263	87,056	3,005	45,744,306	431,826,965	1,009,347,226
	1880	173,409	2,444	3,061	.....	119,774,407	263,618,370

Group 1.—*Food and Kindred Products.*—First among the 15 groups stands the manufacture of food and kindred products, with $2,277,702,010 value in 1900, which was nearly double that for 1880, and constituted 17.5 per cent of the total value of all products of manufacture. Included in the group are 25 specified manufacturing industries which utilize one or more of the food products of agriculture. These industries are presented in detail in General Table 2. In addition to the statistics of this group of industries shown in that table and elsewhere in this volume, there will be found in the Report on Manufactures, Part III, monographs upon several of the more important branches of food manufacture, including the factory production of cheese, butter, and condensed milk; slaughtering and meat packing; flouring and grist mill products; the canning and preserving of fruits and vegetables, of fish, and of oysters; rice, cleaning and polishing; oleomargarine; and beet sugar. A detailed account of the manufacture of cane sugar appears in the Report on Agriculture.

The development of this group of industries is a remarkable demonstration of the advance of factory manufacturing in recent years, and of its invasion of a a field once belonging almost exclusively to agriculture and the household. The raw materials employed in this group, by reason of their intrinsic value, represent a larger proportion of the value of the ultimate products than do the materials of any other group; and the value added by the process of manufacture is proportionally less in this group than in any other. The cost of raw materials consumed in the group was $1,279,450,388, or more than half the gross value of products, $2,277,702,010.

The large proportional value of raw materials seen

in this group in general is shown particularly in the case of wholesale slaughtering and meat packing, represented by 573 establishments with gross products of $698,206,548, the largest value of any industry in the group, or indeed of any industry in any of the 15 groups, with the exception of iron and steel. Since the raw materials for the industry, comprising live animals from ranch and farm, were valued at $497,950,476, there remains only $200,256,072 as the value added by the manufacturing processes. This industry made its first appearance as a manufacture in the census reports of 1850. It is further notable for its remarkable concentration, the single state of Illinois contributing more than one-third to the total value of the product, and the city of Chicago alone contributing $248,811,997. The other states in which this industry is chiefly found are Kansas, Nebraska, Missouri, and Indiana.

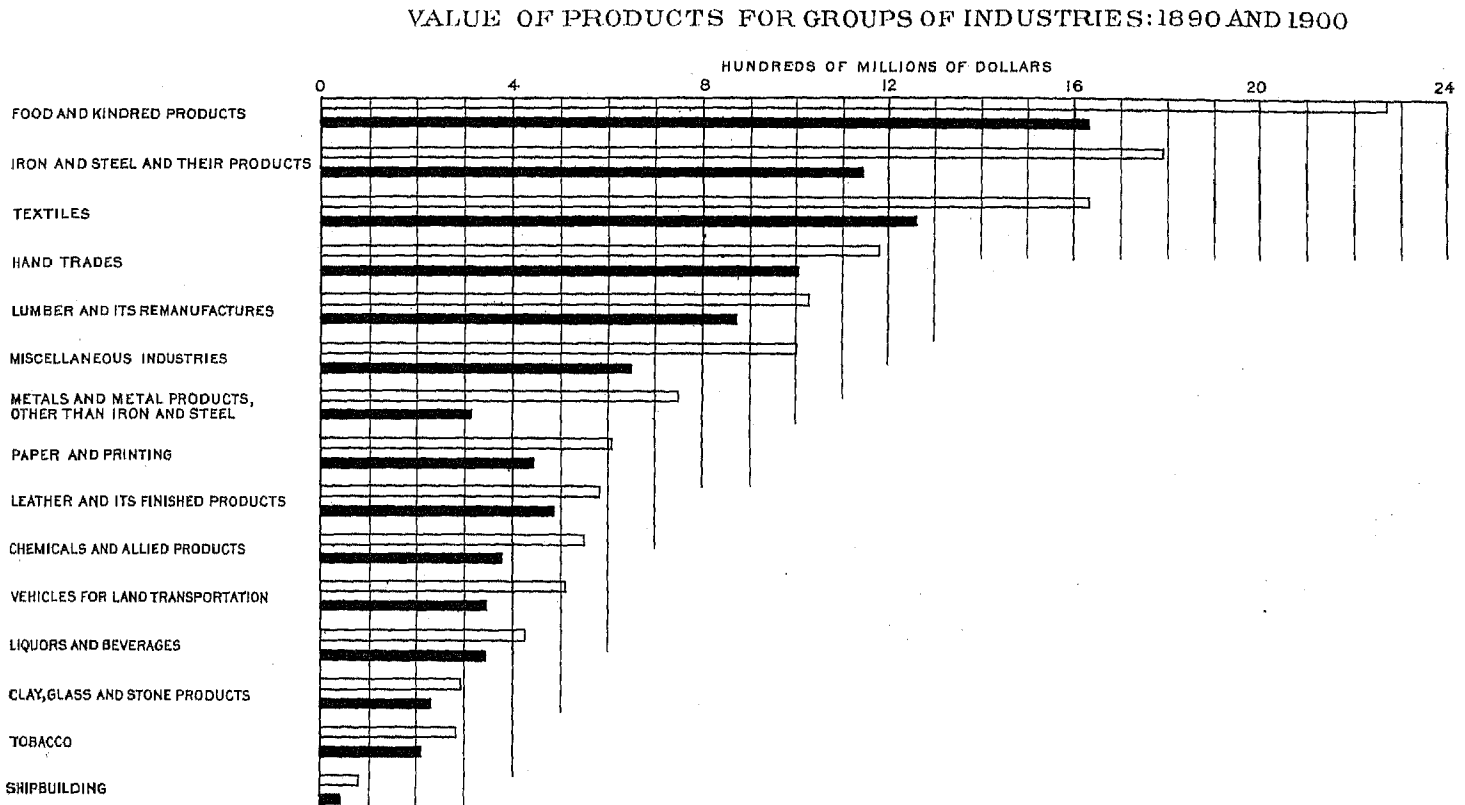
In marked contrast in respect to distribution is the second most important manufacture included in this group, that of flouring and grist mill products, with a value of $560,719,063, from 25,258 establishments, located in every state in the Union. In the American colonies the milling industry was naturally among the first to develop, and it spread with every new settlement. At all censuses, until 1900, the flour and grist milling industry was the most important in the United States in value of products. The census of 1850, which returned but four industries with products exceeding $50,000,000 in value, gave at the head of the list flour and grist mills, with 11,891 establishments and products valued at $136,056,736. Since 1850 the number of such mills has increased to 25,258 and the value of products to $560,719,063. Owing to the diffusion of this industry in every state in the Union and its importance in supplying local needs, it shows, as a whole, the modern tendency toward concentration less than almost any other. It is notable, however, in a degree not witnessed in any other industry, that while in most sections it retains the characteristics of a primitive industry, in others it has become one of the most concentrated of manufactures and affords perhaps the best illustration supplied by this census of large-scale production at low cost. In the single state of Minnesota, where the milling industry, through the operation of natural causes, has centralized and developed machinery and methods to the highest degree, 15 per cent of all the products of flour mills proper were produced. But in every farming community the small gristmill is still and will probably continue to be an essential establishment, representing in this census the largest number of establishments, with the exceptions of blacksmithing and wheelwrighting and lumber manufacture—similar industries, in which the local shop or mill naturally continues to supply the needs of the rural community.

Group 2.—Textiles.—While manufactures of food stuffs form the most valuable class of products, manufactures of clothing and fabrics of every description for household and other uses occupy the third rank. The fundamental materials of this group are textile fibers of every variety—cotton, wool, flax, silk, jute, hemp, ramie, and other coarser fibers, and all admixtures of them. The group includes not merely the fabrics utilized for clothing, but such other products as carpets, oilcloths, mats and mattings, nets, cordage, etc., and the manipulation of textile goods in every form and for every purpose. Forty-four classes of manufactures appear in this group, which, at the census of 1900, comprised 30,048 establishments, being fourth in rank among the 15 groups in this particular. The value of products of these establishments was $1,637,484,484, which constituted 12.6 per cent of the total value of all products for the United States, and was exceeded in 1900 only by group 1, food and kindred products, and by group 3, iron and steel and their products. At the census of 1890 it was second in respect to value of products. Monographs on the leading industries of this group appear in the Report on Manufactures, Part III, including reports on the combined textiles; cotton manufacture; wool manufacture; silk manufacture; hosiery and knit goods; flax, hemp, and jute; dyeing and finishing of textiles; collars, cuffs, and shirts; and the wholesale clothing manufacture.

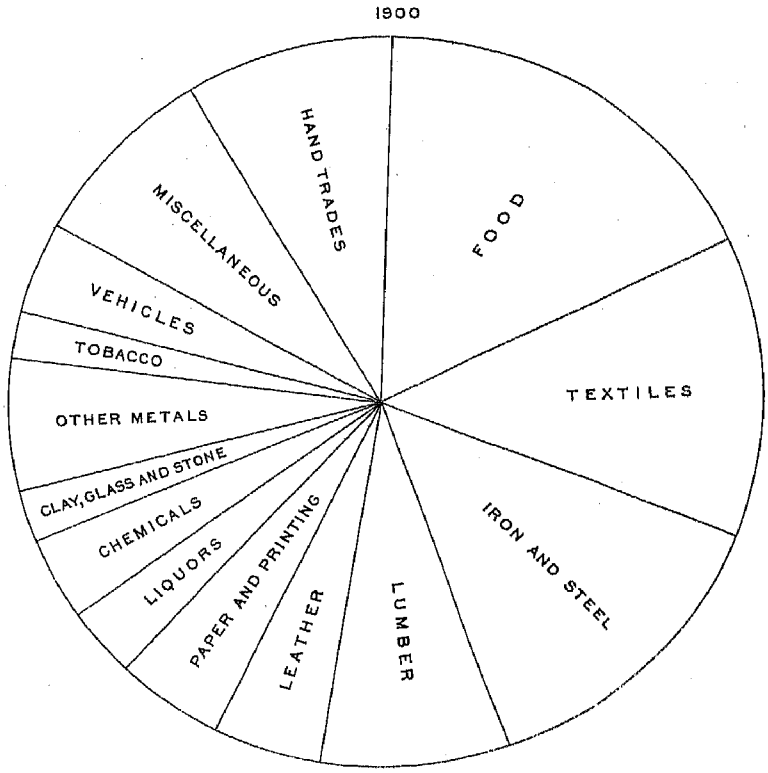
Comparing groups 1 and 2, we find that while the group of food products represents the larger number of establishments and the greater cost of materials and value of products, the textile group far outranks it in the amount of capital invested, in the average number of employees, and in the amount of wages paid, showing how much more closely identified it is with the factory system of manufacture, and how much greater is the value added to raw materials by the various processes through which they pass.

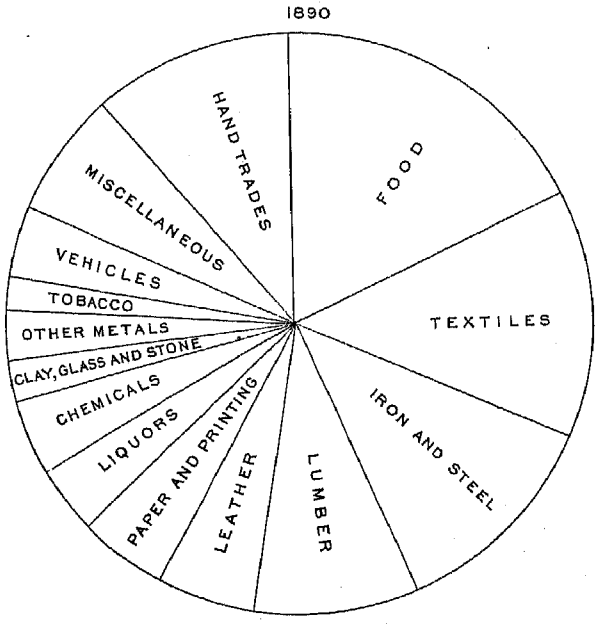
The cotton manufacture stands at the head of the textile industries proper with respect to all the items covered by the census reports, the value of its products being $332,806,156. From the beginning of the century this industry has been one of the leading and in some respects the most typical of our factory manufactures, and it is regarded as the most highly organized. At the census of 1840, 1,240 mills were returned, with 72,119 persons employed, a capital of $51,102,359, and products valued at $46,350,453, a value exceeded at that census only by the value of the products of the flouring and grist mills. At the census of 1850, cotton manufacture was second in rank, the value of its products being $65,501,687 for 1,074 establishments. In 1900 there were but 973 cotton mills, excluding all the establishments engaged in the rehandling of primary products and the manufacture of specialties, which at this census are separately returned for the first time under the distinct industry name, "cotton, small wares." Of this class, there were 82 establishments reported. The little mills of fifty years ago, operating a few hundred spindles, have given

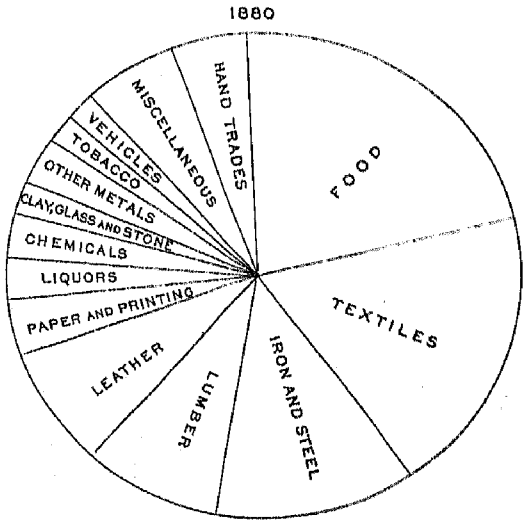
VALUE OF PRODUCTS FOR GROUPS OF INDUSTRIES: 1890 AND 1900



VALUE OF ALL MANUFACTURED PRODUCTS, AND PROPORTIONAL VALUE OF EACH GROUP: 1880 TO 1900







place to large establishments, built according to modern principles of mill construction, and operating thousands of spindles, the improvement of which has brought a speed of 5,000 to 10,000 revolutions a minute.

The United States has pressed forward so rapidly in the manufacture of cotton that in the production of cotton goods, judged by relative spinning capacity, it now holds the second rank among nations. In 1900 Great Britain[1] was operating 45,400,000 spindles, as contrasted with 18,590,515 in the United States; 7,155,500 in Germany; 6,090,889 in Russia; 5,039,000 in France; 4,945,783 in India; 3,140,171 in Austria; 2,614,500 in Spain; 2,092,730 in Italy; and 1,709,400 in Switzerland. The number of spindles in the world in 1900 has been estimated at 103,383,386,[2] and on this basis the United States operates 18 per cent of the world's spindles. The rapidity of our progress has attracted the attention of economists of other countries. M. Emile Levasseur calls attention to the fact that "in the sixty years 1835–1894, the consumption of cotton increased tenfold in the United States, which at the beginning of this period retained only 16 per cent of the home crop. At present, although the production of raw cotton has increased sixfold, 34 per cent is manufactured at home. The manufacturing industry has grown more rapidly than the agricultural."[3]

The wool manufacture took root in the colonies as early as any other industry, and down to the period of the War of 1812 it retained all the characteristics of a neighborhood industry. The local carding mill prepared the neighborhood wool for the household spinners and weavers, and the local fulling mill finished the cloths for use in the community. These mills increased with the spread of settlements, and, notwithstanding the sudden establishment of many complete factories for the manufacture of wool by power machinery, maintained themselves throughout the country until a comparatively recent date. Indeed, there are many of them still remaining, as the special report on this industry in Part III shows. In the Southern and Western states, and even in the New England states, the home of the factory manufacture of textiles, certain localities still contain a few carding mills. The advance of the wool manufacture into the perfected factory system has been more slow than that of cotton, although there are many wool-working establishments of enormous productive capacity. The range of products made in American wool factories is as wide as the multiform uses of this most valuable of fibers. The principal products of the industry fall naturally into four great groups—woolen goods, worsted goods, carpets, and felts. The once extensive industry of wool hat manufacture has well-nigh been swallowed up by the newer fur hat industry.

[1] The New York Commercial and Financial Chronicle, quoted in the Special Report on "Combined Textiles" in Part III of the Report on Manufactures.

[2] Ibid.

[3] "The American Workman," by E. Levasseur, page 32.

The census of 1900 shows a continued decadence in the manufacture of woolens proper, as distinguished from worsteds, there being an actual decrease in the value of the products of woolen mills, accompanying a marked increase in the value of worsted products. The worsted manufacture is an industry of comparatively recent origin in the United States. Early in the forties there were two or three large mills in New England for the production of worsted fabrics or stuffs for women's wear, but the manufacture made little headway until after the close of the civil war, and it was not until about 1870 that the manufacture of worsted goods for men's wear was seriously undertaken in this country. Since then, however, the development of the industry along these lines has been phenomenal, and there are now in this country half a dozen or more mills of most modern equipment turning out these goods in larger quantities than any foreign establishments.

The most notable achievement in textile manufactures has been, perhaps, in the carpet industry. Beyond question the United States is the greatest carpet manufacturing nation. The 133 mills engaged in this industry in 1900 produced $48,192,351 worth of two-ply or three-ply ingrains, Brussels, moquettes, tapestries, velvets, Smyrnas, and the higher grades of Axminsters and Aubussons, representing an aggregate of over 80,000,000 square yards of carpets. The development of the machine manufacture of carpets dates from 1844, when power was first successfully applied to the weaving of ingrain carpets by the late Erastus B. Bigelow, of Boston. This invention, and later the power loom for weaving Brussels and Wiltons, are at the base of all the power loom carpet weaving now done, both in Europe and in this country.

The manufacture of hosiery and knit goods has in previous censuses been treated as a branch of wool manufacture; it is now more properly presented as a cognate industry, wool having given place to cotton as the chief material of these goods. In this industry also the United States has outstripped the rest of the world. More machine-knit goods, both underwear and hosiery, are turned out annually in this country than in all other countries combined. The beginnings of the machine-knitting industry are well within the lifetime of many manufacturers still living. The knitting of socks and stockings remained wholly a household industry until 1832, when the principle of knitting by power was first successfully applied at Cohoes, N. Y. At first the use of the knitting machine was confined to the production of hosiery, but with the development of the power machine came an extension of its application to the manufacture of underwear. This had previously been made of flannels fashioned and sewed at home according to individual need; but when it was seen that the knitting machine was capable of knitting underwear in the form of the finished garment, there resulted a revolution in the manufacture of these

goods. The value of the products of hosiery and knit goods mills in the census year was $95,482,566, an increase of 42 per cent since 1890. The great variety of goods made, facilitates a tendency shown by this industry to maintain itself in comparatively small mills which purchase their yarns and require but small capital. It happens in consequence that these mills spring up all over the country. The 921 establishments existing in the census year were scattered through 36 states, although there is also a marked concentration of the industry in New York state and Pennsylvania. This manufacture is the only important branch of the textile industry showing a distinct tendency to maintain itself best in small mills.

Notable also among textiles for its rapid development in recent years is the silk manufacture. In 1850 there were but 67 establishments engaged in this industry, and their production was valued at only $1,809,476. The present census shows 483 establishments manufacturing goods valued at $107,256,258, which is an increase of 22.9 per cent since 1890. Notwithstanding the fact that American silk factories depend entirely upon imports for their raw silk material, the industry has grown so rapidly, stimulated by many inventions of American origin, and by the general prosperity of the people which has encouraged consumption of these comparatively expensive goods, that the United States has in fifty years become the chief silk-manufacturing nation in the world, with the possible exception of France, the value of whose products in this industry may still slightly exceed that of the products of the United States.

The only branch of textile manufacture in which the United States has not made a progress in keeping with that of all other lines of industry, is the linen manufacture; and the reasons for this are fully explained in the special report upon the flax, hemp, and jute industry, which appears in the Report on Manufactures, Part III.

The most striking point of difference between the textile industries of this country and those of Europe is the much greater specialization abroad. Indeed it is only in the United States that there are to be found large numbers of textile mills in which are performed all the separate processes of the manufacture of great varieties of goods. In England and on the Continent experience seems to have demonstrated that the greatest economy and the best practical results are secured by the specialization, in separate mills, of the several processes of combing, spinning, weaving, dyeing, and finishing. A marked tendency toward a similar specialization in the American textile industries has developed since the last census.

Cotton Ginning.—Included in the textile group are reports from 11,369 establishments employed in the ginning of cotton. Reports from these establishments, giving the quantity of cotton ginned in the United States preparatory to placing it on the market, constitute a portion of the results of a special inquiry, undertaken for the first time at the Twelfth Census. This investigation was under the immediate supervision of Mr. Daniel C. Roper, of South Carolina, expert special agent. The returns were made upon a special schedule and corrected both by correspondence and through the enumerators. Much important information, new to the public, was elicited, and the contribution to the precise and accurate knowledge of the cotton crop of the census year was accepted as so important and valuable that, by order of the Director, a second inquiry was undertaken regarding the crop of 1900, and this second report was followed by a third upon the cotton crop of 1901.

The returns for the first report were for the most part gathered by the enumerators; it remained to be demonstrated whether it was possible to obtain similar reports through the use of the mails. The two subsequent canvasses have demonstrated that this method is both feasible and satisfactory; every ginning establishment in the United States was heard from, either directly or indirectly. Wherever there was a failure on the part of the ginners to respond to the circulars of the Census Office, the coöperation of the local postmasters was secured, through the courtesy of the Postmaster-General, and in this way the product of every gin was obtained, or the fact ascertained that it was not in operation for the crop in question. The Census Office now possesses a complete list of the cotton ginneries of the country, with the capacity of each as shown by the quantities of cotton handled. This list is kept in perfect condition by the elimination of abandoned establishments and the addition of new ginneries.

The law establishing a permanent census office provides for the annual continuation of the report on cotton ginning and for its publication in parts at frequent intervals. By this method complete statistics of the cotton crop of each year will be collected and published a number of months earlier than these statistics have ever before been gathered. Early and accurate knowledge of the volume of the annual cotton crop is of the utmost importance commercially, and the cost of the inquiry is small in comparison with the value of the results. Three annual investigations as to the volume of the cotton crop have satisfactorily determined the trustworthiness of the ginners' reports.

The success of the inquiry was due mainly to the direct appeal made to the ginners for individual coöperation in this work. They were made to see that their own interests were promoted by an annual official report of the cotton crop, upon the accuracy of which they could depend. From hundreds of them the Census Office has received the most flattering testimonials as to the value of these reports, and the great advatages which must accrue from a regular continuance of such a collection of these statistics.

Part III of the Report on Manufactures contains the results of the three annual inquiries into the quantity of cotton ginned; it is the only occurrence in these volumes of statistical data covering any period subsequent to the census year. This departure from the ordinary rule seems justified by the fact that the information is at hand, and is increased in value by its freshness. The report locates the cotton crop by states and territories and distributes it by counties, presenting for each county the quantity of cotton ginned, the size of the bales handled, and the number of ginning establishments.

The estimates of the cotton crop, made annually by the United States Department of Agriculture, are based upon statistical information furnished by the officials of transportation lines, by cotton mills located in the cotton states, and by special agents of the Department at Southern ports and important receiving points in the interior. Results obtained by these methods, however carefully conducted, are estimates and not statistics compiled from an actual canvass, and as such are subject to possible errors which are eliminated in the census reports.

The cotton ginning report for the census year was based upon returns from 29,620 gins, which, in accordance with the peculiar conditions surrounding this industry, consisted of 6,468 establishments operated for the public, 2,863 establishments operated only for the plantations upon which was grown the cotton they handled, and 20,289 establishments operated jointly for the plantations owning them and for the planters of the immediate neighborhood. In the general statistics of manufactures only 11,369 of these 29,620 ginneries appear under the industry "cotton ginning." The discrepancy is due to the fact that the plantation ginneries were included in the agricultural reports, and to the further fact, explained elsewhere in this report, that a large proportion of these ginning establishments are run in connection with sawmills, grist mills, and cotton-seed oil mills, the separate lines of industry being carried on in the same establishment successively at different seasons of the year; in the consolidation of the reports made to the Census Office, the establishment was assigned to the industry the product of which predominated in value.

Group 3.—Iron and Steel.—The third great group comprises the products of iron and steel in almost infinite variety. Iron is said to be the basis of all manufacturing industry, and the condition of this basic industry is regarded in trade as the most accurate barometer of the general condition of all industrial enterprise. "Manufactures of iron constitute, in whole or in part, the implements or materials, or both, of almost every useful occupation."[1] Included in this group are the primary or fundamental products of iron and steel, such as pig iron, iron and steel ingots, billets, rails, structural iron and steel, machinery and tools of every description, all forms of hardware, and a well-nigh innumerable group of subsidiary products. Special reports upon the primary iron and steel industries, blast furnaces, forges and bloomeries, rolling mills, and steel works; upon locomotives; upon machinery; and upon various other subordinate branches of the industry appear in Part IV.

The variety of industries in which iron and steel form the fundamental materials is so great that it is impossible by census methods to secure data which shall reveal the details of all the various branches. One great branch (classified in the census reports under the head of "foundry and machine-shop products,") includes such a multitude of separate and distinct articles that it is impossible to secure returns which adequately distribute them for the purpose of revealing their relative importance. It becomes necessary to classify these establishments according to their chief product, regarding as "by-products" a great mass of other articles, the production of which is simultaneously carried on.

The coarser forms of iron and steel manufacture supply the raw material for innumerable industries which produce the most delicate mechanisms, in which the value added by labor is many times the value of the original materials. Perhaps the most striking illustration of this appears in the watch manufacture, upon which a special report is presented in Part IV.

Returns were received from 13,896 establishments in this group representing a value of products of $1,793,490,908, which constitutes 13.8 per cent of the total gross value of products of all industries during the census year. Since the last census there has developed an entirely new branch of manufacture, that of tin and terne plate, represented in 1900 by 57 establishments, with 3,671 wage-earners, and products valued at $31,892,011. The increase in the value of products of the iron and steel group was 56.8 per cent. This increase, in connection with the great advance which has taken place in all the manufactures of the country during the decade, is a striking confirmation of the popular belief that the iron business is a reliable barometer of general trade. Iron and steel penetrate so widely into other industries that prosperity in any of them increases the demand for iron entering as material into their products, and at the same time also increases the demand for machinery and tools for working up that material into finished products.

At the time when the census was taken the blast furnaces, rolling mills, steel works, forges, and bloomeries of the country were in a state of activity unprecedented in our history, and yet it was impossible to promptly supply the demands for their products.

In these mills have occurred the most marked advances in labor-saving machinery and in appliances for reducing labor costs. To these advances, which are nearly all of American invention, is due the fact that

[1] Report on Manufactures, December 5, 1791, by Alexander Hamilton, Secretary of the Treasury.

since the last census was taken the United States has reached a point where, measured by value of products, it stands preeminently the greatest iron-manufacturing nation in the world.[1] Not less striking than the increase in the value of products is the increased use to which iron and steel have been put in the evolution of other branches of industrial activity. The nineteenth century witnessed (in 1825) the building of the first railroad for general freight and passenger traffic, the Stockton and Darlington road in England. The street railway dates from 1832. The general use of iron and steel for bridges and for steamships is a development of the last half century; the use of steel in the construction of large buildings is a development of the last quarter century; the invention and use of steel cars for general freight purposes belong to the last decade. Simultaneously with the demand for iron and steel to carry out these developments, there has been a constantly increasing demand for these materials for agricultural machinery, textile machinery, mining machinery, electrical machinery, machine tools, iron and steel pipe, hardware, stoves, shovels, tin plate, wire, and thousands of minor tools and mechanisms, the use of many of which was unknown even as late as 1850.

The secretary of the American Iron and Steel Association singles out steel rails as affording the best illustration of "the marvelous energy and superior skill which have been displayed in the manufacture of iron and steel in our country in the last quarter of the nineteenth century. The first experimental steel rails ever made in the United States were rolled at Chicago in 1865, but our Bessemer steel industry at first made such slow progress, owing to foreign competition and the prejudice in favor of iron rails, that the whole country made only 259,699 tons of steel rails in 1875. Soon afterwards, however, American energy and skill produced most wonderful results. In 1879 we made more Bessemer steel rails than Great Britain. In 1881 we made 1,187,770 tons of steel rails, and in 1887 we made 2,101,904 tons, and we have since increased these figures. Great Britain's largest production of Bessemer steel rails was in 1882, when she made 1,235,785 tons. From 1867 to 1900, both years included, we made 33,064,467 tons of Bessemer steel rails, an average of almost 1,000,000 tons a year, of which 15,668,101 tons were made in the last ten years."[2]

[1] "In short, it may be asserted that the production of pig iron has doubled almost every tenth year between 1840 and 1890, being thirty-one times as great in the latter as in the former year. For a score of years the United States held second rank among the countries producing pig iron, far behind the United Kingdom and but slightly in advance of Germany and France. By 1893 she had passed the United Kingdom and was contributing more than a quarter of the total production of the civilized world. To produce such a rapid development there must be a combination of four elements, the fuel, the mineral, a spirit of enterprise, and a demand for the product. The first two have been supplied by nature, the American character has furnished the third, the presence of the fourth is due to the multiplication of railroads and the growth of consumption, productive and unproductive." The American Workman, by E. Levasseur, pages 16–17.

[2] Iron and Steel at the close of the Nineteenth Century, by James M. Swank, United States Geological Survey: Mineral Resources of the United States, 1900, page 73.

Group 4.—Lumber and its Remanufactures.—The fourth great group of industries is that which uses wood as its material. The Twelfth Census shows for this group 47,079 establishments, $946,116,515 capital, and $1,030,906,579 as the value of products, which was 7.9 per cent of the total value of products of the country.

In 1850, lumber, sawing and planing, was second in rank, with 17,895 establishments and products valued at $58,520,966. At the present census, 37,239 establishments reported $735,175,987 as the value of lumber and timber products and planing-mill products. These two branches were shown as a single industry in 1850, and the combination is made here for purposes of comparison, thus eliminating duplications. Subtracting from this combined value of products the cost ($94,137,837) of material purchased in a partly manufactured form by the planing mills, there remains $641,038,150 as the true net value of products, or eleven times the amount reported fifty years before.

The abundance of the forests of the United States and the great variety of timber which they contain, have contributed chiefly to this enormous development. During the past ten years capital and enterprise have penetrated into many regions heretofore unreached, in search of new supplies of a raw material upon which all the other industries depend in greater or less degree, in much the same way as they depend upon iron.

A special report covering the more important branches of lumber manufacture appears in the Report on Manufactures, Part III. There are many important branches of the lumber industry, however, as in the case of iron and steel, which it is impossible for the Census Office to follow with that degree of detail essential to the presentation of a complete picture of progress and products. The furniture manufacture may be cited as one instance. It is a branch of industry which has become more and more dependent upon machinery, and is now highly concentrated at certain recognized centers; in the variety, beauty, and cheapness of its products, it has attained a degree of excellence recognized throughout the world.

In each of the four preceding groups—food products, textiles, iron and steel, and lumber—the value of products for 1900 exceeded $1,000,000,000; and these four, taken together, represent more than one-half of the total value of the products of the United States.

Group 5.—Leather and its Finished Products.—The fifth great group of national industries is that which depends upon skins and hides for its chief raw materials. It includes in its products the leather itself in all its forms, tanned and curried, patent and enameled, and morocco, as well as the finished products into which the leather is remanufactured. The most important among these are included under the factory production of boots and shoes, and the minor industries of saddlery and harness, trunks, belting, and a great variety of other leather goods. Special reports upon the manufacture of leather and upon the factory

manufacture of boots and shoes appear in Part III of this report. The present census is the first which has given special treatment to the leather industry. The minor industries dependent upon this material are of constantly increasing importance, and it is to be regretted that census methods are not yet sufficiently organized to admit the presentation of all the details of these minor leather industries.

The group includes 16,989 establishments, having a capital of $343,600,513, employing an average of 238,202 wage-earners, and reporting a value of products of $583,731,046, which constitutes 4.5 per cent of the total value of products for all industries. Included in the fifteenth group, that of hand trades, are reports from 23,560 establishments engaged in the custom manufacture and repairing of boots and shoes, representing an additional product of $26,550,678. It is significant of the evolution of the industry that these latter establishments, now excluded from the leather group by the somewhat arbitrary classification of the Census Office, represented until a comparatively recent period the entire product of boots and shoes. In no other industry is the advance from the household and small-shop manufacture more clearly shown than in the manufacture of boots and shoes, which were formerly made one pair at a time and exclusively by hand, but which are now produced in factories with their intricate division and subdivision of labor, by which each employee performs but one of the score or more of separate operations which combine to turn out the finished product with the utmost rapidity. The factory manufacture of boots and shoes had its origin in this country about 1815. Before that time the work of producing a finished shoe had all been done by the single shoemaker. The invention, in 1811, of wooden shoe pegs gave the first impetus to a division of labor which finally resulted in the establishment of true factory manufacture, although machinery was not applied until the middle of the century. The development of the industry is almost wholly the result of American enterprise, both as to machinery and methods, and the United States is the only country in which the factory production of boots and shoes has practically driven out the hand-made article. The superiority of the machine-made article in uniformity, general excellence, and comparative cheapness is more striking, perhaps, in the production of shoes than in any other industry. Factory methods made possible the production in the census year of 219,000,000 pairs of boots, shoes, and slippers of all descriptions for men's, women's, and children's wear. A large and increasing proportion of this product is exported; the increasing popularity of American shoes in foreign countries being due to the superior quality and comparative cheapness of this particular product of American inventive genius.

Group 6.—Paper and Printing.—The sixth great group is that of paper and printing, in which 26,747 establishments, with $557,610,887 capital and 297,551 employees, turned out products valued at $606,317,768, which constituted 4.7 per cent of the total value of products for all industries. The value of products of this group of industries in 1900 was more than threefold that in 1880. The census classification includes in this group the manufacture of wood pulp, which, except for its more intimate relation under modern conditions to the manufacture of paper, might well have been included in the lumber industry. The difficulty of making a proper separation arises from the fact that many of the great paper-manufacturing companies of the present day own the forests and operate the wood-pulp mills in intimate connection and often in the same buildings with their paper mills. This condition is one which has arisen almost wholly during the last decade; and, indeed, the whole development of the manufacture of paper from the fiber of wood is of modern date and largely of American origin. Nowhere in industry has there occurred an evolution so striking as that which has entirely changed the sources and character of the materials utilized. The paper and wood-pulp industry records a phenomenal advance during the decade. In 1900, 763 establishments produced $127,326,162 worth of products, an increase in value since 1890 of 61.3 per cent.

From a somewhat precarious and widely scattered industry, carried on generally in small establishments situated at remote points where water power was available, the paper manufacture has shown a marked tendency toward concentration in large establishments, equipped with the most modern machinery and labor-saving devices. These improvements, together with the utilization of the cheaper raw material of wood pulp, have resulted in a pronounced decrease in the cost of paper, while in turn the industry has been stimulated by the extraordinary development of the newspaper press and by the great demand for reading matter which characterizes the American people. This demand for paper, and the abundance and accessibility of the materials from which it is manufactured, have brought this industry to a point of perfection in the United States not known elsewhere, and in recent years has resulted in a marked increase in the demand for American paper for export trade. A special report upon the paper manufacture is, for the first time, presented at this census, and appears in Part III of the Report on Manufactures.

In this group are 21 industries, many of which, like steel engraving, diesinking, lithographing, photo-engraving, stereotyping, and electrotyping, are only related to the rest of the group through their cognate utilities.

Next in importance to the production of the material itself, and of even greater importance than the manufacture of paper, measuring importance by value of product, stands printing and publishing, in which are included, under separate classes, book and job printing,

music printing, and the printing and publishing of newspapers and periodicals, representing among them an aggregate product of $347,055,050, or more than one-half of the value of all products included in the group. A special report upon the printing and publishing industry in its several branches appears in Part III. That report brings out in detail the features of an evolution in methods accomplished almost wholly during the census decade, and more extraordinary in its character and its effects than any similar progress in industry of which this census makes record. The old-fashioned, laborious method of typesetting by hand has very generally given place, particularly in newspaper offices, to machine typesetting. Accompanying this change has been a development in the printing press which permits the production of newspapers of enormous size with a rapidity and at a price not conceived of twenty-five years ago as within the possibility of mechanical enterprise. The printing industry, as represented by the newspaper press, is widely scattered, appearing not only in every state and territory in the Union, but in almost every place which has passed the stage of the hamlet.

Group 7.—Liquors and Beverages.—The seventh great group of industries covers the production of liquors and beverages, including distilled liquors, malt liquors, wines, and mineral and soda waters, and the important cognate industry of bottling. Thus the group includes everything manufactured for drinking purposes, whether from roots, herbs, sirups, hops, and grapes or other fruit, whether brewed, distilled, or fermented. These industries represent a group as clearly and distinctly defined, from a statistical and sociological point of view, as any of the fifteen. The group includes 7,861 establishments, with $534,101,049 capital, 63,072 wage-earners, and with products valued at $425,504,167, which sum represents 3.3 per cent of the total value of products for all industries. The value of products for the industry has more than doubled since 1880. Special reports upon the principal industries of this group appear in Part III.

The products of the distilleries, breweries, and wineries of the country represented a total annual production of 1,325,358,094 gallons of beverages. If this quantity be increased by the excess of imports over exports of the various classes of malt, distilled, and vinous liquors, and the total diminished by the excess of distillates manufactured over those withdrawn from bond, the result obtained (1,322,000,000 gallons) will indicate the approximate annual consumption by the people of the United States.

Group 8.—Chemicals and Allied Products.—The eighth great group of industries is that of chemicals and allied products, in which are included, in a manner somewhat arbitrary, the manufacture not only of chemicals proper, but the proprietary and patent preparations of drugs, medicines, and compounds, expressed and other oils, non-mineral paints, explosives, fertilizers, dyestuffs and extracts, salt, petroleum refining, and many similar industries, the total number of classes being 20. A special report on the manufacture of chemicals covering the most important of the above classes appears in Part IV of the Report on Manufactures, where are also included special reports upon the manufacture of salt and starch, and petroleum refining. The manufacture of chemicals and allied products was carried on in 5,444 establishments, with a capital of $498,390,219, employing 101,522 wage-earners, and products valued at $552,891,877, or 4.3 per cent of the total value of products for all industries.

This group is one of vast and growing importance, its products contributing in constantly increasing quantities to the subsidiary materials and supplies required in nearly every other line of manufacture. With the exception of lumber products and the hand trades, all the remaining groups depend more or less upon the assistance of the chemical industries, and to the remarkable advance made in chemical manufactures we may attribute a large share of the general advance made in all industries. The statistics show that the value of products in this group was more than threefold that in 1880. This increase represents a great variety of chemical products, the manufacture of which had previously either not been undertaken at all in this country, or only in the most desultory and unsatisfactory manner. The single branch of the chemical industry in which the United States appears to have lagged behind in any degree is in the manufacture of dye stuffs and coal-tar products. In this branch of the industry the German manufacturers have so developed their resources, perfected their methods, and consolidated their organization that they have been able to hold their markets and to discourage the adventure of capital elsewhere.

Group 9.—Clay, Glass, and Stone Products.—The ninth great group is that of clay, glass, and stone products, among which industries, although their products are widely dissimilar, there is a certain degree of kinship, owing to the fact that they all derive their raw materials from the earth by extractive processes, and these raw materials are of kinds which have only a potential value as they lie in the earth, the value as represented in the census reports being the labor cost of extraction and preparation. Included in this group are sixteen industries, among which are pottery products, plate and window glass and glassware of all kinds, the reworking of glass and clay products, mantels, marble-work, emery wheels, lime and cement, grindstones, millstones, hones and whetstones, monuments and tombstones, kaolin and other earth grinding, etc.

No report has been prepared upon the stone products of the country. It is practically impossible to represent the stoneworking industry separately from the quarrying of stone, with which it is so intimately connected.

Quarrying, like mining, will be the subject of a subsequent report, in accordance with the provision of section 7 of the act creating a permanent Census Office. It follows that the statistics of stone products contained in the present report, present a wholly inadequate picture of this important source of wealth.

The group shows 14,809 establishments, with $350,902,367 capital, 244,987 wage-earners, and $293,564,235 as the value of products, or 2.3 per cent of the total value of products for all industries—nearly threefold the value reported in 1880. Special reports upon the glass manufacture and the brick and tile and pottery industries appear in Part III.

Group 10.—*Metals and Metal Products, other than Iron and Steel.*—The tenth great group of industries, the manufacture of metals other than iron and steel, includes 35 of the census industries, among which are brass, copper, brass castings, watches, clocks, and jewelry, gold and silver reducing and refining, plated ware, electroplating, zinc, lead, type founding, and all metal working other than that of iron and steel. Large quantities of iron and steel, however, are among the necessary materials employed in this interesting and important group of industries. The development of these industries during the last decade was rapid, being enormously stimulated by the increased utilization of electricity for both power and heat. The extension of the street-railway system in all parts of the country since the successful application of electricity as a method of propulsion, has been one of the chief factors in quadrupling the uses of copper during the last ten years, and our vast domestic supplies of raw copper have enabled our manufacturers not only to supply the home demand for all forms of manufactured copper, but to develop a large export business.

For the group there were reported 16,305 establishments, with $410,646,057 capital, 190,757 wage-earners, and $748,795,464 as the value of products, or 5.8 per cent of the value of products for all industries. The total value of products for the group at the census of 1880 was $173,273,848. It thus appears that the rate of increase in this group for the twenty years was considerably greater than in any other group, except vehicles for land transportation. Special reports upon the smelting and refining of lead, copper, and zinc, upon watches and watch cases, needles and pins, and pens, included in this group, appear in Part IV. Attention is also directed to the special report in Part IV upon the manufacture of electrical apparatus and supplies, in which are shown many details of the new uses of copper, growing out of the rapid utilization of electric power in manufacture, transportation, lighting, and heating. In comparing the statistics of this group with those for former censuses, it should be borne in mind that formerly the production of these metals from the ore was not generally considered a manufacturing operation, and, therefore, the statistics of such production were not separated from the statistics of mining. In a few cases smelting was included in 1890 with the statistics of manufactures, and in view of the known expansion of metal productions since that year it is probable that the error of comparison is less than would at first appear.

Group 11.—*Tobacco.*—The eleventh great group of industries comprises those which are confined to the manufacture of tobacco in any of its forms. This group shows 15,252 establishments, with $124,089,871 capital, 142,277 wage-earners, and products of $283,076,546 in value, or 2.2 per cent of the total gross value of products in 1900, an increase of more than 100 per cent for this group since 1880.

This industry has undergone great changes since the last census was taken. In all manufacturing communities there remain small shops for the manufacture of cigars, and this branch of the industry is widely distributed; but the manufacture of smoking tobacco, chewing tobacco, and cigarettes has shown a remarkable tendency toward consolidation, giant organizations controlling the greater part of the production. A special report on the tobacco manufacture appears in Part III.

Group 12.—*Vehicles for Land Transportation.*—The twelfth great group of industries includes all manner of vehicles for land transportation. These manufactures utilize so many varieties of raw materials that it is impossible to class them together on that basis, although it is the common one in the census grouping, and they are therefore grouped together on the basis of the similarity in use of their products. They include nine industries, the most important of which are the manufacture and repair of cars by steam and street railway companies, the manufacture of carriages and wagons, and of bicycles and tricycles.

There were 10,113 establishments in this group, with $396,778,672 capital, 316,214 wage-earners, and products valued at $508,649,129, or 3.9 per cent of the total value of products for all industries, an increase since 1880 of 384.6 per cent, or nearly four-fold. Special reports appear in Part IV upon the manufacture of bicycles and tricycles, carriages and wagons, and steam railroad cars.

Group 13.—*Shipbuilding.*—The thirteenth great industry group is that of shipbuilding, which has been assigned to a distinct class, not only because of its growing importance and the great public interest in its development, but also because it utilizes such a great variety of raw materials that it can not be properly assigned to any of the other groups.

A remarkable increase in this industry is shown by the statistics of the present census. The value of ships, boats, and vessels of all kinds produced in the shipyards of the country, both private and governmental, has increased from $40,342,115 in 1890 to $85,612,470 in 1900, an increase of 112.2 per cent. The whole of this

increase, however, has been in the branch of iron and steel shipbuilding; the value of such vessels constructed, not including those in governmental shipyards, increased from $12,929,953 in 1890 to $50,367,739 in 1900, or 289.5 per cent. On the other hand, there was an actual decrease of 3.7 per cent in the value of wooden ships, boats, etc. (not including those in Government shipyards), built in 1900, as compared with the output of the year 1890, the amounts being $24,210,419 and $25,135,457 respectively. A special report, in which the full significance of these changes in the industry is brought out, appears in Part IV of this report.

Group 14.—*Miscellaneous Industries.*—The fourteenth group of industries is a heterogeneous grouping of all the miscellaneous industries not included in any of the prior groups, nor in the hand trades, and not susceptible of such inclusion. It comprises all those branches of true manufacturing which, by reason of their peculiar character as specialties or novelties, or by reason of the special raw material utilized, or for any other reason, can not properly be classified with any of the great general groups preceding. Among the raw materials thus employed may be specified rubber, ivory, precious stones, and the like.

Included in the miscellaneous group are 80 industries, the most important of which, on the basis of the classification by value, are agricultural implements, representing $101,207,428; electrical apparatus and supplies, representing $91,348,889; gas, illuminating and heating, representing $75,716,693; soap and candles, representing $53,231,017; rubber and elastic goods, representing $52,627,030; paving and paving materials, representing $46,447,719; rubber boots and shoes, representing $41,089,819; coke, representing $35,585,445; pianos, representing $35,324,090; and bridges, representing $30,151,624.

The group reported 29,479 establishments, $1,348,920,721 capital, 483,273 wage-earners, and products valued at $1,004,092,294, or 7.7 per cent of the total gross value of products, an increase of over threefold since 1880.

Group 15.—*Hand Trades.*—There remains to be considered one great group embracing the industries commonly known as hand trades, which in this census have been segregated from the manufacturing industries proper, in order to bring out distinctly the relative importance of each. The difficulty experienced in formulating a satisfactory rule of inclusion under this group, or line of division between true manufacture and the hand trades, has been fully discussed on pages xxxiv to xl of this introduction.

In the total number of establishments reporting at the Twelfth Census, these hand trades naturally represent a proportion altogether out of keeping with the relative value of their products. In 1890 there were 143,716 such establishments reporting, out of a total number for all industries of 355,415, or 40.4 per cent. In 1900 the number of such establishments had increased to 215,814, and represented 42.1 per cent of the total of 512,254 establishments. In 1890 they employed 661,760 persons, including all the proprietors of such establishments. In 1900 the number of wage-earners was 559,130, to which, in order to render the number comparable with that of the census of 1890, must be added 242,154 proprietors, making a total of 801,284. The value of the products of these establishments in 1890 was $1,009,347,226, or 10.8 per cent of the total gross value of the products of the manufacturing industries of that year. In 1900 the gross value of products was $1,183,615,478, or 9.1 per cent of the total.

This group of hand trades may be profitably subdivided into two groups, one of which embraces all the industries known as the building trades, and includes carpentering, masonry, painting, plumbing, plastering, and paper hanging. The building trades cover the construction and repair of dwellings, factories, and business buildings of all descriptions; hence the value of products returned for this group should indicate, in a general way, the total value of the construction work of the country during the census year. This total value as shown by the census figures was $739,944,811. That the sum falls far short of the actual value of the construction work of the country during the census year is manifest, and the reasons why this is so have been fully explained in that portion of this report which discusses in detail the difficulties and defects of the census of the mechanical industries. An effort has been made to measure the degree of deficiency by correspondence with the building inspectors in the various cities of the country having a population of 20,000 or more, and the results of the correspondence are presented in that portion of this report which deals with manufacturing in cities, and to which, owing to the fact that a large proportion of the hand trades returned to the Federal census are urban, the further consideration of this branch of industry is deferred.[1]

Included in the 15 groups are establishments representing nearly every manufacturing industry which is pursued by man in any part of the world. The exceptions are practically confined to certain products of skilled hand labor, ordinarily known as specialties or novelties. Because of the limited profitable employment of machinery, and the higher rate of wages paid in this country for skilled labor, which forms a large item in the cost of production in this class of industries, they have not been transferred from the centers of Europe, where they had their origin generations ago.

Types of this class of industry are the manufacture of lace, rugs, and embroidery. Even here the machine

[1] See infra, page ccxlvi.

manufacture of lace from cotton threads has attained a considerable development in the United States by the use of American mechanisms.

In several lines of manufacture, moreover, notably in the textiles, American production is still confined largely to what are known as staple products, susceptible of rapid production, in accordance with a uniform standard, at a minimum labor cost, and involving a comparatively small element of artistic skill on the part of the workman. The special report on the cotton manufacture indicates that not over 10 per cent by value of the cotton goods produced in this country are what are known as fancy goods, as distinguished from staples. It is a fact that the use of the Jacquard loom in the weaving of fancy patterns into the body of fabrics is not as general in the textile factories of this country as in those of continental Europe. In all branches of fancy goods, however, there has been a notable progress in the United States since 1890, and it is to be regretted that census methods will not permit of a proper presentation of this progress.

That the minds of American manufacturers are turning more and more to the further development of the artistic side of manufacturing is shown in many ways, and notably by the establishment in certain manufacturing centers—largely through the generosity and at the instigation of manufacturers—of schools of industrial art, where special attention is paid to the application of art to manufacture, and by the founding of textile schools, where young men and women are taught the business of manufacturing from the scientific and artistic points of view. Since the last census three such textile schools have been established in the state of Massachusetts alone. The organization of another in Providence, R. I., is now under way, and there are at least three similar schools in the Southern states. The first school of this character to be founded in the United States, that at Philadelphia, Pa., was established in 1877.

XXIX.

DECREASES IN INDUSTRIES.[1]

The above summary of the industries embraced in the 15 groups showed a large development of each group as a whole. It appears, however, that in certain of the industries there has been a decline during the decade in the gross values of products. The industries in which these apparent declines have occurred and the proportional decreases are indicated in table LIX.

[1] This section was prepared by Mr. Joseph D. Lewis, of the Division of Manufactures.

TABLE LIX.—*Industries showing decreases in value of products from 1890 to 1900.*

INDUSTRIES.	VALUE OF PRODUCTS.		DECREASE.	
	1900.	1890.	Amount.	Per cent.
Artificial feathers and flowers	$6,297,805	$9,078,683	$2,780,878	30.6
Artists' materials	497,046	531,785	34,739	6.5
Axle grease	718,114	846,459	128,345	15.2
Bags, other than paper	20,123,486	20,207,805	84,319	0.4
Belting and hose, linen	717,137	777,942	60,805	7.8
Billiard tables and materials	1,650,868	2,823,278	1,172,410	41.5
Bone, ivory, and lamp black	359,787	1,031,030	671,243	65.1
Boot and shoe uppers	700,225	3,346,002	2,645,777	79.1
Boots and shoes, custom work and repairing	26,550,678	34,856,651	8,305,973	23.8
Boxes, cigar	5,856,916	7,091,948	1,235,033	17.4
Brass	1,419,817	2,549,860	1,130,043	44.3
Brick and tile	51,270,476	67,770,695	16,500,219	24.3
China, decorating	693,800	847,555	153,755	18.1
Clothing, horse	1,305,164	1,572,265	267,101	17.0
Clothing, women's, dressmaking	48,356,034	57,071,732	8,715,698	15.3
Coffee and spice, roasting and grinding	69,527,108	75,042,010	5,514,902	7.3
Dyestuffs and extracts	7,350,748	9,292,514	1,941,766	20.9
Electroplating	3,007,455	3,121,642	114,187	3.7
Engraving and diesinking	1,683,690	2,187,157	503,467	23.0
Engraving, wood	616,166	1,555,418	939,252	60.4
Flax, dressed	158,650	981,283	822,633	83.8
Galvanizing	2,470,703	2,957,143	486,440	16.4
Gold and silver, leaf and foil	2,666,224	2,977,791	311,567	10.5
Gold and silver, reducing and refining	11,811,537	32,035,520	20,223,983	63.1
Hairwork	1,952,792	2,489,061	536,269	21.5
Hooks and eyes	499,543	593,604	94,061	15.8
Horseshoes, factory product	387,619	1,110,032	722,413	65.1
Iron and steel, nails and spikes, cut and wrought, including wire nails	14,777,299	34,227,517	19,450,218	56.8
Iron and steel, pipe, wrought	21,292,043	37,906,801	16,614,758	43.8
Ivory and bone work	1,873,357	1,918,607	45,250	2.4
Japanning	215,506	350,819	135,313	38.6
Jewelry and instrument cases	1,156,977	1,454,053	297,076	20.4
Kindling wood	1,784,690	2,401,878	617,188	25.7
Lard, refined	8,630,901	15,474,848	6,843,947	44.2
Lead, bar, pipe, and sheet	7,477,824	8,351,754	873,930	10.5
Leather board	108,734	463,705	354,971	76.6
Liquors, distilled	96,798,443	104,197,869	7,399,426	7.1
Looking-glass and picture frames	15,570,293	16,376,173	805,880	4.9
Lumber, planing mill products, including sash, doors, and blinds	168,343,003	183,681,552	15,338,549	8.4
Malt	19,373,600	23,442,559	4,068,959	17.4
Mantels, slate, marble, and marbleized	1,153,540	3,127,662	1,974,122	63.1
Masonry, brick and stone	203,593,634	204,165,642	572,008	0.3
Musical instruments, organs and materials	5,691,504	9,213,188	3,521,684	38.2
Oil, castor	395,400	573,363	177,963	31.0
Ordnance and ordnance stores	2,239,797	2,424,662	184,865	7.6
Printing materials	1,088,432	1,459,434	371,002	25.4
Pulp, from fiber other than wood	103,204	524,243	421,039	80.3
Pumps, not including steam pumps	1,341,713	4,103,410	2,761,697	67.3
Regalia and society banners and emblems	3,077,945	3,203,890	125,945	3.9
Registers, car fare	80,865	141,320	60,455	42.8
Safes and vaults	3,927,867	6,641,844	2,713,977	40.9
Sand and emery paper and cloth	1,175,895	1,249,647	73,752	5.9
Shoddy	6,730,974	7,887,000	1,156,026	14.7
Show cases	2,467,901	2,569,557	101,656	4.0
Smelting and refining, not from the ore	7,784,695	28,188,826	20,404,131	72.4
Stationery goods, not elsewhere specified	5,065,869	9,456,467	4,390,598	46.4
Steam fittings and heating apparatus	22,084,860	23,147,434	1,062,574	4.6
Stencils and brands	673,784	732,511	58,727	8.0
Straw goods, not elsewhere specified	36,985	329,987	293,002	88.8
Type founding	2,842,384	3,916,904	1,074,520	27.4
Vault lights and ventilators	338,111	455,413	117,302	25.8
Vinegar and cider	6,454,524	6,649,300	194,776	2.9
Watch and clock materials	345,347	831,348	486,001	58.5
Watch cases	7,783,960	8,618,479	834,519	9.7
Whalebone and rattan	135,000	682,977	547,977	80.2
Wheelbarrows	454,441	1,185,565	731,124	61.7
Window shades	8,868,259	9,239,669	371,410	4.0
Wire	9,421,238	22,012,804	12,591,566	57.2
Woodenware, not elsewhere specified	3,585,542	3,597,602	12,060	0.3
Wool hats	3,691,940	5,329,921	1,737,981	32.6
Woolen goods	118,480,158	133,677,977	15,147,819	11.3

While in several instances the decreases shown in the above table accurately reflect changed conditions, the decreases shown for most of the industries are apparent rather than real, and are caused by changes in classification at the two census periods. It frequently occurs, also, that several products different in character, are manufactured by one establishment; in such cases the product of greater value as a rule controls the classification of the return, which must necessarily be considered as a whole. If each were the sole product of a single establishment, they would be assigned to different industries. Lard refining affords an excellent example of this apparent loss of a part of an industry. The product of establishments which are engaged exclusively in manufacturing lard, or the larger part of whose product consists of that article, is placed under the class, "lard, refined." The value of the products so reported was, however, less than 50 per cent as great as the reported value of refined lard manufactured by slaughtering and meat packing establishments in 1890, and in 1900 less than 20 per cent of that reported by establishments classified as "slaughtering and meat packing." A list of the 354 census industries, with the more important products of each, appears in Appendix E, and may assist in explaining these apparent fluctuations of certain industries. A decrease in price of certain products, resulting from more economical methods of manufacture, is the cause of several of the decreases shown in the above table, an increase in quantity being attended by a decrease in value in such cases. The following explanations of the decreases shown in the several industries, stated in their alphabetical order in the table, are in some instances suggestions of the causes of the decline, in others they embody the actual reasons.

1. *Artificial Feathers and Flowers.*—It is possible that the decrease was caused by a reduced demand for these goods and that it represents actual conditions. It is possible also that a large quantity of this class of goods was included under "millinery and lace goods."

2. *Artists' Materials.*—The decrease probably does not represent actual conditions. The various products that are included are to a considerable extent reported under other industries. Artists' colors are reported by "paint" manufacturers; brushes are included under "brooms and brushes;" and picture frames under "looking-glass and picture frames."

3. *Bags, Other than Paper.*—The decrease in the industry is probably explained by the fact that the total value of products for 1890 included $16,355,365 for "bags, other than paper," and $3,852,440, for "bagging, flax, hemp, and jute." The latter industry named, has been discontinued at the present census, as explained in the chapter on "classification," a part of the products formerly included therein now appearing under "bags, other than paper," and the remainder under "jute and jute goods." A more exact comparison, therefore, would be between $20,123,486 for 1900 and $16,355,365 for 1890, which would indicate an increase of $3,768,121, or 23 per cent.

4. *Belting and Hose, Linen.*—The decrease here is doubtless to be explained by the increase in the manufacture of "belting and hose, leather" and "belting and hose, rubber," the former showing an increase in the value of products for 1900 over 1890 of $1,989,543, and the latter, an increase of $656,204.

5. *Bone, Ivory, and Lamp Black.*—These products are largely manufactured as by-products of other establishments, whose returns are otherwise classified. The value of "bone, ivory, and lamp black" reported by establishments so classified was $359,787. In addition to this, boneblack valued at $586,683 was manufactured in fertilizer and chemical works. Lamp black is made also, to some extent, in petroleum refineries.

6. *Boot and Shoe Uppers.*—This decrease is explained by the fact that in 1900 a large part of this product was reported under the related industries, "boot and shoe findings," "boot and shoe cut stock," and "boots and shoes, factory product."

7. *Boots and Shoes, Custom Work and Repairing.*—It appears by a comparison of the figures for "boots and shoes, custom work and repairing," that decreases in the value of the products are shown for the United States and for several of the leading states, among them Illinois, Indiana, New York, Ohio, Pennsylvania, Virginia, and Wisconsin. Whatever the causes may have been, it is probable that the figures represent the actual condition.

8. *Brass.*—The explanation of the decrease of $1,130,043 in "brass" is, no doubt, the increase in the value of the products of "brass castings and brass finishing," amounting to $5,998,610. A large proportion of the brass manufactured in the United States is made in brass foundries whose finished products are in the form of brass castings of various kinds, such as steam fittings, etc.

9. *Brick and Tile.*—As explained in the special report on the manufacture of clay products, Report on Manufactures, Part III, "the decline in the common brick output is undoubtedly due to changes in methods of construction, the modern steel-frame building, with its large use of fireproofing and hollow building blocks in place of common brick; the increasing use of cement and vitrified brick for sidewalks, etc. Another cause for the small increase in brick and tile products is found in the fact that the building trades are early affected by seasons of business depression and are the last to revive; and evidently at the taking of the Twelfth Census the brick-making industry had not fully recovered from the panic of 1893."

10. *China Decorating.*—The manufacture of increased quantities of highly decorated chinaware in potteries, probably accounts for the decrease shown in the value of products of establishments engaged exclusively in china decorating.

11. *Clothing, Horse.*—The products which come under the class "clothing, horse," are horse blankets, fly nets, hoods, etc. It is probable that a considerable proportion of such products were reported by establishments whose returns were classified as "saddlery and harness," which would in part explain the decrease.

12. *Clothing, Women's, Dressmaking.*—The large decrease, $8,715,698, shown in the value of products for "clothing, women's, dressmaking," may be explained by the fact that at the census of 1890 no specific instructions were given to special agents and enumerators limiting the canvass to certain establishments of this class; all dressmakers and seamstresses were required to make returns. But at the census of 1900, enumerators and special agents were instructed not to secure returns from dressmakers or seamstresses who worked at home. The increased use of ready-made clothing by women is probably responsible for a part of the decrease in dressmaking. This industry is also discussed in that part of this volume which treats of the hand trades in cities. The number of establishments reported has decreased 26.1 per cent, or from 19,587 in 1890, to 14,479 in 1900.

13. *Coffee and Spice, Roasting and Grinding.*—The work of roasting and grinding coffee and spices, in the large majority of cases, is done by wholesale grocers, and it was difficult in many cases to obtain separate returns, which, eliminating all items relating to the mercantile branch, contained only data pertaining to the manufacturing branch of the business. It is possible that the separation was more accurately done in 1900 than in 1890, and that the value of products as reported in 1890 was excessive. The conditions of the industry are such, however, that it can not be definitely determined whether the former returns were excessive or those of the present census defective.

14. *Dyestuffs and Extracts.*—It is probable that the decrease of $1,941,766 in the value of "dyestuffs and extracts" reported in 1900, as compared with 1890, is, as explained in the special report on the manufacture of chemical products, Report on Manufactures, Part IV, "not real, but that it is due to a difference in rulings as to the category in which certain of the products reported should be put. For instance, the chromium compounds are used in dyeing, in tanning, for paints, and as chemicals in many arts. Where shall they be classified? Again, citric, lactic, tartaric, and other acids are used in calico printing and in other arts. Shall they be classified under acids or under dyestuffs?" The decrease may further be explained by the large increase during the decade in the importation of coal-tar colors—from $1,813,771 in 1890 to $4,792,103 in 1900.

15. *Engraving and Diesinking.*—It is possible that this decrease is not real, and that the apparent decrease is due to the fact that this work was to a large extent done by stationers from whom returns were not in all cases received.

16. *Engraving, Wood.*—This decrease is fully accounted for by the increase of $2,154,526 in "photolithographing and photoengraving." The figures mark the extent of the decline in wood engraving and of its displacement by photolithographing and photoengraving.

17. *Flax, Dressed.*—The small quantity of domestic flax used in the manufacture of linen goods in the United States, sufficiently explains the large decrease, $822,633, in the value of dressed flax reported. The value of this product in 1890 was $981,283, as compared with $158,650 in 1900. There were 19,979,492 bushels of flaxseed, valued at $19,624,901, reported to the agricultural division of the Census Office as the crop of 1899. This production, compared with the value of dressed flax reported, indicates that only a very small proportion of the fiber was utilized. As stated in the Special Report on the Manufacture of Flax, Hemp, and Jute Products at the Twelfth Census, Report on Manufactures, Part III: "there is, to speak broadly, no American production of fiber suitable for spinning. Flax is grown in great quantities, but it is cultivated chiefly for the seed and not for the fiber. The process of retting involves the expenditure of too much time and labor to be profitable to the American farmers. Consequently, it is necessary to rely almost wholly upon foreign importations for the raw materials."

18. *Galvanizing.*—This decrease in value of products is confined to establishments engaged exclusively in galvanizing, and was caused by the introduction of galvanizing plants in large rolling mills, whose product was classified as "iron and steel." The American Sheet Steel Company and the American Steel and Wire Company have several departments of this character in their mills. Galvanizing pots are quite generally being made a part of the equipment of establishments manufacturing sheet iron and sheet steel.

19. *Gold and Silver Leaf and Foil.*—The manufacture of gold and silver, leaf and foil, is confined almost entirely to the largest cities, and is not carried on in connection with other branches of manufacture. This fact and the fact that the canvass of the large cities for statistics of manufacture was very carefully conducted both in 1890 and 1900 render it likely that the decrease of $311,567 in the value of products represents an actual decrease in the American production of these goods. It is possible, however, that a part of these products was, in 1900, classified with "dentists' materials."

20. *Gold and Silver, Reducing and Refining, not from the Ore.*—

21. *Smelting and Refining, not from the Ore.*—The decreases of $20,223,983 in the value of products reported for "gold and silver, reducing and refining, not from the ore," and of $20,404,131 for "smelting and refining, not from the ore," can be explained upon no other ground than that of the differences in the classifi-

cation of schedules at the censuses of 1890 and 1900. The statistics of 1890 for these two industries are utterly valueless for purposes of comparison with the statistics of 1900. The methods of classifying and editing these returns were entirely different at the two censuses. At the Eleventh Census returns for products valued at many millions of dollars were included with "gold and silver, reducing and refining, not from the ore," and with "smelting and refining," while at the Twelfth Census similar returns were classified "lead, smelting and refining," and "copper, smelting and refining." The figures shown in the table should not be accepted as indicating a correct comparison of the industries at the two census periods.

22. *Hair Work.*—The decrease shown in this industry is undoubtedly an accurate measure of the decline. The decrease in the value of products was attended by a decrease in the number of establishments from 492 in 1890 to 397 in 1900.

23. *Hooks and Eyes.*—The decrease in this manufacture of $94,061 may be explained in several ways. The varying demands of fashion may be in part responsible, and to some extent buttons, and ball and socket or other patent fasteners may have been substituted for hooks and eyes for use on women's clothing. But the decrease is more largely due to the fact that they were manufactured more cheaply and consequently had a lower value per gross in 1900 than in 1890. It should be stated also that two establishments engaged in the manufacture of pins, reported 1,131,541 gross of hooks and eyes, valued at $81,110, although their returns were classified "needles and pins," and that one establishment in the "brass-ware" industry reported 720,000 gross of hooks and eyes, valued at $75,000.

24. *Iron and Steel, Nails and Spikes, Cut and Wrought, including Wire Nails.*—The decrease of $19,450,218 in the value of products for "iron and steel, nails and spikes, cut and wrought, including wire nails," is partly accounted for by the fact that in 1890 the industry included all establishments in which nails constituted the product of chief value, while in 1900 only those establishments were included which purchased the bar or plate from which the nails were manufactured. The value of products in 1890, $34,227,517, was practically the value of all the nails manufactured in iron and steel works, and distinctively nail mills. In 1900 the value of products for "iron and steel, nails and spikes, cut and wrought, including wire nails," was $14,777,299. The value of cut nails and wire nails reported by iron and steel establishments was $15,737,159, a total value of $30,514,458 for iron and steel nails reported by both classes of establishments; this still shows a decrease of $3,713,059 for the decade. To what extent this decrease may be attributed to a fall in prices between 1890 and 1900 can not be exactly stated. The average wholesale price was $2.29 in 1890, and $2.02 in 1899, for "nails cut, eightpenny, fence, and common;" and $2.96 in 1890 and $2.39 in 1899 for "nails, wire, eightpenny, fence and common."[1] The average price per keg of 100 pounds of all cut nails computed from the census figures was $2.11 in 1890, and $1.99 in 1900.

25. *Iron and Steel Pipe, Wrought.*—In 1900 the value of products reported under "iron and steel pipe, wrought," was $21,292,043, compared with $37,906,801 in 1890, a decrease of $16,614,758. This is not a trustworthy indication of the comparative conditions of the industry. Like nail factories, pipe factories were in 1890 classified according to the product of chief value; but in 1900 only those factories in which the pipe was made from purchased skelp iron and steel were included in the pipe industry. Those whose materials consisted of ore, pig iron, ingots, blooms, billets, etc., muck or scrap bar, scrap iron, etc., regardless of the fact that their finished product was iron or steel pipe, were classified as in the "iron and steel" industry. The value of the pipe manufactured in such "iron and steel" establishments in 1900 amounted to many millions of dollars, much more than enough to change the decrease shown in the table into a large increase in the value of these products.

26. *Ivory and Bone Work.*—The decrease in this industry may be accounted for by the fact that products reported under "ivory and bone work" in 1890, were included under "fancy articles" and other closely related industries in 1900. Owing to the scarcity of ivory, and to other causes, celluloid and other compounds have been substituted very largely in the manufacture of articles formerly made of ivory and bone.

27. *Japanning.*—This decrease is, no doubt, due to unavoidable confusion in the classification of the schedules on which the work is reported. Articles which have been japanned or lacquered are likely, in many cases, to be accredited to other industries. Japanned tea caddies would probably be classified "boxes, fancy and paper." "Fancy articles" would also cover a greater or smaller proportion of japanned articles.

28. *Jewelry and Instrument Cases.*—The decrease in "jewelry and instrument cases" may be ascribed to exactly the same causes as the decrease in the value of japanned articles, explained in the preceding paragraph.

29. *Kindling Wood.*—Only wood that was prepared for use by being made more combustible and bundled for sale was classified as "kindling wood" at the census of 1900. In 1890 sawed and split wood was included in this industry.

30. *Lard, Refined.*—The statistics of "lard, refined," indicate a progressive decline since 1880 in the independent refining of lard outside of slaughtering and meat-packing establishments. The value of products reported by establishments engaged exclusively in manufacturing lard or in which lard was the product of chief value, in 1880 was $23,195,702; in 1890, $15,474,848; and in 1900, $8,630,901. This progressive decline was attended

[1] United States Department of Labor, Bulletin No. 39, March, 1902.

by a progressive increase in the quantity of lard manufactured by slaughtering and meat-packing establishments. In 1880 only the number of pounds, and not the value, was reported. The value of lard manufactured by such establishments in 1890 was $32,458,752, and in 1900, $52,620,348, so that the total value of lard manufactured in 1900 was $61,251,249, as compared with $47,933,600 in 1890, an increase of $13,317,649, or 27.8 per cent. It is probable, however, that the production has been affected, to some extent, by the use of cottonseed-oil compounds as substitutes.

31. *Leather Board.*—The decrease is fully accounted for by an increase of $604,395 in the value of leather board reported by paper mills. It is possible also that a large quantity of this product has been included under other designations on the special schedule for paper and pulp mills, such as "binders and trunk board," "all other board," etc. The census figures indicate that the decrease has been progressive since 1880.

32. *Liquors, Distilled.*—The decrease of $7,399,426 in the value of "liquors, distilled," may be attributed to a different treatment of the internal revenue tax as a part of the value of the product at the two censuses, and to a different method of estimating the value of products.

33. *Lumber, Planing Mill Products, Including Sash, Doors, and Blinds.*—The apparent decrease of $15,338,549 in the value of products of "lumber, planing mill products, including sash, doors, and blinds," is due to an increasing tendency of the sawmills to complete the process of manufacture begun by them. This results in an increased value of planed lumber reported by sawmills and a proportionate diminution of the products of the mills which carry on only the finishing process. At the census of 1890, the value of products of planing mills not operated in connection with sawmills was $183,681,552, and of planing mills owned and operated in connection with sawmills, included under "lumber and other mill products, from logs or bolts," was $53,465,797, making a total value of products for planing mills of both kinds of $237,147,349. The value of products of independent planing mills in 1900 was $168,343,003, and of planing mills owned and operated in connection with sawmills, included under "lumber and timber products," $107,622,519, making a total value of products of $275,965,522. This shows an actual increase in 1900 over 1890 of $38,818,173, or 16.4 per cent.

34. *Malt.*—The decrease shown should not be accepted as indicating an actual decrease in the industry. A large number of the principal brewers in the United States make their own malt, a custom which probably prevailed more generally in 1900 than in 1890.

35. *Mantels, Slate, Marble, and Marbleized.*—It is difficult to assign a direct cause for the decrease in this industry, although a large part of these products was possibly included with "marble and stone work." The work of sawing and smoothing marble is frequently done at the quarry, as is also the manufacture of blackboards, school slates, slabs for sanitary plumbing purposes, and other finished products. No doubt a very large proportion of products which should properly be designated "mantels, slate, marble, and marbleized" have thus been shown as "marble and stone work." The decrease may also be partly attributed to a diminishing demand for this form of house furnishing.

36. *Masonry, Brick, and Stone.*—The decrease of $572,008, or three-tenths of 1 per cent in "masonry, brick and stone," is no doubt partly due to the great development of steel frame building and to the large use of hollow fire-proofing material in buildings. There was also a marked scarcity of structural iron and steel in 1899 and 1900, which interfered with and delayed building operations. At that time also prices were unusually high, and many large contractors suspended operations for a considerable period in expectation of obtaining structural material at a lower cost. Work of considerable value, properly belonging to masonry, may also have been accredited to "carpentering" and "plastering."

37. *Musical Instruments, Organs and Materials.*—The decrease shown in this industry is fully accounted for by the decline in the manufacture of reed organs, which constituted in 1900, $2,890,081, or 50.8 per cent of the total value of these products. The condition was quite general, several of the leading states in the industry, viz: Illinois, Massachusetts, Connecticut, New York, and Michigan, showing decreases. As explained in the special report on the industry in Part IV, "the general decline in the manufacture of reed organs since 1890 has been due partly to a change of taste, and partly, to the fact that pianos have become less expensive and have thus found their way into homes where, earlier, reed organs had been used. Many of the standard manufacturers of reed organs have added the manufacture of pianos, and several have been very successful."

38. *Oil, Castor.*—The total value of castor oil manufactured has, according to the census statistics, decreased progressively since 1880. The value of the product reported at the last three censuses was: in 1880, $653,900; in 1890, $573,363; and in 1900, $395,400. The decrease is undoubtedly due to the demand for a more palatable purgative. Manufacturers of patent and proprietary medicines have for years been attempting to mask or obliterate the unpleasant properties of drugs, and the decrease in the manufacture of castor oil is one of the results.

39. *Ordnance and Ordnance Stores.*—The decrease indicated for this industry is misleading. For purposes of comparison, the value of the products for 1900 should be increased by $2,208,159, the value of the products manufactured at the gun factory of the Washington (D. C.) Navy-Yard, making a total of $4,447,956 for 1900, an increase of $2,023,294, or 83.4 per cent. This establishment was included in the statistics for 1890.

40. *Pulp from Fiber other than Wood.*—The decrease of $421,039 in the value of "pulp, from fiber other than wood" indicates the extent of the actual decline caused by the substitution of wood fiber for other fibers in the manufacture of paper. In 1890 the cost of fiber other than wood, reported by paper manufacturers, was $17,856,949, compared with $15,297,751 in 1900; and in 1890 the cost of wood pulp and fiber was $12,266,165, compared with $18,369,464 in 1900. In addition to the latter amount, wood for pulp and fiber costing $9,837,516 was reported in 1900 by paper and pulp mills, a large part of which wood was made into pulp and fiber and remanufactured into paper by the same mills.

41. *Pumps, not Including Steam Pumps.*—The statistics show a decrease for the decade amounting to $2,761,697, or 67.3 per cent, in the value of "pumps, not including steam pumps." It is impossible to determine how far this decrease was due to the extension of city water mains to suburban localities and to the installation of new water systems in small communities; these causes no doubt operated very strongly. Furthermore, a much larger number of pumps was manufactured by agricultural-implement makers in 1900 than in 1890, and these products, when so made, were included under "agricultural implements." The number of pumps of all kinds reported in 1890 by such establishments was 9,961, as compared with 51,580 hand pumps in 1900, the value not being reported separately at either census.

42. *Regalia and Society Banners and Emblems.*—The two industries "regalia and society banners and emblems" and "flags and banners" are so closely allied that the small decrease indicated in the former is fully explained by the large increase shown in the value of the products of the latter, which increase was from $455,849 in 1890 to $1,038,052 in 1900.

43. *Registers, Car Fare.*—The decrease of $60,455 in "registers, car fare," is attended by an increase of $4,313,000 in the value of products reported as "registers, cash." It is possible that car fare registers are manufactured to some extent in establishments whose principal product is cash registers, and in establishments the machinery of which can be utilized in the manufacture of such products. Probably the apparent decrease shown in the table was not attended by any actual diminution in the manufacture of these products.

44. *Sand and Emery Paper and Cloth.*—The decrease of $73,752 in the value of the products reported under this industry should not be considered as indicating a decrease in the value of such goods manufactured. One establishment engaged principally in the manufacture of glue also manufactured sandpaper valued at more than $300,000. Allowing for this, there would appear an increase of over 20 per cent. Whether a similar condition existed in other establishments can not be stated.

45. *Shoddy.*—As explained in the special report on "shoddy" manufacture, in Part III, the quantity of shoddy made in shoddy mills increased, but the value decreased. "The decrease in the industry, therefore, is apparent rather than real, being not in the quantity produced, but in its value, owing to reduced prices." The quantity of shoddy manufactured for their own use by woolen mills increased largely over 1890.

46. *Show Cases.*—The decrease in this industry can be attributed to the fact that such goods are more largely manufactured in planing mills and wood-working and furniture establishments than formerly. These establishments frequently execute orders for show cases of the most ornate description, the woodwork and glazing of which show first-class workmanship. There has been no actual decrease in the value of show cases manufactured.

47. *Stationery Goods, not Elsewhere Specified.*—So many varieties of goods are included under this caption that the decrease shown is amply accounted for by slight changes in the proportion of these products and by the uncertainty of their proper classification in either industry.

48. *Steam Fittings and Heating Apparatus.*—Products that would, if manufactured alone, be included under "steam fittings and heating apparatus" are made to a large extent in establishments otherwise classified. For instance, radiators, furnaces, etc., are made in foundries; brass valves and connections are made in brass foundries, etc., so that the decrease of $1,062,574 is probably caused by the close relation of certain industries.

49. *Type Founding.*—The general introduction of the typesetting machine in the city newspaper offices accounts for the decrease of $1,074,520 in the value of products of "type founding."

50. *Vault Lights and Ventilators.*—The decrease in this industry can, without doubt, be attributed to the fact that a large proportion of these products were included under "foundry and machine shop products."

51. *Vinegar and Cider.*—The decrease of $194,776 in "vinegar and cider," made by establishments in which vinegar and cider constituted the products of chief value, is caused principally by the large increase in the amount of vinegar produced by establishments engaged in the manufacture of pickles, the returns of which were classified under "pickles, preserves, and sauces." The vinegar made in a single such establishment exceeded in value the decrease above shown. As the principal use of vinegar is in pickling and as the pickle factories make practically all their own vinegar without reporting it as such, the very general increase during the decade in the consumption of factory-made pickles instead of the home-made product largely accounts for the apparent decrease.

52. *Watch and Clock Materials.*—The decrease in the value of products of this industry was attended by a reduction in the number of establishments from 36 to 20 and

in capital invested from $705,647 to $367,291. These products were manufactured to a much larger extent in watch and clock factories in 1900 than in 1890, and the independent establishments making watch and clock materials have been gradually giving way. These, especially such as were engaged in the manufacture of clock materials, grew up alongside of the large factories, and for a time the specialization of the various branches of the watch and clock industry worked well and was profitable. But as competition increased, the large establishments in which the watches and clocks were assembled found it necessary to conduct all the various processes of manufacture in one establishment. This was necessary in many cases not only for reasons of economy, but in the interest of mechanical accuracy. There is no competition in this line by small concerns when the automatic machines, especially for the making of watch materials, are owned by the large factories and are largely the invention of the mechanics in their employ.

53. *Watch Cases.*—This decrease is due to a variety of causes. The number of watch cases made in 1890 can not be ascertained, since the statistics were not collected. But the growing use of open-faced watches, which growth has been marked during the decade, has doubtless reduced the number of hunting cases. This would considerably lower the value of the output. Another reason for the decrease is the increasing use of the filled case, which has been growing in popularity on account of its durability, attractive appearance, and comparative cheapness. The reduction in the cost of materials used—silver, for instance, and the alloys with nickel as a base—is also an element in the decrease in value. The increased use of automatic labor-saving machines also accounts in part for the decrease.

54. *Whalebone and Rattan.*—The decrease in this industry is principally due to the substitution of other materials for whalebone in corsets, umbrellas, etc. These metal substitutes are better fitted for the purpose, while the scarcity of whalebone, caused by the practical extinction of the whale fisheries, has given an additional incentive to efforts to provide suitable substitutes. The manufacture of articles made of rattan has not decreased, but, on the contrary, has increased. Such products are included so largely under other industries, however, as to result in an apparent decrease in the value of products classified as "whalebone and rattan." "Baskets, and rattan and willow ware" and "furniture, factory product," include large quantities of articles made from rattan.

55. *Wheelbarrows.*—The increased use of steam shovels and power derricks on large excavating contracts is suggested as the principal cause of the decrease in the total value of wheelbarrows manufactured. There is no question but that the use of such labor-saving machines has displaced wheelbarrows to a very considerable extent. It is probable also that a large number of wheelbarrows were manufactured by establishments whose reports were otherwise classified.

56. *Wire.*—The apparent decrease of $12,591,566 in the value of products reported under the classification "wire" is explained in the same manner as the decrease in "iron and steel, nails and spikes, cut and wrought, including wire nails," viz, that at the census of 1890 all establishments in which wire constituted the product of chief value were put under that class, but in 1900 only such establishments as purchased the wire rod or plate from which the wire was manufactured were so included. The value of products reported for this industry in 1890 was $22,012,804, which was the value of the entire product manufactured in wire mills proper and in iron and steel works. In 1900 the value of products of the industry "wire" was $9,421,238; the value of iron and steel wire manufactured by iron and steel establishments in which the raw material was iron ore or pig iron, or iron or steel ingots, blooms, billets, etc., was $35,283,688, which, added to $9,421,238, makes the total value of wire manufactured in 1900, $44,704,926. It should be explained, however, that a considerable part of the wire reported by iron and steel establishments was not sold as such, but was remanufactured by the same establishments into wire nails. Making due allowance for this, it can be stated with certainty that instead of decreasing the value of wire manufactured and sold as such during the census year exceeded considerably the value of that made and sold in 1890.

57. *Woolen Goods.*—The decrease in the value of products of woolen mills was caused by the rapid substitution of worsted for woolen goods, a change due to popular taste. The decrease is explained in the special report on wool manufacture, in Part III, as follows: "The introduction of the worsted cloth for men's wear, and the wonderful development of the knit-goods manufacture have made great inroads on the consumption of woolen goods which formerly were necessities, substituting combed wool fabrics for men's wear, and knitted underwear in place of flannels. Principally for these reasons the returns show a falling off in every particular. The reduction in the number of establishments may be attributed mainly to the gradual disappearance of small country mills and to some extent to the transfer of mills from the carded to the combed wool manufacture."

58. *Wool Hats.*—The decrease in the value of "wool hats," once a great neighborhood industry, is explained by the substitution of fur hats for hats made of wool. A decrease of $1,737,981 in the value of wool hats during the decade was accompanied by a large increase in the value of fur hats. This decline in the wool-hat industry has been in progress, as indicated by the census figures, since before 1880. The subject was mentioned in the special report on wool manufacture at the Eleventh Census. "The wool-hat manufacture is thus rapidly being superseded by that of fur hats. These

figures do not mean that the manufacture of hats has fallen into decadence in the ten years, but simply that the fur hat is superseding the all-wool hat in popular favor."[1]

There are no reasonable explanations apparent for the decreases shown in the remaining industries other than those of changes in the classification of schedules. In many of these cases the decreases are small, and for various reasons might easily have occurred. These industries are as follows: Axle grease; billiard tables and materials; boxes, cigar; electroplating; horseshoes, factory product; lead, bar, pipe, and sheet; looking-glass and picture frames; printing materials; safes and vaults; stencils and brands; straw goods not elsewhere specified; window shades; and woodenware, not elsewhere specified.

XXX.

THE RANK OF INDUSTRIES.

Throughout this report the rule has been adopted of ranking industries by the relative value of the gross products of each. It is necessary for purposes of uniformity in the census to adopt a single standard of measurement, and that of gross value of products has been adopted in all censuses, not because it is necessarily the most exact or the most significant standard of measurement, but because it is the simplest and most readily understood.

In the analysis of the statistics, however, it is necessary to point out the erroneous conclusions likely to result from a strict application of this standard of measurement, and to show that it is of value only in the most general way. Many misleading conclusions can thus be avoided.

The importance of one industry as compared with another depends upon a variety of considerations, of which the value of the gross product is only one, and in some respects the least important. Other standards of measurement which should be carefully considered are the net value of products, the amount of capital utilized, the number of hands employed, the volume of wages paid, and the character and value of the materials used.

It is a curious fact that of all the industries considered in this report there is not one which occupies the same rank among the industries when it is considered from all these points of view. To illustrate: Slaughtering and meat packing ranks first among the industries in net value of products and second in gross value, owing to the intrinsic value of the raw materials operated upon; but when considered from the point of view of capital invested, this industry falls to the tenth rank; from the point of view of the average number of wage-earners, to the seventeenth rank, and from the point of view of wages paid, to the fifteenth rank. It is thus apparent that while this industry occupies nominally the second rank when gauged by the standard adopted for census comparisons, the gross value of products, it is actually, in respect to all the other elements which are combined in manufacture, of much less importance compared with other industries. Another illustration is cotton manufacturing, which ranks eighth when the gross value of the products is taken as the standard, sixth by the net value of products, fifth by wages paid, fifth by capital invested, and second by the standard of the average number of employees. These variations in rank between these two industries make cotton manufacturing much more important economically than slaughtering and meat packing, considering both industries entirely apart from the agricultural forces employed in the creation of their raw materials.

The industry of lumber and timber products ranks second among those in the census classifications when measured by the volume of capital employed, and third when measured by the average number of wage-earners and the total amount of wages paid, but it falls to the fourth rank when considered on the basis of the gross value, and to the fifth in the net value of products. The variation in this case is easily accounted for by the fact that many establishments engaged in the production of lumber have large sums invested in great tracts of timber lands for future exploitation. The flouring and grist mill industry holds the second rank, measured by the net value of products; fifth, measured by gross value; ninth, measured by the amount of capital utilized; thirty-fifth, measured by the amount paid in wages; and thirty-fourth, measured by the average number of wage-earners. These striking variations are explained by the peculiar conditions surrounding this industry, which is represented by an enormous number of establishments, located in both large and small communities. Some of these mills are very large, but the majority are small mills, in many cases working only during portions of the year, and being operated by the proprietors without any hired assistance.

Table LX shows the more important items of the totals for 55 industries having products valued at over $50,000,000 in 1900, together with the rank of the industry in each of these items.

[1] Eleventh Census of the United States, Manufacturing Industries, Part III, Report on Wool Manufacture, page 64.

TABLE LX—RANK OF INDUSTRIES WITH PRODUCTS VALUED AT OVER $50,000,000.

INDUSTRIES.	Number of establishments.	Rank.	Capital.	Rank.	Average number of wage-earners.	Rank.	Wages.	Rank.	VALUE OF PRODUCTS.			
									Net.	Rank.	Gross.	Rank.
Iron and steel	668	41	$573,391,663	8	222,490	4	$120,820,276	2	$432,687,119	3	$803,968,273	1
Slaughtering and meat packing, not including retail butchering[1]	1,184	31	190,706,927	10	69,441	17	33,923,253	15	684,119,221	1	790,252,586	2
Foundry and machine shop products	9,324	15	665,058,245	1	350,327	1	182,232,009	1	377,812,876	4	644,990,999	3
Lumber and timber products	33,035	2	611,611,524	2	283,260	3	104,640,591	3	307,961,250	5	566,832,984	4
Flouring and grist mill products	25,258	4	218,714,104	9	37,073	34	17,703,418	35	540,052,049	2	560,719,063	5
Clothing, men's[2]	28,014	3	173,034,543	13	191,048	5	79,434,932	7	220,140,823	8	415,256,391	6
Printing and publishing[3]	22,312	5	292,517,072	8	162,992	7	84,249,954	6	264,859,062	7	347,055,050	7
Cotton manufactures[4]	1,055	33	467,240,157	5	302,861	2	86,689,752	5	295,633,150	6	339,200,320	8
Carpentering	21,315	6	71,327,047	31	123,985	10	71,049,737	8	176,611,706	12	316,101,758	9
Woolen manufactures[5]	1,414	28	310,179,749	7	159,108	8	57,933,817	10	218,637,292	9	296,990,484	10
Boots and shoes, factory product	1,600	26	101,795,233	21	142,922	9	59,175,883	9	93,701,767	19	261,028,580	11
Sugar and molasses refining	832	37	184,245,519	11	14,262	45	6,945,811	46	49,216,847	40	240,969,905	12
Liquors, malt	1,509	27	415,284,468	6	39,532	33	25,826,211	23	202,582,268	10	237,269,713	13
Cars and general shop construction and repairs by steam railroad companies	1,296	30	119,580,273	16	173,652	6	96,062,329	4	111,683,559	16	218,238,277	14
Leather, tanned, curried, and finished	1,306	29	173,977,421	12	52,109	26	22,591,091	27	186,389,057	11	204,038,127	15
Masonry, brick and stone[6]	8,333	16	48,070,239	39	93,568	13	53,152,258	11	125,356,555	14	203,593,634	16
Bread and other bakery products	14,917	9	81,049,553	28	60,271	21	27,803,170	21	89,262,303	23	175,657,348	17
Lead smelting and refining	39	55	72,148,933	30	8,319	52	5,088,684	49	97,425,341	18	175,466,304	18
Lumber, planing-mill products, including sash, doors, and blinds	4,204	22	119,271,631	17	73,627	16	32,685,210	16	74,205,166	28	168,343,003	19
Copper smelting and refining	47	54	53,063,395	37	11,324	49	8,529,021	42	76,502,702	26	165,131,670	20
Tobacco, cigars, and cigarettes	14,539	10	67,706,493	32	103,462	11	40,925,596	13	152,300,012	18	160,223,152	21
Clothing, women's, factory product	2,701	23	48,431,544	38	83,739	14	32,586,101	17	75,315,179	27	159,389,539	22
Furniture, including cabinetmaking, repairing, and upholstering[7]	7,972	17	117,982,091	19	100,018	12	42,638,810	12	91,151,488	22	153,168,309	23
Plumbing and gas and steam fitting	11,876	13	47,111,264	40	53,916	24	31,873,866	18	68,035,688	30	131,852,567	24
Cheese, butter, and condensed milk[8]	9,355	14	36,508,015	47	12,865	46	6,170,670	48	124,008,578	15	131,199,277	25
Paper and wood pulp	763	38	167,507,713	14	49,646	27	20,746,426	32	77,954,480	25	127,326,162	26
Petroleum refining	67	53	95,327,892	22	12,199	47	6,717,087	47	107,512,092	17	123,929,384	27
Carriages and wagons	7,632	18	118,187,888	18	62,540	19	29,814,911	19	67,172,479	31	121,537,276	28
Silk and silk goods	483	44	81,082,201	27	65,416	18	20,982,194	31	85,483,994	24	107,256,258	29
Cars, railroad and street, and repairs, not including establishments operated by steam railroad companies[9]	193	52	106,721,188	20	44,063	31	23,342,763	26	39,326,856	47	107,186,359	30
Tobacco, chewing, smoking, and snuff	437	47	43,856,570	41	29,161	39	7,109,821	45	92,915,542	20	103,754,362	31
Agricultural implements	715	39	157,707,951	15	46,582	29	22,450,880	28	60,535,599	36	101,207,428	32
Tinsmithing, coppersmithing, and sheet-iron working	12,466	12	55,703,509	35	45,575	30	22,155,039	29	51,638,038	38	100,910,720	33
Liquors, distilled	967	34	32,551,604	51	3,722	55	1,733,218	55	91,451,293	21	96,798,443	34
Hosiery and knit goods	921	35	81,860,604	26	83,387	15	24,358,627	25	54,544,999	37	95,482,566	35
Electrical apparatus and supplies	580	42	83,130,943	24	40,890	32	20,190,344	33	44,583,830	41	91,348,889	36
Painting and paper hanging	16,939	7	27,217,086	55	59,191	22	34,822,819	14	52,541,861	35	88,396,852	37
Blacksmithing and wheelwrighting	51,771	1	54,976,341	36	36,193	36	17,974,264	34	63,764,914	34	85,971,630	38
Marble and stone work[10]	6,070	19	67,509,533	33	54,370	23	28,663,241	20	69,097,079	29	85,101,591	39
Confectionery	4,297	21	35,155,361	48	33,583	37	10,867,087	38	44,179,706	42	81,290,543	40
Gas, illuminating and heating	877	36	567,000,506	4	22,459	41	12,436,296	36	64,276,481	33	75,716,693	41
Shipbuilding[11]	1,116	32	77,362,701	29	46,781	28	24,839,163	24	42,402,518	46	74,578,158	42
Millinery, custom work	16,151	8	27,740,386	54	33,298	38	9,570,586	40	34,529,813	51	70,303,752	43
Coffee and spice, roasting and grinding	458	46	28,436,897	52	6,387	54	2,486,759	54	64,741,832	32	69,527,108	44
Chemicals	459	45	89,091,430	23	19,054	44	9,401,467	41	36,918,124	48	62,676,780	45
Saddlery and harness	12,934	11	43,354,136	42	24,123	40	10,725,647	39	30,677,178	52	62,630,902	46
Patent medicines and compounds	2,026	24	37,209,793	46	11,809	48	4,407,988	50	43,819,968	44	59,611,335	47
Oil, cottonseed and cake	369	49	34,451,461	49	11,007	50	3,143,459	53	43,196,446	45	58,726,632	48
Fruits and vegetables, canning and preserving	1,808	25	27,743,067	53	36,401	35	8,050,793	44	36,668,635	49	56,668,313	49
Glass	355	50	61,423,903	34	52,818	25	27,084,710	22	43,905,999	43	55,539,712	50
Ironwork, architectural and ornamental	672	40	33,062,409	50	20,646	42	11,111,226	37	23,398,179	54	53,508,179	51
Soap and candles	558	43	38,068,334	45	9,487	51	3,754,767	52	24,228,062	53	53,231,017	52
Rubber and elastic goods	262	51	39,304,853	44	20,405	43	8,082,738	43	35,278,808	50	52,627,030	53
Brick and tile	5,423	20	82,086,438	25	61,979	20	21,883,333	30	50,312,022	39	51,270,476	54
Paints	419	48	42,501,782	43	8,151	53	3,929,787	51	18,545,525	55	50,874,995	55

[1] Includes "sausage," "slaughtering and meat packing, wholesale," and "slaughtering, wholesale, not including meat packing."
[2] Includes "clothing, men's custom work and repairing;" "clothing, men's, factory product;" and "clothing, men's, factory product, buttonholes."
[3] Includes "printing and publishing, book and job;" "printing and publishing, music;" and "printing and publishing, newspapers and periodicals."
[4] Includes "cotton goods" and "cotton small wares."
[5] Includes "woolen goods," "worsted goods," "carpets and rugs, other than rag," "felt goods," and "wool hats."
[6] Includes "masonry, brick and stone;" and "plastering and stuccowork."
[7] Includes "furniture, cabinetmaking, repairing, and upholstering," and "furniture, factory product."
[8] Includes "cheese, butter, and condensed milk, factory product;" and "cheese and butter, urban dairy product."
[9] Includes "cars and general shop construction, and repairs by street railroad companies;" "cars, steam railroad, not including operations of railroad companies;" and "cars, street railroad, not including operations of railroad companies."
[10] Includes "marble and stone work" and "monuments and tombstones."
[11] Includes "ship and boat building, wood;" and "shipbuilding, iron and steel."

Table LXI shows the similar statistics for the 15 industry groups. The table shows that in gross and net value of products the group of food and kindred products was first among the groups; iron and steel and their products ranked first in capital and total wages paid; textiles ranked first in average number of wage-earners; and the hand trades reported the greatest number of establishments.

TABLE LXI.—INDUSTRIAL GROUPS, RANKED BY CAPITAL, NUMBER OF WAGE-EARNERS, WAGES, AND GROSS AND NET VALUE OF PRODUCTS: 1900.

INDUSTRIAL GROUPS.	Number of establishments.	Rank.	Capital.	Rank.	Average number wage-earners.	Rank.	Wages.	Rank.	VALUE OF PRODUCTS.			
									Gross.	Rank.	Net.	Rank.
The United States	512,254	.....	$9,817,484,799	.....	5,308,406	.....	$2,322,383,877	.....	$13,004,400,143	.....	$8,370,595,176	.....
Group 1—Food and kindred products	61,802	2	940,889,838	5	313,809	7	129,910,070	8	2,277,702,010	1	1,753,171,220	1
Group 2—Textiles	30,048	4	1,366,604,058	2	1,029,910	1	341,734,399	2	1,637,484,484	3	1,081,961,248	2
Group 3—Iron and steel and their products	13,896	11	1,528,979,076	1	733,968	2	381,875,499	1	1,793,490,908	2	983,821,918	3
Group 4—Lumber and its remanufactures	47,079	3	946,116,515	4	546,953	4	212,201,768	4	1,030,906,579	5	547,350,520	6
Group 5—Leather and its finished products	16,989	7	343,600,513	13	238,202	10	99,759,885	10	582,731,046	9	329,614,996	11
Group 6—Paper and printing	26,747	6	557,610,887	6	297,551	8	140,092,458	7	606,317,768	8	419,798,101	7
Group 7—Liquors and beverages	7,861	13	534,101,049	7	63,072	14	36,946,557	14	425,504,167	12	349,157,618	10
Group 8—Chemicals and allied products	5,444	14	498,390,219	8	101,522	13	43,870,602	13	552,891,877	10	372,592,807	8
Group 9—Clay, glass, and stone products	14,809	10	350,902,367	12	244,987	9	109,022,582	9	293,564,235	13	245,447,118	14
Group 10—Metal and metal products other than iron and steel	16,305	8	410,646,057	9	190,757	11	96,749,051	11	748,795,464	7	371,154,446	9
Group 11—Tobacco	15,252	9	124,089,871	14	142,277	12	49,852,484	12	283,076,546	14	264,052,573	12
Group 12—Vehicles for land transportation	10,113	12	396,778,672	10	316,214	6	164,614,781	6	508,649,129	11	250,683,696	13
Group 13—Shipbuilding	1,116	15	77,362,701	15	46,781	15	24,839,163	15	74,578,158	15	42,492,518	15
Group 14—Miscellaneous	29,479	5	1,348,920,721	3	483,273	5	202,746,162	5	1,004,092,294	6	688,191,538	5
Group 15—Hand trades	215,814	1	392,442,255	11	559,130	3	288,118,421	3	1,188,615,478	4	721,104,859	4

XXXI.

EXPORTS AND IMPORTS OF MANUFACTURES.

1. *Foreign Trade.*—The development of the foreign trade of the United States during the last decade has been more striking than any other phase of our industrial growth. The total exports of the United States, including both domestic and foreign merchandise, amounted to $144,375,726 in 1850, and to $1,394,483,082 in 1900, having increased nearly tenfold in 50 years. The increase in the value of exports during the last decade was $536,654,398, or 62.6 per cent—one of the most rapid increases shown for any branch of commerce or industry. The imports of merchandise of every description into the United States in 1850 were valued at $173,509,526, and in 1900 at $849,941,184, an increase of $676,431,658, or 389.9 per cent. The growth of our export trade in the half century has therefore been very much greater than that of our import trade. The total value of the exports and imports of the United States in 1850 was $317,885,252, and in 1900 $2,244,424,266, showing a gain of $1,926,539,014 in the half century.

In 1900 the foreign commerce of the United States, valued at $2,244,424,266, was exceeded in value only by the foreign commerce of the United Kingdom and of the German Empire, the value of the exports and imports of the United Kingdom having been $4,270,105,155, and of Germany, $2,639,160,000. Of these three countries the United States alone shows an excess of exports over imports, the excess of exports from the United States having been $544,541,898, while for the United Kingdom the excess of imports over exports was $820,985,407, and for Germany $278,110,000.

2. *Exports.*—The total exports of the United States in the fiscal year 1900 were larger than those of any other nation except the United Kingdom, the exports of which amounted to $1,724,559,874, exceeding those of the United States by $330,076,792. The exports of the German Empire were $1,180,525,000, and those of France $1,065,661,000.

Table LXII presents the values of domestic manufactured products, the values of domestic manufactures exported, and the ratio of the exports of manufactures to the total exports for each census year from 1850 to 1900.

TABLE LXII.—*Value of products of manufacture, exports of domestic manufacture, and per cent of exports of manufactures to total exports: 1850 to 1900.*

YEAR.	Value of products (census).	Value of exports of domestic manufacture.[1]	Per cent of exports of manufactures to total exports.
1900	$13,004,400,143	$433,851,756	31.7
1890	9,372,437,283	151,102,376	17.9
1880	5,369,579,191	102,856,015	12.5
1870	4,232,325,442	[2] 68,279,764	15.0
1860	1,885,861,676	40,345,892	12.8
1850	1,019,106,616	21,541,422	14.2

[1] Reports of the United States Treasury Department on Commerce and Navigation.
[2] Figures for exports in 1870 are in paper currency, and about 15 per cent greater than those of other years, but the percentage of total exports is not vitiated by the difference in basis.

The remarkable development of our export trade bears an intimate relation to the internal development of the country as brought out by the census statistics of agriculture and manufacture. It becomes impor-

tant, therefore, to attempt now some statement of the correlation between the census figures and the statistics of the Treasury Department showing foreign commerce. No attempt has been made at any previous census to measure the proportion of manufactured products of the country which is exported.

In 1883 the statistical bureau of the Treasury Department, in its quarterly report, No. 2, page 236, attempted to show the value of the principal dutiable articles manufactured in the United States during the year ending June 30, 1880, as determined by the Tenth Census, the value of such articles exported, the value of those retained for home consumption, and the ratio of the value of exports to the total home product. This statement had so little value, by reason of the differences in classification of the two bureaus, that the Bureau of Statistics did not attempt to prepare a similar compilation based upon the statistics of the census of 1890.

These differences in classification, which present almost insuperable difficulties in the way of such a showing and prevent a close correlation of the figures in detail, are due to the fact that the Census Office includes in manufactures many articles that are classed by the Treasury Department as products of agriculture, the forest, or the mine. The Treasury Department classification consequently shows a value in exports of domestic manufactures very much smaller than would be the case if the department followed the method of classification adopted by the Census Office. In order that this report may present with clearness the very different results arrived at, by reclassifying the statistics in accordance with the census classification, it is necessary to show with some detail the results of the figures of the Treasury Department under its own classifications.

The exports of the United States at ten-year periods, from 1860 to 1900, and annually from 1890 to 1900, grouped according to the sources of production, are shown in table LXIII.

TABLE LXIII.—DOMESTIC EXPORTS[1]: 1860 TO 1900.

YEAR.	AGGREGATE.		AGRICULTURE.		MANUFACTURES.		MINES.		FORESTS.		FISHERIES.		MISCELLANEOUS.	
	Value.	Per cent.	Value.	Per cent.	Value.	Per cent.	Value.	Per cent.	Value.	Per cent.	Value.	Per cent.	Value	Per cent.
1900	$1,370,763,571	100	$835,858,123	60.98	$433,851,756	31.65	$37,843,742	2.76	$52,218,112	3.81	$6,326,620	0.46	$4,665,218	0.34
1899	1,203,931,222	100	784,776,142	65.19	339,592,146	28.21	28,156,174	2.34	42,126,889	3.49	5,992,990	0.50	3,286,872	0.27
1898	1,210,291,913	100	853,683,570	70.54	290,697,354	24.02	19,410,707	1.60	37,900,171	3.13	5,435,483	0.45	3,164,628	0.26
1897	1,032,007,603	100	683,471,139	66.23	277,285,391	26.87	20,804,573	2.01	40,489,321	3.92	6,477,951	0.63	3,479,228	0.34
1896	863,200,487	100	569,879,297	66.02	228,571,178	26.48	20,045,654	2.32	33,718,204	3.91	6,850,392	0.79	4,135,762	0.48
1895	793,392,599	100	553,210,026	69.73	183,595,743	23.14	18,509,814	2.33	28,576,285	3.61	5,328,807	0.67	4,171,974	0.52
1894	869,204,937	100	628,363,038	72.28	183,728,808	21.14	20,449,598	2.35	28,000,629	3.22	4,261,920	0.49	4,400,944	0.52
1893	831,030,785	100	615,382,986	74.05	158,023,118	19.02	20,020,026	2.41	28,127,113	3.38	5,541,378	0.67	3,995,164	0.47
1892	1,016,782,011	100	798,328,232	78.69	159,510,937	15.61	20,692,885	2.04	27,957,423	2.75	5,403,587	0.53	3,888,947	0.38
1891	872,270,283	100	642,751,344	73.69	168,927,315	19.37	22,054,970	2.53	28,715,713	3.29	6,208,577	0.71	3,612,364	0.41
1890	845,293,828	100	629,820,808	74.51	151,102,376	17.87	22,297,755	2.64	29,473,084	3.49	7,458,385	0.88	5,141,420	0.61
1880	823,946,353	100	685,961,091	83.25	102,856,015	12.48	5,863,232	0.71	17,321,268	2.11	5,255,402	0.64	6,689,345	0.81
1870	455,208,341	100	361,188,483	79.35	68,279,764	15.00	5,026,111	1.10	14,897,963	3.27	2,835,508	0.62	2,980,512	0.66
1860	316,242,423	100	256,560,972	81.13	40,345,892	12.76	999,465	0.31	10,299,959	3.26	4,156,480	1.31	3,879,655	1.23

[1] From annual reports of United States Treasury Department on "Commerce and Navigation of the United States."

According to this table the products of agriculture represented 81.13 per cent of our total exports in 1860, and 60.98 per cent of the total in 1900. The products of manufactures exported in 1860, to the extent of $40,345,892, represented 12.76 per cent of the total value of exports in that year, and that percentage had increased in 1900 to 31.65. The percentages represented by the exports of minerals, lumber, etc., were comparatively small at both periods. The products of agriculture exported appear by these figures to have possessed a value over four hundred million dollars greater than the value of the manufactured exports in the census year 1900.

If we assume that the combined value of the products of agriculture, manufacture, mining, and the forests, after eliminating, in a rough way, all duplications in the returns of these products, was twelve billion dollars in 1890, the proportion of this product that was exported equaled one-tenth of the whole; and this proportion may be accepted as indicating approximately the relative value of our domestic and our foreign trade in these products. As shown above, much the larger proportion of the recent increase in exports from this country, on the basis of the Treasury classification, consists of manufactured products, as distinguished from the products of agriculture, mining, and forestry.

It may now be shown that the Treasury figures do not accurately present the true proportion which manufactured articles bear to these total exports.

3. *Differences in Classification.*—Among the commodities classed by the Census Office as manufactures and by the Treasury Department as products of agriculture may be named bread and biscuit; corn meal; wheat and rye flour; preserved fruits and vegetables; oils; canned, preserved, and pickled meats; dairy products; glucose; grape sugar; glue; oil cake and oil-cake meal; manufactures of hair; lard, oleomargarine, butter, and cheese; sugar, molasses, sirup; wines, etc. Some of these articles represent an enormous value; that of meat alone being $108,056,769, and of oil cake and oil-cake meal $16,757,519 in 1900.

Among the commodities classed by the Census Office as manufactures and by the Treasury Department as products of the forest are reckoned $12,474,194 worth

of naval stores, including rosin, tar, turpentine, and spirits of turpentine; and lumber, boards, planks, shingles, shooks, staves, etc., valued at $27,796,412. Of the total exports of the products of the forest, amounting in 1900 to $52,218,112, practically all are included by the Census Office among manufactured articles.

The production of some of these articles may be said to lie on the border line between the two branches of industry. They are products of agriculture or forestry, which have been increased in value and transformed from their original condition by certain processes of manufacture, and therefore are included in the census statistics of manufactures.

The total value of the exported products which, from the census point of view, are wrongly classified by the Treasury Department is so great that their transfer from one group of Treasury classification to the other increases the value of the exports of manufactures for the census year from $433,851,756 to $798,999,482, and correspondingly reduces the value of exported products of agriculture, forests, etc. On the basis of the census classification, the largest item in the exports of the country consists not of the products of agriculture, but of the products of manufacture, and represents 58.3 per cent of the total exports of merchandise in the fiscal year in question.

4. *Relation of Exports to Production.*—There are certain lines of the Treasury Department classification which are sufficiently distinct to enable us to trace the relation of the exports to production in many important industries, and to indicate how important the foreign trade has become in its relation to domestic manufacture. The figures show to what extent the recent great development of manufactures has been directly due to the increase in the export trade, and how dependent many industries are for their further development, or even for the continuance of their present condition, upon the maintenance and the future enlargement of foreign markets for manufactured articles.

The Treasury Department presents an itemized table showing the exact value of the exports of certain specified articles of manufacture. The table is so closely classified as to leave under the group of "all other articles"—those not specifically enumerated in the table—a value of only $9,906,602 in 1900. It is reproduced in detail for the last decade.

TABLE LXIV.—VALUE OF PRODUCTS OF DOMESTIC MANUFACTURE EXPORTED, 1890 to 1900.

ARTICLES.	1900	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890
Agricultural implements	$16,099,149	$12,432,197	$7,609,732	$5,240,686	$5,176,775	$5,413,075	$5,027,915	$4,657,333	$3,794,983	$3,219,130	$3,859,184
Art works: Paintings and statuary	263,443	303,493	273,521	301,362	524,077	471,104	391,763	210,892	422,238	406,374	228,082
Blacking	880,598	852,187	733,568	384,937	533,058	464,707	295,505	241,996	221,116	219,903	238,391
Books, maps, engravings, and other printed matter	2,943,435	2,656,136	2,434,325	2,647,548	2,338,722	2,316,217	2,620,046	1,808,873	1,948,228	1,820,470	1,886,094
Brass, and manufactures of	1,866,727	1,351,049	1,320,093	1,171,431	872,396	784,640	808,427	519,435	528,756	296,349	467,313
Bricks	516,481	229,066	157,274	148,389	128,055	127,833	177,904	196,159	87,702	99,175	99,293
Brooms and brushes	232,968	211,931	158,272	186,056	180,183	165,672	179,098	241,343	181,110	150,609	151,128
Candles	191,687	275,470	232,214	216,505	230,146	190,986	189,462	155,403	165,933	149,112	143,078
Carriages, all other, and parts of	2,809,784	2,047,788	1,685,838	1,955,760	1,884,658	1,514,336	1,649,154	1,605,801	1,944,170	2,015,870	2,056,980
Cars, passenger and freight, for steam railroads	3,542,677	2,058,496	1,738,581	990,950	1,002,940	868,378	1,700,521	969,871	1,320,265	2,885,250	2,689,698
Chemicals, drugs, dyes, and medicines	12,132,373	10,042,916	8,655,478	8,792,545	8,138,789	7,130,384	6,537,401	5,766,425	4,671,582	5,406,781	5,424,279
Clocks and watches, parts of	1,977,694	1,863,431	1,727,469	1,770,402	1,460,375	1,204,005	1,302,813	1,204,181	1,229,616	1,580,164	1,695,136
Coffee and cocoa, ground and prepared, and chocolate	231,509	192,863	137,369	128,078	107,740	104,317	137,777	93,292	70,651	86,936	93,735
Copper and manufactures of, not including copper ore	57,852,960	35,983 529	32,180,872	31,621,125	19,720,104	14,468,703	19,697,140	4,525,573	7,226,392	4,614,597	2,349,392
Cotton, manufactures of	24,003,087	23,566,914	17,024,092	21,037,678	16,837,396	13,789,810	14,340,886	11,809,355	13,226,277	13,604,857	9,999,277
Cycles, and parts of	3,553,149	5,753,880	6,846,529	7,005,323	1,898,012	.....	.....	.....	.....	.....	.....
Earthen, stone, and china ware	576,702	351,830	232,992	177,832	149,388	141,021	127,437	226,806	237,431	159,626	175,477
Fertilizers	841,857	[1] 974,474	4,359,834	5,005,929	4,400,593	5,741,262	5,038,445	3,927,348	2,657,120	2,182,274	1,618,681
Fibers, vegetable, and textile grasses, and manufactures of	4,441,835	3,093,102	2,557,465	2,216,184	1,868,601	1,722,559	1,712,744	1,778,746	1,998,663	1,504,740	2,094,807
Glass and glassware	1,936,119	1,503,651	1,211,084	1,208,187	1,062,225	946,381	922,072	973,827	942,302	868,374	882,677
Gunpowder and other explosives	1,891,604	1,531,889	1,395,406	1,555,318	1,381,102	1,277,281	1,002,126	861,513	860,355	995,546	868,728
India rubber and gutta-percha, manufactures of	2,860,072	2,142,347	1,981,501	1,807,145	1,858,556	1,505,142	1,461,842	1,609,406	1,416,067	1,236,443	1,090,807
Ink, printers' and other	259,776	210,673	203,927	162,955	165,238	154,152	154,691	118,480	145,886	122,235	144,057
Instruments and apparatus for scientific purposes	6,435,766	4,399,180	2,770,803	3,054,453	2,522,217	1,912,771	1,534,277	1,345,621	1,388,117	1,575,444	1,429,785
Iron and steel, and manufactures of, not including iron ore	121,918,548	93,716,031	70,406,885	57,497,872	41,160,877	32,000,989	29,220,264	30,106,482	28,800,930	28,909,614	25,542,208
Jewelry, gold and silver, and manufactures of	1,143,638	963,156	747,780	658,676	800,851	716,844	851,084	881,893	1,026,188	832,440	662,759
Lamps, chandeliers, and all other devices for illuminating purposes	978,874	777,379	672,010	710,997	719,173	669,777	650,418	561,358	538,304	509,518	523,021
Lead, and manufactures of	331,057	235,112	223,018	656,088	372,941	216,087	688,636	316,943	166,078	182,412	184,317
Leather, and manufactures of	27,293,010	23,466,985	21,113,640	19,161,446	20,242,756	15,614,407	14,283,429	11,912,154	12,084,781	13,278,847	12,438,847
Lime and cement	249,016	203,096	128,476	143,471	121,914	127,256	162,096	166,381	115,205	148,938	134,994
Malt liquors	2,139,216	1,888,124	585,579	723,949	659,875	558,770	548,979	665,588	657,934	672,243	654,408
Marble and stone, manufactures of	1,556,772	1,317,843	1,792,582	1,316,815	901,585	885,179	912,123	703,081	537,759	653,634	729,111
Matches	95,422	103,693	78,548	70,988	90,315	94,799	66,614	67,974	73,666	73,220	62,284
Musical instruments	1,958,779	1,791,343	1,383,867	1,276,717	1,271,161	1,115,727	972,590	1,824,107	1,164,656	1,326,389	1,105,134
Oil, mineral, refined	68,247,588	51,070,276	51,782,316	56,463,185	56,261,567	41,498,372	37,083,891	37,574,667	39,704,152	46,150,282	44,658,854
Oils, vegetable (not including cottonseed, corn, and linseed oils)	811,503	1,118,842	1,267,365	1,571,557	587,252	491,436	403,670	583,443	298,650	279,364	326,227
Paints, pigments, and colors	1,902,367	1,447,425	1,079,518	944,536	880,841	729,706	825,987	700,308	709,857	690,698	578,103
Paper, and manufactures of	6,215,833	5,477,884	5,494,564	3,333,163	2,713,875	2,185,257	1,906,634	1,540,886	1,382,251	1,299,169	1,226,686
Paraffin and paraffin wax	8,602,723	6,804,684	6,030,292	4,957,096	4,406,841	3,569,614	3,820,656	4,515,584	3,965,263	3,714,649	2,408,709
Perfumery and cosmetics	359,827	316,542	306,363	316,913	350,116	338,495	327,835	345,041	404,706	450,663	.....
Plated ware	509,776	450,462	417,824	443,032	408,314	336,618	281,390	322,016	369,478	414,719	440,714

[1] Phosphates; see Products of the Mines, etc.

TABLE LXIV.—VALUE OF PRODUCTS OF DOMESTIC MANUFACTURE EXPORTED, 1890 TO 1900—Continued.

ARTICLES.	1900	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890
Silk manufactures	252,608	290,729	297,074	224,660	300,884	256,181	283,765	161,673	152,150	92,071	54,449
Soap	1,774,024	1,457,610	1,390,603	1,136,880	1,273,645	1,092,126	1,139,722	1,007,233	1,003,207	1,187,263	1,109,017
Spirits, distilled	2,278,111	2,495,612	1,850,353	1,941,703	1,730,804	2,991,686	5,676,936	2,724,057	2,401,117	1,887,431	1,633,110
Starch	2,604,362	2,292,843	1,371,549	1,665,926	885,198	366,800	727,011	707,093	612,531	475,817	378,115
Stationery, except of paper	592,427	1,120,893	1,005,016	928,378	774,284	681,639	683,278	597,169	592,020	560,456	490,673
Stereotype and electrotype plates	48,877	60,940	61,482	69,505	73,980	44,839	58,124	62,722	47,912	28,310	30,662
Straw and palm leaf, manufactures of	402,861	359,780	317,468	305,418	269,311	177,946	186,427	155,783	65,853	78,844	63,363
Sugar, refined, including candy and confectionery	1,569,622	1,029,372	1,032,376	885,272	966,016	1,119,476	1,144,800	1,297,730	870,086	6,320,247	2,080,662
Tin, manufactures of	387,381	365,470	263,365	300,441	240,526	277,796	290,494	223,441	225,113	249,836	284,896
Tobacco, manufactures of	6,010,141	5,178,998	4,818,493	5,025,817	4,380,361	3,953,165	3,849,996	4,050,555	4,069,380	4,186,713	3,876,045
Toys	216,512	148,805	177,668	133,792	143,390	133,557	114,431	109,890	124,869	161,166	.....
Trunks, valises, and traveling bags	119,777	132,688	104,602	100,382	113,118	104,275	123,968	147,335	171,804	202,520	229,850
Varnish	620,104	463,547	422,693	431,761	362,975	303,959	282,278	258,400	293,059	203,285	216,483
Vessels sold abroad	202,948	67,025	144,543	191,840	154,610	94,951	99,042	124,132	257,885	96,422	104,798
Vinegar	12,583	13,488	12,939	11,572	16,975	11,278	9,537	12,177	11,690	10,489	10,520
Wood, manufactures of	11,232,838	9,715,285	9,098,219	8,592,416	7,426,475	6,249,807	6,773,724	6,058,896	6,062,789	5,987,322	6,509,645
Wool, manufactures of	1,300,862	1,047,407	1,089,632	947,808	913,609	670,226	774,580	326,055	367,737	519,198	437,479
Zinc, manufactures of	1,669,215	1,156,970	1,339,668	1,829,560	228,605	237,815	456,856	610,709	765,567	131,732	156,160
All other manufactured articles (not agricultural, mining, forest, or fishery products)	9,906,602	6,516,845	4,760,745	3,528,921	1,919,812	1,264,207	1,088,097	1,752,588	1,656,350	1,911,235	2,074,509
Total value of exports of domestic manufacture	433,851,756	339,592,146	290,697,354	277,285,391	228,571,178	183,595,743	183,728,808	158,023,118	158,510,937	168,927,315	151,102,376
Per cent of total exports	31.7	28.2	24.0	26.9	26.5	23.1	21.1	19.0	15.6	19.4	17.9

The largest value for a single article shown in this table—that of refined mineral oil, or petroleum—amounted in 1900 to $68,247,588, representing a production upon which has been expended comparatively little labor to advance it from the crude condition of a mineral product.

On the other hand, the largest item shown in the table, which, however, stands for a group of manufactured articles, was the value for iron and steel exports, which includes a class of products in which the labor cost is very large. The exports of manufactures of iron and steel were valued at $121,913,548 in 1900, an increase of 377.3 per cent from the $25,542,208 reported in 1890. Only $3,124,753 of these exports in 1900 consisted of pig iron, $1,958,388 of steel bars and rods, and $9,356,448 of railroad steel, showing that the great bulk of our exports of manufactures of iron and steel consisted of special articles in the production of which our manufacturers have exhibited peculiar skill. It is made up in detail of such items as "builders' hardware, saws and tools," to the value of $9,648,924; "sewing machines," to the value of $4,541,774; "steam engines and parts of," to the value of $2,455,968; "locomotives," to the value of $5,592,403; "typewriting machines and parts of," to the value of $2,697,544; "cycles and parts of," to the value of $3,553,149; "other machinery," to the value of $40,197,806; "pipes and fittings," to the value of $7,024,888; and "wire," to the value of $5,982,400.

5. *Competition with Foreign Manufacturers.*—The ability of our manufacturers to compete with foreign manufacturers in the production of these articles, notwithstanding a great difference in labor costs, is due to a variety of causes, among which patents are in some instances important, but superior machinery and facilities for large and rapid output are most conspicuous. There are many articles, among which steam engines and locomotives may be specified, in which American patterns, differing widely from those of foreign countries, have been found upon trial abroad to be better adapted to the work required of the machines. Illustrations of this fact are found in the exports of American locomotives, largely to Russia, China, and Japan, for the equipment of the new railroads building by the governments of those countries. Among other machines exported in 1900 were $1,219,774 of "printing presses and parts of," demonstrating the claim made in the special report upon this industry that American printing presses are superior in rapidity and perfection of operation to any others in the world. Among the exports of machinery are many devices for expediting and making automatic the intermediate processes in other industries. These are the fruits of American ingenuity and enterprise, which are not made at all in other countries, and which have only recently become known and used away from the country of their origin.

This phase of our superiority in new mechanisms has, perhaps, been demonstrated best in the foreign utilization of American electrical apparatus. The third largest item of our export trade consisted of the manufactures of copper, of which we exported $57,852,960 in 1900—an amount that is almost entirely the growth of the last decade; and this remarkable progress is due to the new uses to which copper is applied in modern industry, especially in the development of electricity. The superiority of American mechanisms has also been shown in many varieties of small tools and instruments of precision, such as micrometers, calipers, squares, scales, rules, etc.

The fourth industry in order of relative value of exports was "leather, and manufactures of leather," in

which our exports in 1900 reached a value of $27,293,010, an increase of $14,854,163 since 1890.

Cotton manufacture stands fifth in the value of exports, with a total of $24,003,087 in 1900. This is the largest value of manufactured cotton exports ever reported; but the growth is not as striking as in other fields, for we have had a well-developed cotton-export trade for many years. As far back as 1881 the total exports reached a value of $11,607,686.

Cotton is the only one of the textile industries in which the United States has as yet seriously undertaken to enter into competition with the European manufacturers in foreign markets, and up to the present time our exports have not reached a very high figure. Although the United States produces more than one-half of all the cotton grown in the world, it supplies less than 5 per cent of the manufactured cottons which are exported by all nations. Systematic efforts to increase the American proportion of the world's export trade in manufactured cotton have been the chief cause for the development of this industry during the last decade.

In agricultural implements the export trade of the United States is larger than that of all other countries combined. In 1900 it reached a total value of $16,099,149, having more than quadrupled since 1890.[1]

Among other industries in which our exports of manufactured products have become an important part of the total product, may be mentioned manufactures of wood, which had a value of $11,232,838 in 1900; manufactures of tobacco, with a value of $6,010,141; manufactures of paper, valued at $6,215,833; manufactures of chemicals, valued at $12,132,373; manufactures of steam railroad cars, valued at $3,542,677; manufactures of brass, valued at $1,866,727; and manufactures of malt liquors, valued at $2,139,216.

Table LXV represents, for some of the more important of the industries, the value of exports for the first year in each decade since 1870. The figures in this table were obtained by using the Treasury Department statistics and reclassifying them on the basis of the census definition of manufactures.

TABLE LXV.—*Exports of specified manufactures: 1870 to 1900.*

ARTICLES.	1900	1890	1880	1870
Agricultural implements	$16,099,149	$8,859,184	$2,240,979	$1,068,476
Bread and breadstuffs	262,744,078	154,925,927	288,036,835	72,250,933
Cotton, and manufactures of	266,992,065	260,968,069	221,517,823	230,814,906
Iron and steel, and manufactures of	121,913,548	25,542,208	12,605,576	11,002,902
Leather, and manufactures of	27,293,010	12,438,847	6,760,186	673,331
Mineral oils	75,611,750	51,403,089	84,014,928	30,429,057
Tobacco, and manufactures of	35,432,512	25,355,601	18,442,273	22,705,225
Wood, and manufactures of	50,598,416	28,274,529	16,237,376	13,734,888

[1] "In the manufacture of agricultural implements the Americans have always held a prominent position, and many—I do not know whether I ought to say most—of the ingenious devices by which human labor has been supplanted by mechanism in this field have been the characteristic product of American inventive genius."—Extract from the London Times: Correspondence on American Engineering Competition, 1900.

6. *Imports.*—The statistics of the imports of manufactures into the United States present a striking contrast to those of the export trade. They show a progressive change in the character of the commodities imported, which is immediately traceable to the great development of domestic manufactures.

The attempt to correlate the statistics of imports with those of domestic production encounters the same difficulty—a difference in classification between the Census Office and the Statistical Bureau of the Treasury Department—which has been found to complicate the study of the export trade. The Treasury classification of goods imported differs not only from the classification of similar articles by the Census Office, but also from the Treasury classification of exports. Conclusions from a comparison of the two groups of statistics can, therefore, be drawn only in the most general way.

In its general grouping of imports entered for consumption the Treasury Department has adopted a broad division of five classes: the first includes food and live animals; the second, crude articles and raw materials for use in domestic manufactures; the third, partially manufactured articles to be used as materials in domestic manufactures; fourth, manufactured articles ready for consumption; and fifth, articles of voluntary use, luxuries, etc.

Table LXVI shows the value of each of the five classes of imports referred to above, which were entered for consumption in the years 1890 and 1900, and the percentual ratio of the imports of each class to the whole value of imports.

TABLE LXVI.—*Imports for consumption: 1890 and 1900.*

Classes.	1900		1890	
	Value.	Per cent of total imports.	Value.	Per cent of total imports.
Total	$830,519,252	100.00	$789,310,409	100.00
Class A: Food and live animals	216,107,303	26.02	251,944,708	31.92
Class B: Crude articles for domestic industries	299,351,033	36.05	180,846,654	22.91
Class C: Manufactured articles for use as materials in mechanic arts	80,575,042	9.70	84,746,767	10.74
Class D: Articles manufactured ready for consumption	130,577,155	15.72	157,943,573	20.01
Class E: Articles of voluntary use, luxuries, etc	103,908,719	12.51	113,828,707	14.42

The values given are the foreign values as declared by the shippers abroad. They include the costs of boxing, etc., for shipment, but exclude the amount of duties paid at custom houses in this country. As these duties averaged 27.5 per cent, in 1900 the domestic cost of the imports was increased by the sum of $228,364,556, which, added to the $830,519,252 given in the table, made the total domestic cost of imported articles, at wholesale, and exclusive of all commissions, profits of importers, etc., $1,058,883,808.

It appears from this table that the total foreign value of imports in 1900 had increased but $41,208,843, or 5.2 per cent, in the ten years, in contrast with an increase of

62.6 per cent in the value of all exports in the same decade. The two striking facts shown in this table are the steady decrease in the imports of manufactured articles ready for consumption and the corresponding increase in the imports of raw materials for use in manufacture. In 1890 the manufactured articles entered for consumption were valued at $157,943,573, and constituted 20.01 per cent of the total imports; in 1900 the value of this class of imports had fallen to $130,577,155, or 15.72 per cent of the total foreign value of imports. Notwithstanding the increase in population and in the purchasing capacity of the people, the dependence upon foreign manufactures is shown to be decreasing, and domestic products are taking the place of foreign manufactures. However, consideration must be given in this connection to the effect of customs laws.

The imports of crude materials for use in the domestic manufactures have increased from $180,846,654 to $299,351,033 in the ten years. These crude articles constituted 22.91 per cent of the total imports in 1890, and in 1900, 36.05 per cent. The detailed tables of the Treasury Department show the exact character of these raw materials, and indicate the lines in which this country continues to be dependent upon foreign countries for the crude materials consumed by domestic manufactures.

Table LXVII shows the value of the principal articles of this character imported in 1890 and 1900, with the percentage of increase in the ten years.

TABLE LXVII.—*Value of principal articles imported for use in manufacturing.*[1]

	1900	1890	Increase per cent.
Hides and skins	$57,940,316	$21,881,886	164.8
Chemicals, drugs, and dyes	53,705,152	41,602,078	29.1
Silk	45,329,760	24,331,867	86.3
India rubber and gutta-percha	31,792,697	14,854,512	114.0
Fibers	26,373,805	20,541,767	28.4
Wool	20,260,936	15,264,083	32.7
Tin in bars, blocks, etc	19,104,301	6,898,909	176.9
Wood	15,837,342	12,611,058	25.6
Furs and fur skins	12,060,124	7,558,816	59.7
Cotton	7,960,945	1,392,728	471.6

At the head of the list stands "hides and skins," of which $57,940,316 worth were imported in 1900, an increase of 164.8 per cent over 1890. The next most important item is that of "chemicals, drugs, and dyes," of which $53,705,152 worth were imported in 1900, an increase of 29.1 per cent. A large part of this class of imports consisted of patented aniline dyestuffs, for use in the textile manufactures. These came chiefly from Germany, which leads the world in the production of dyestuffs. This is a branch in which domestic manufacturers have made no decided effort to supply the domestic market. The reasons for this fact are given in that section of the special report on chemical manufactures which relates to dyestuffs. Included in the group also are a number of medicinal drugs made from plants which do not grow in the United States.

[1] Annual Reports on Commerce and Navigation: United States Treasury Department, 1890 and 1900.

Third in order were the imports of "silk," both raw and spun, which reached a value of $45,329,760 in 1900, an increase of 86.3 per cent in the decade. All the raw silk consumed in the United States is of foreign production; and this seems likely to continue to be the case indefinitely, notwithstanding the extraordinary development of the manufacture of silk goods.

Next in order in the value of imports were "india rubber and gutta-percha," the value of which in 1900 was $31,792,697, an increase of 114 per cent in ten years. The United States is the largest consumer of rubber, and must continue to rely entirely upon foreign sources for its supply of this important raw material.

Next in order are miscellaneous "fibers," including flax, hemp, jute, sisal grass, etc., the imports of which in 1900 were valued at $26,373,805, an increase of 28.4 per cent in the decade. With the exception of some domestic flax fiber of inferior quality, and the further exception of decreasing quantities of hemp, this country relies upon foreign sources for its supply of these materials. The same is true of tin, the imports of which were valued at $19,104,301 in the census year, an increase of 176.9 per cent in the decade, which was due to the remarkable development of the tin-plate industry since 1890.

The imports of wood, valued at $15,837,342 in 1900, or 25.6 per cent more than in 1890, consisted almost wholly of tropical woods not grown within the limits of the United States.

The imports of wool, valued at $20,260,936, an increase of 32.7 per cent in the decade, consisted largely of what are known as "third class, or carpet wools," i. e., wools from sheep of unimproved stock, of coarse and inferior quality, used almost wholly in carpet manufacture; its value per pound is relatively so small that it is not worth the while of American farmers to attempt to supply the domestic demand. The remaining imports of wool were the finer grades, chiefly of Australian growth, which are matched in some degree by the better grades of our territory wools, but which are not yet grown in sufficient quantities to supply the domestic demand.

The imports of cotton, which were valued at $7,960,945, an increase of 471.6 per cent in the decade, consisted almost wholly of fine and long staple cotton from Egypt, which is superior, for certain purposes, to domestic cotton, and which is required by our manufacturers for certain yarns, chiefly used in the hosiery manufacture.

XXXII.

CONSUMPTION OF MANUFACTURES.

It has been shown above that insuperable difficulties stand in the way of an exact correlation of the census statistics of manufactures with the Treasury statistics of exports and imports of manufactures. If such a correlation were possible, it would result in showing

what proportion the country's production for export bears to that which is retained for home consumption, and also what proportion of the home consumption is contributed by imports. These would be statistics of the utmost economic importance if it were possible to supply them, but the difficulties in the way are very great. In the first place, neither gross nor net values of products are satisfactory figures to use in comparison with exports and imports. The gross value of products includes duplications not included in the value of exports and imports, and in obtaining the net value of products the value of partly manufactured materials has been eliminated, while the value of some such materials is included in the statistics of exports and imports. In the second place, the value of the exports and imports of manufactured products is not properly comparable with the census figures, since these latter are values at the mills or factories, while export and import values are the mill values increased by the profits of the middlemen or commission houses and by freight and terminal charges. In the third place, the values of imports are foreign values, and not duty-paid values, and do not include the profits of importers or the costs of transportation and terminal charges. The three sets of figures are, therefore, not comparable with one another, and percentages based upon them are misleading to an indeterminate extent. These percentages would show a considerable increase during the decade in the proportion of domestic manufactures exported, and a considerable decrease in the ratio of imports of manufactures to total consumption in nearly all of the 15 groups of industries.

Table LXVIII shows, by groups of industries, the domestic production of manufactured articles, the exports thereof, and the imports of foreign manufactured goods for consumption in the United States, for the years 1890 and 1900.

TABLE LXVIII.—DOMESTIC PRODUCTION, EXPORTS, AND IMPORTS FOR CONSUMPTION OF MANUFACTURED ARTICLES, BY GROUPS OF INDUSTRIES: 1890–1900.

GROUPS.	Year.	DOMESTIC PRODUCTION. Value.[1]	DOMESTIC EXPORTS. Value.[2]	IMPORTS FOR CONSUMPTION. Value.[2]
Total—all groups	1900	$13,004,400,143	$793,999,482	$493,690,411
	1890	9,372,437,283	411,468,779	477,405,321
1. Food and kindred products.	1900	2,277,702,010	281,186,400	115,400,056
	1890	1,636,197,191	208,075,542	116,270,279
2. Textiles	1900	1,637,484,484	31,486,065	178,180,942
	1890	1,261,672,504	12,737,691	181,023,540
3. Iron and steel and their products.	1900	1,793,490,908	122,203,843	20,039,042
	1890	1,144,056,537	25,542,208	43,755,245
4. Lumber and its remanufactures.	1900	1,030,906,579	50,724,700	20,661,176
	1890	877,954,920	28,370,733	16,326,368
5. Leather and its finished products.	1900	583,731,046	27,400,749	13,130,741
	1890	487,556,030	12,438,847	11,974,454
6. Paper and printing	1900	606,317,763	9,159,268	7,358,039
	1890	445,587,430	3,112,780	6,842,517
7. Liquors and beverages	1900	425,504,167	5,267,708	12,232,923
	1890	341,155,361	2,631,377	12,684,837
8. Chemicals and allied products.	1900	$552,891,877	$129,355,305	$39,782,974
	1890	380,056,497	81,962,867	26,742,489
9. Clay, glass, and stone products.	1900	293,564,235	5,061,093	19,061,087
	1890	229,806,003	2,061,762	18,882,320
10. Metal and metal products other than iron and steel.	1900	748,795,464	68,412,498	42,322,722
	1890	816,908,150	6,794,360	14,248,945
11. Tobacco	1900	283,076,546	6,010,141	2,323,079
	1890	211,746,623	3,876,045	4,040,232
12. Vehicles for land transportation.	1900	508,649,129	9,905,610	33,178
	1890	344,476,243	4,746,678	452,884
13. Shipbuilding	1900	74,578,158	202,948	[3]
	1890	40,342,115	104,798	[3]
14. Miscellaneous industries.	1900	1,004,092,294	52,673,654	23,164,452
	1890	645,574,453	19,013,091	23,255,211
15. Hand trades	1900	1,183,615,478	[3]	[3]
	1890	1,009,347,226	[3]	[3]

[1] Production figures for 1900 do not include figures for Hawaii nor for governmental establishments in District of Columbia.

[2] United States Treasury Department: Annual Reports on Commerce and Navigation of the United States. 1890–1900.

[3] Not enumerated separately.

XXXIII.

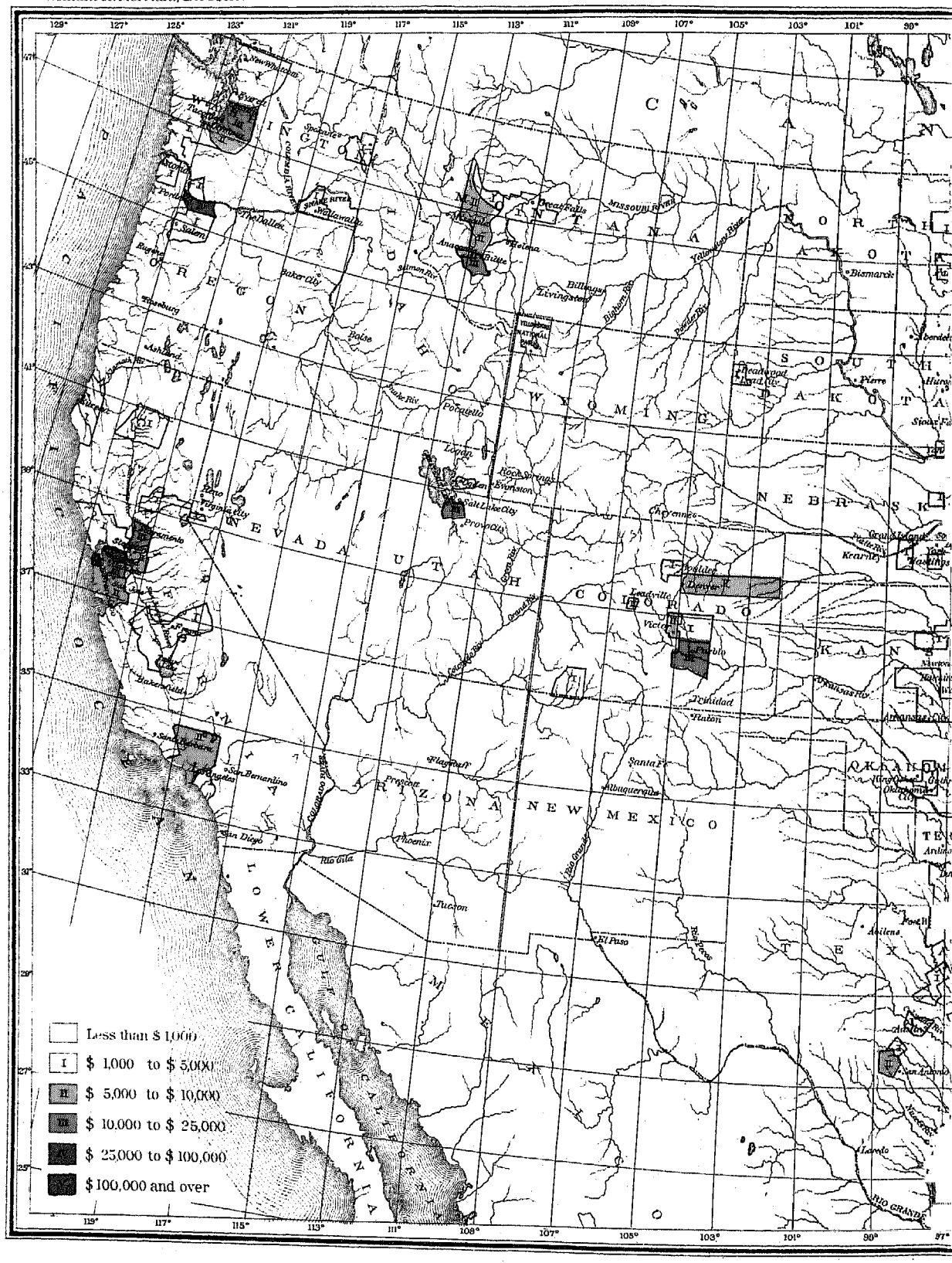
DENSITY OF MANUFACTURES.

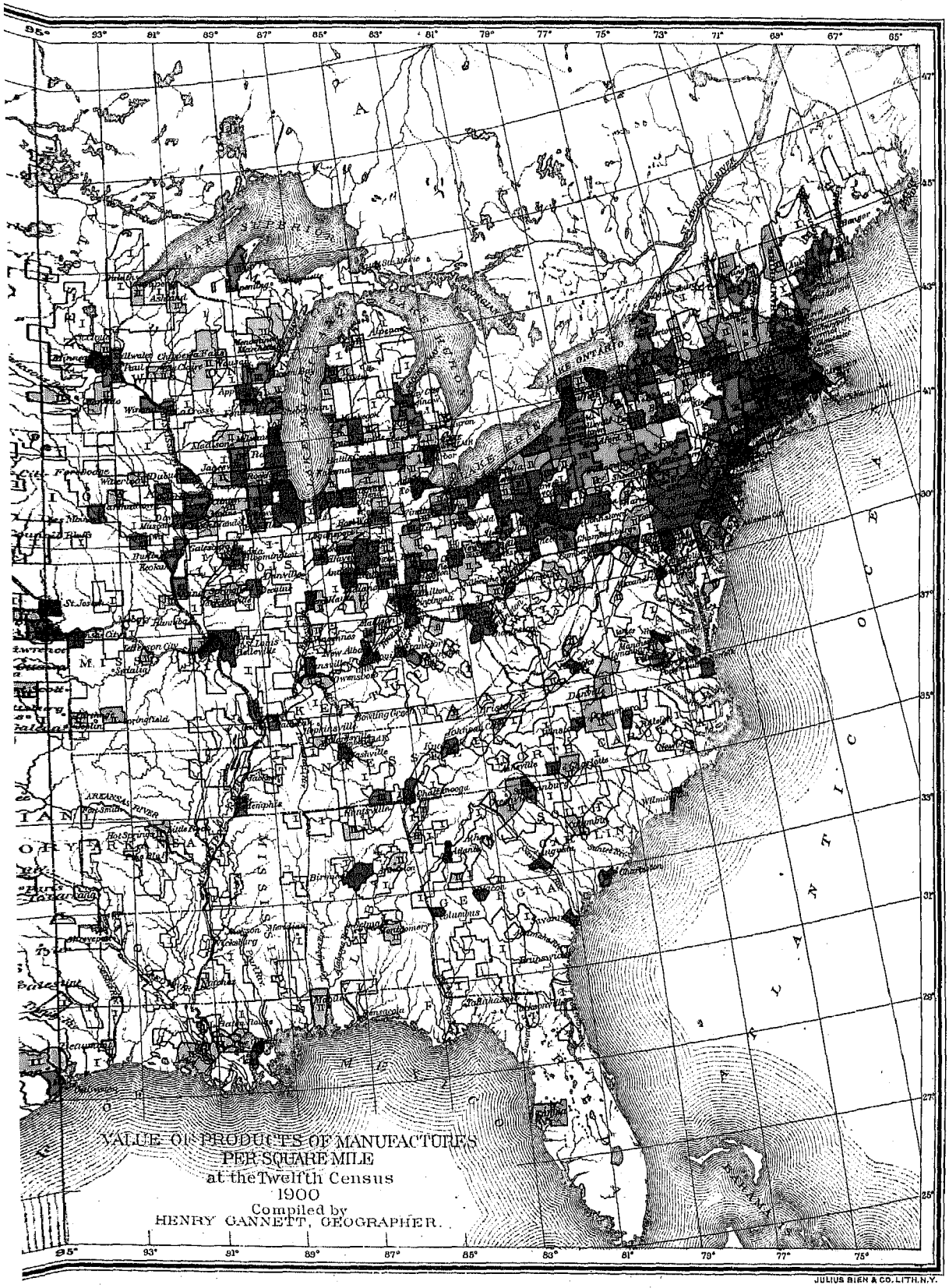
The map facing this page, showing the value of manufactures per square mile, is intended to express the varying importance of manufactures in the different localities and sections of the country. It has been made by dividing the value of the gross product in each county by the area of the county in square miles, plotting the results, and coloring the areas of the counties in accordance with the legend.

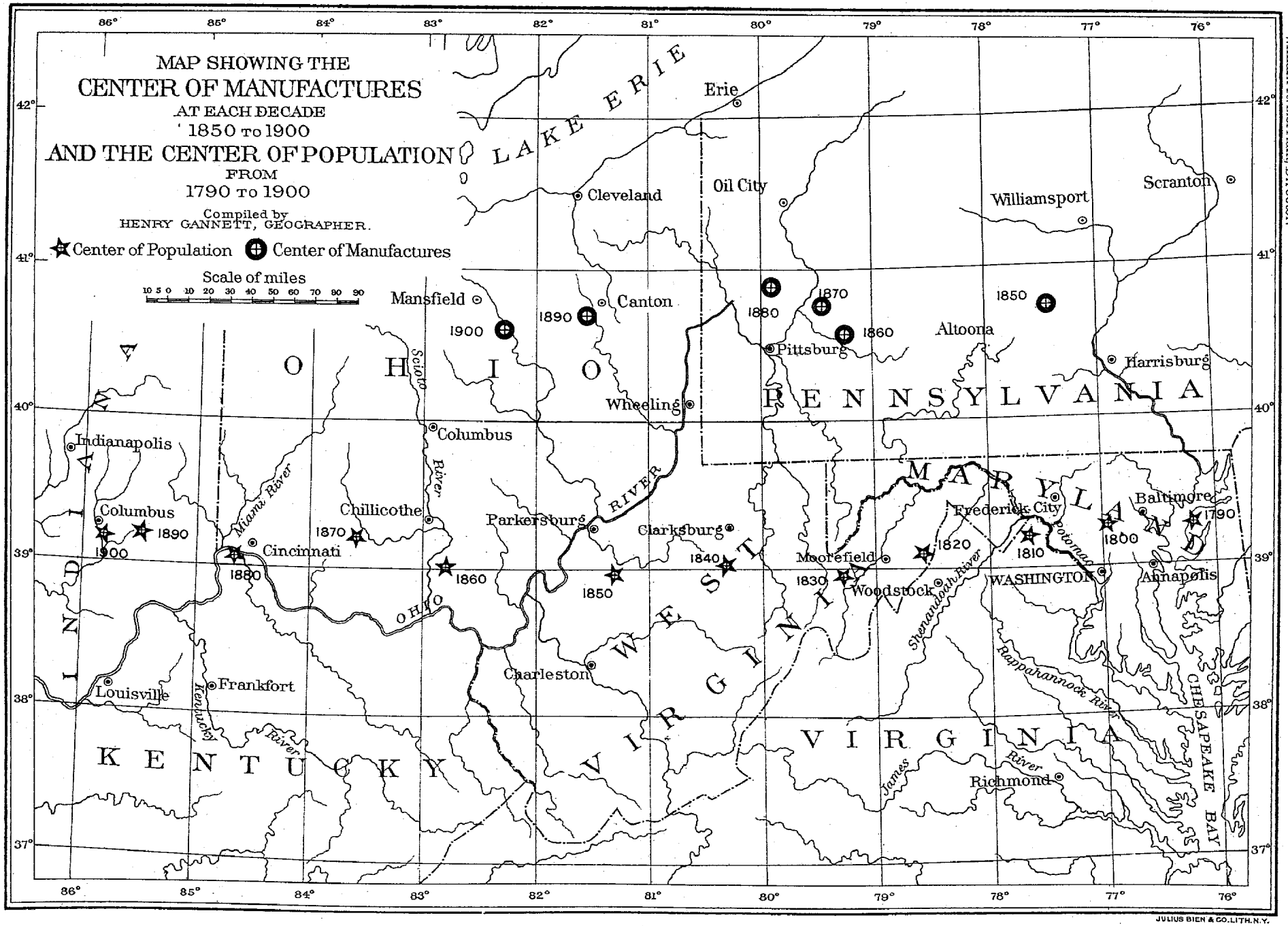
The map shows that the heaviest area of manufactures is in southern New England, southern New York, New Jersey, and eastern Pennsylvania. Manufactures are extensive and fairly heavy over a much larger area, namely, that north of the Potomac and the Ohio and east of the Mississippi rivers, while even farther to the south and west the position of every considerable city is marked by the dark spot of its manufactures.

The method explained above of ascertaining the density of manufactures is the only method practicable from the nature of the census statistics, but it results in a showing that is manifestly unfair to certain parts of the country. The county is the smallest geographic unit, the manufacturing statistics for which are uniformly presented for the whole country, but in parts of the West, for instance, it is a unit often so large as to afford great diversity of condition within its limits. A considerable degree of manufacturing development in one part of a county may be counterbal-

Twelfth Census of the United States
William R. Merriam, Director.




VALUE OF PRODUCTS OF MANUFACTURES
PER SQUARE MILE
at the Twelfth Census
1900
Compiled by
HENRY GANNETT, GEOGRAPHER.
JULIUS BIEN & CO. LITH. N.Y.



Twelfth Census of the United States.
William R. Merriam, Director.

JULIUS BIEN & CO. LITH. N.Y.

anced by an entire absence of it in the rest of the county, even to the extent of bringing the average product per square mile below the minimum limit for any color on the map. Such exceptions to the validity of the method, however, are not of sufficient frequence and importance to justify the withholding of the graphic view afforded by such a map; all the principal centers of manufacture are indicated, and in general all localities of any degree of manufacturing development are shown.

Similar maps might be made for earlier censuses; and a comparison of these would show a steady advance of the frontier of manufactures southward and westward, as the manufacturing area has spread from its early home, which is now the dense area above outlined.

XXXIV.

THE CENTER OF MANUFACTURES.

The steady westward trend of manufacturing is indicated upon the accompanying map, which shows the center of manufactures in the United States, as computed for each census since 1850 by the geographer of the census. The computation is based upon the gross value of products, and the center is found to have been located as follows at the different censuses:

TABLE LXIX.—*Location of center of manufactures: 1850–1900.*

LATITUDE AND LONGITUDE.	1850	1860	1870
	° ′ ″	° ′ ″	° ′ ″
Latitude north	40 41 42	40 33 01	40 47 13
Longitude west	77 25 09	79 18 50	79 25 58

LATITUDE AND LONGITUDE.	1880	1890	1900
	° ′ ″	° ′ ″	° ′ ″
Latitude north	40 50 09	40 42 22	40 36 36
Longitude west	79 53 00	81 33 37	82 18 07

The center of manufactures in 1850 was 5 miles east and 6 miles north of Mifflintown, Pa.; in 1860, 5.5 miles west, 6.5 miles south of Indiana, Pa.; in 1870, 6 miles east, 3.75 miles south of Kittanning, Pa.; in 1880, 2 miles east and 2 miles south of Butler, Pa. In 1890 it had moved nearly to the center of Ohio, and was 8.5 miles west and 7 miles south of Canton in that state. In 1900 it was located at the intersection of the meridian of 82° 18′ 7″ west with the parallel of 40° 36′ 36″ north, the position being approximately 3 miles southwest of the village of Loudonville, Hanover township, Ashland county, Ohio, and about 17 miles southeast of Mansfield, Ohio. During the decade the center has moved 39.35 miles west, and 6.63 miles south.

Upon the map which indicates this movement has also been shown the centers of population at the censuses since 1850. A study of the map is interesting, as indicating the variations which have occurred from census to census in the relative movements of these two centers.

XXXV.

MANUFACTURES BY GEOGRAPHIC GROUPS OF STATES.

An interesting feature of the manufacturing development of the United States is brought out by grouping the states along geographic lines.

For such a grouping the Twelfth Census has employed the old and familiar divisions. The New England states are commonly regarded as a geographic unit, ordinary commercial use associating these six states as a distinct group governed by conditions peculiar to themselves. The same is true of the Middle states, although there is less certainty in the public mind as to the states which actually constitute this group. The Southern states comprise another distinct geographic unit, and a more accurate conception of their industrial progress is obtained by associating them in one group than by dividing them into the South Atlantic and South Central groups. The central states in the Middle West, often called the Prairie states, are a homogeneous territory, whose industrial development has been nearly uniform. The same is true of the Western states, known as the Rocky Mountain group, most of which have advanced into statehood within a comparatively recent period. Finally there are the three states comprising the Pacific group, whose industrial development has been governed by conditions altogether different from those prevailing elsewhere.

Table LXX presents a comparative summary, by these geographic divisions, from 1850 to 1900; table LXXI shows the percentage of increase in each group, and table LXXII, the percentage which the totals of each group form of the totals for manufactures in the United States, at each of these censuses.

TABLE LXX.—COMPARATIVE SUMMARY, UNITED STATES

	DIVISIONS.	Date of census.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.	
					Number.	Salaries.
1	United States	1900	512,734	$9,846,628,564	397,748	$404,852,838
		1890	355,415	6,525,156,486	[1] 461,009	[1] 391,988,208
		1880	253,852	2,790,272,606	(2)	(2)
		1870	252,148	2,118,208,769	(2)	(2)
		1860	140,433	1,009,855,715	(2)	(2)
		1850	123,025	533,245,351	(2)	(2)
2	New England states	1900	57,941	1,594,142,061	49,568	56,178,388
		1890	48,392	1,176,078,498	63,633	55,593,464
		1880	31,581	624,228,061	(2)	(2)
		1870	32,352	489,666,032	(2)	(2)
		1860	20,671	257,477,783	(2)	(2)
		1850	22,487	165,695,259	(2)	(2)
3	Middle states	1900	160,374	3,951,914,758	149,197	161,006,298
		1890	125,187	2,554,437,860	175,478	163,221,941
		1880	89,603	1,174,934,893	(2)	(2)
		1870	87,606	905,722,631	(2)	(2)
		1860	53,287	435,061,964	(2)	(2)
		1850	54,024	235,586,443	(2)	(2)
4	Southern states	1900	84,256	953,850,192	38,903	32,929,083
		1890	46,455	510,776,260	46,469	30,901,668
		1880	36,938	192,949,654	(2)	(2)
		1870	38,759	139,160,713	(2)	(2)
		1860	24,081	116,231,764	(2)	(2)
		1850	20,505	67,104,157	(2)	(2)
5	Central states	1900	166,454	2,750,223,234	137,128	131,996,187
		1890	113,050	1,940,088,802	[1] 148,509	118,435,877
		1880	81,999	699,587,944	(2)	(2)
		1870	84,392	516,709,757	(2)	(2)
		1860	32,884	172,604,454	(2)	(2)
		1850	24,921	62,896,995	(2)	(2)
6	Western states	1900	23,950	289,889,077	10,890	10,154,880
		1890	11,332	130,380,451	12,289	9,843,633
		1880	6,505	27,813,717	(2)	(2)
		1870	3,817	20,950,911	(2)	(2)
		1860	681	3,803,216	(2)	(2)
		1850	37	112,700	(2)	(2)
7	Pacific states	1900	19,301	291,467,178	11,406	11,843,008
		1890	10,989	218,288,888	14,679	13,988,077
		1880	7,226	70,758,337	(2)	(2)
		1870	5,222	45,998,725	(2)	(2)
		1860	8,829	24,676,534	(2)	(2)
		1850	1,055	1,849,797	(2)	(2)
8	Outlying districts	1900	458	15,142,064	656	740,044
		1890	10	105,727	8	3,548

[1] Includes proprietors and firm members, with their salaries; number only reported in 1900 but not included in this table.

SUMMARY AND ANALYSIS OF RESULTS.

BY GEOGRAPHIC DIVISIONS: 1850 TO 1900.

AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.								Miscellaneous expenses.	Cost of materials used.	Value of products, including custom work and repairing.	
Total.		Men, 16 years and over.		Women, 16 years and over.		Children, under 16 years.					
Average number.	Wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.				
5,321,389	$2,330,578,010	4,121,006	$2,023,205,844	1,031,760	$281,704,746	168,623	$25,667,420	$1,028,908,911	$7,360,993,418	$13,039,279,566	1
4,251,613	1,891,228,321	3,327,042	1,659,234,483	803,686	215,367,976	120,885	16,625,862	631,225,035	5,162,044,076	9,372,437,283	
2,732,595	947,953,795	2,019,035	(2)	531,639	(2)	181,921	(2)	(3)	3,396,823,549	5,369,579,191	
2,053,996	775,584,343	1,615,598	(2)	323,770	(2)	114,628	(2)	(3)	2,488,427,242	4,232,325,442	
1,311,246	378,878,966	1,040,349	(2)	270,897	(2)	(2)	(2)	(3)	1,031,605,092	1,885,861,676	
957,059	236,755,464	731,137	(2)	225,922	(2)	(2)	(2)	(3)	555,123,822	1,019,106,616	
947,645	420,508,031	662,163	335,795,373	260,295	79,998,908	25,187	4,713,750	126,110,899	999,822,661	1,875,792,081	2
821,499	358,866,392	559,528	284,986,075	239,894	70,391,917	22,077	3,488,400	99,255,002	792,343,452	1,498,797,507	
647,373	226,775,089	420,738	(2)	185,329	(2)	41,306	(2)	(3)	660,263,286	1,106,158,303	
526,969	210,763,206	345,960	(2)	149,886	(2)	31,123	(2)	(3)	604,953,163	1,009,116,772	
391,836	104,231,472	262,884	(2)	129,002	(2)	(2)	(2)	(3)	245,523,107	468,599,287	
312,716	75,949,612	197,805	(2)	114,911	(2)	(2)	(2)	(3)	153,123,607	283,872,747	
1,979,693	913,668,853	1,478,175	778,886,431	445,293	125,015,909	61,225	9,766,513	422,688,839	2,737,592,070	4,957,874,935	3
1,634,930	772,035,923	1,238,356	669,484,100	350,961	95,882,206	45,613	6,669,617	229,899,520	1,964,780,270	3,646,692,021	
1,139,372	405,869,904	798,139	(2)	262,115	(2)	79,118	(2)	(3)	1,395,050,594	2,219,072,594	
806,094	321,474,373	628,135	(2)	128,398	(2)	49,561	(2)	(3)	1,038,536,682	1,769,003,895	
546,243	152,328,841	432,424	(2)	113,819	(2)	(2)	(2)	(3)	444,126,969	802,338,392	
420,615	104,757,312	329,493	(2)	91,122	(2)	(2)	(2)	(3)	265,835,236	472,876,861	
656,169	197,382,610	529,679	177,421,581	83,452	15,347,244	43,038	4,613,785	83,284,868	671,349,385	1,184,398,684	4
411,971	135,219,489	336,581	122,798,138	52,319	10,130,531	23,061	2,290,820	51,709,991	388,991,779	706,844,392	
223,376	53,087,894	181,587	(2)	22,150	(2)	19,639	(2)	(3)	213,371,564	338,791,898	
186,470	44,904,607	161,299	(2)	13,581	(2)	11,590	(2)	(3)	160,264,937	277,720,637	
131,979	34,701,277	118,168	(2)	13,811	(2)	(2)	(2)	(3)	108,838,911	193,462,521	
109,866	22,601,824	97,192	(2)	12,674	(2)	(2)	(2)	(3)	53,019,925	100,872,071	
1,472,128	657,325,006	1,225,357	598,595,991	212,797	53,082,068	33,974	5,646,952	352,746,781	2,300,547,763	4,000,817,987	5
1,197,500	522,283,667	1,030,388	485,152,770	141,349	33,559,778	25,763	3,571,119	218,783,949	1,675,470,323	2,945,240,950	
646,158	228,271,144	550,066	(2)	56,977	(2)	39,115	(2)	(3)	999,300,913	1,502,637,308	
488,313	175,316,083	435,977	(2)	30,713	(2)	21,623	(2)	(3)	618,919,314	1,055,419,013	
186,580	56,567,547	172,460	(2)	14,120	(2)	(2)	(2)	(3)	201,640,864	341,710,554	
110,501	30,014,160	108,286	(2)	7,215	(2)	(2)	(2)	(3)	80,737,837	146,348,545	
116,815	63,544,792	104,881	60,525,631	9,449	2,584,118	2,485	435,043	20,745,358	373,714,053	555,482,428	6
77,502	41,059,679	69,218	39,170,899	6,100	1,633,444	2,184	255,336	14,797,905	183,473,736	278,199,781	
28,003	10,684,587	25,804	(2)	1,025	(2)	1,174	(2)	(3)	47,807,578	72,518,749	
16,848	8,294,243	16,409	(2)	251	(2)	188	(2)	(3)	25,547,069	44,742,180	
3,534	1,558,685	3,458	(2)	76	(2)	(2)	(2)	(3)	2,489,594	7,114,012	
132	80,756	132	(2)	.....	.....	(2)	(2)	(3)	447,601	540,230	
142,089	74,866,253	119,093	68,729,197	20,322	5,651,407	2,674	485,649	22,298,532	268,333,097	435,670,399	7
108,133	61,744,546	92,883	57,623,876	13,063	3,770,100	2,187	350,570	17,273,416	161,954,318	296,604,192	
48,313	23,265,177	42,701	(2)	4,043	(2)	1,569	(2)	(3)	81,529,614	130,400,339	
29,302	14,881,831	27,818	(2)	941	(2)	543	(2)	(3)	40,206,077	76,322,995	
51,074	29,491,144	51,005	(2)	69	(2)	(2)	(2)	(3)	28,985,647	72,636,910	
4,249	4,105,800	4,249	(2)	.....	.....	(2)	(2)	(3)	2,010,714	15,099,162	
6,850	3,282,465	6,658	3,251,640	152	25,097	40	5,728	1,043,634	14,634,489	29,243,052	8
78	18,625	78	18,625	.....	.....	.....	.....	5,252	30,198	58,440	

[2] Not reported separately.

[3] Not reported.

TABLE LXXI.—PERCENTAGES OF INCREASE, UNITED STATES, BY GEOGRAPHIC DIVISIONS: 1850 TO 1900.

DIVISIONS.	Year.	PER CENT OF INCREASE.						
		Number of establishments.	Capital.	Wage-earners.		Miscellaneous expenses.	Cost of materials used.	Value of products.
				Average number.	Total wages.			
United States	1900	44.3	50.9	25.2	23.2	63.0	42.6	39.1
	1890	40.0	133.9	55.6	99.5	.....	52.0	74.5
	1880	0.7	31.7	33.0	22.2	.....	36.5	26.9
	1870	79.6	109.8	56.6	104.7	.....	141.2	124.4
	1860	14.1	89.4	37.0	60.0	.....	85.8	85.1
	1850	.....	.....	.....	.....	.....	.....	.....
New England states	1900	19.7	35.5	15.4	17.2	27.1	26.2	25.2
	1890	53.2	88.4	26.9	58.2	.....	20.0	35.5
	1880	[1]2.4	27.5	22.8	7.6	.....	9.1	9.6
	1870	56.5	90.2	34.5	102.2	.....	146.4	115.3
	1860	[1]8.1	55.4	25.3	38.5	.....	60.3	65.4
	1850	.....	.....	.....	.....	.....	.....	.....
Middle states	1900	28.1	54.7	21.1	18.3	84.3	39.3	36.0
	1890	39.7	117.4	43.5	90.2	.....	40.8	54.3
	1880	2.3	29.7	41.3	26.3	.....	34.3	25.4
	1870	64.4	108.2	47.6	111.0	.....	133.8	120.5
	1860	[1]1.4	84.7	29.9	45.4	.....	67.1	69.7
	1850	.....	.....	.....	.....	.....	.....	.....
Southern states	1900	81.4	86.7	59.3	46.0	61.1	74.8	67.6
	1890	25.8	164.7	84.4	154.7	.....	80.0	108.6
	1880	[1]4.7	38.7	19.8	18.2	.....	33.1	22.0
	1870	61.0	19.7	41.3	29.4	.....	47.2	43.6
	1860	17.4	73.2	20.1	53.5	.....	105.3	91.8
	1850	.....	.....	.....	.....	.....	.....	.....
Central states	1900	47.2	41.8	22.9	25.9	61.2	37.3	35.8
	1890	37.9	177.3	85.3	128.8	.....	67.7	96.0
	1880	[1]2.8	35.4	32.3	30.2	.....	61.5	42.4
	1870	156.6	199.4	161.7	209.9	.....	206.9	208.9
	1860	32.0	174.4	68.8	88.5	.....	149.7	133.5
	1850	.....	.....	.....	.....	.....	.....	.....
Western states	1900	111.3	122.3	50.7	54.8	40.2	103.7	99.7
	1890	74.2	368.8	176.8	284.3	.....	287.8	283.6
	1880	70.4	32.8	66.2	28.8	.....	85.2	62.1
	1870	460.5	450.9	376.7	432.2	.....	926.2	528.9
	1860	1,740.5	3,274.6	2,577.3	4,967.9	.....	456.2	1,216.8
	1850	.....	.....	.....	.....	.....	.....	.....
Pacific states	1900	75.6	36.7	31.4	21.3	29.1	62.6	46.9
	1890	52.1	201.4	123.8	165.4	.....	98.6	127.5
	1880	38.4	53.8	64.9	56.9	.....	102.8	70.9
	1870	[1]40.9	86.4	[1]42.6	[1]49.7	.....	38.7	5.1
	1860	726.9	1,234.0	1,102.0	618.3	.....	1,341.6	381.1
	1850	.....	.....	.....	.....	.....	.....	.....
Outlying districts	1900	4,480.0	14,221.9	8,682.1	17,524.0	19,771.2	48,361.6	49,939.4
	1890	.....	.....	.....	.....	.....	.....	.....

[1] Decrease.

TABLE LXXII.—RATIO OF EACH GEOGRAPHIC DIVISION TO THE UNITED STATES: 1850 TO 1900.

DIVISIONS.	Year.	PER CENT OF TOTALS FOR UNITED STATES.						
		Number of establishments.	Capital.	Wage-earners.		Miscellaneous expenses.	Cost of materials used.	Value of products.
				Average number.	Total wages.			
United States	1900	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1890	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1880	100.0	100.0	100.0	100.0	.....	100.0	100.0
	1870	100.0	100.0	100.0	100.0	.....	100.0	100.0
	1860	100.0	100.0	100.0	100.0	.....	100.0	100.0
	1850	100.0	100.0	100.0	100.0	.....	100.0	100.0
New England states	1900	11.3	16.2	17.8	18.1	12.2	13.6	14.4
	1890	13.6	18.0	19.3	19.0	15.7	15.3	16.0
	1880	12.4	22.4	23.7	23.9	.....	19.4	20.6
	1870	12.8	23.1	25.7	27.2	.....	21.3	23.8
	1860	14.7	25.5	29.9	27.5	.....	23.8	24.8
	1850	18.3	31.1	32.7	31.8	.....	27.6	27.8
Middle states	1900	31.3	40.1	37.2	39.2	41.1	37.2	38.0
	1890	35.2	39.2	36.5	40.8	36.3	38.1	38.9
	1880	35.3	42.1	41.7	42.8	.....	41.1	41.3
	1870	34.7	42.7	39.2	41.4	.....	41.7	41.8
	1860	37.9	43.1	41.6	40.2	.....	43.1	42.5
	1850	43.9	44.2	43.9	44.3	.....	47.9	46.4
Southern states	1900	16.4	9.7	12.3	8.5	8.1	9.1	9.1
	1890	18.1	7.8	9.7	7.1	8.2	7.4	7.5
	1880	14.6	6.9	8.2	5.6	.....	6.3	6.3
	1870	15.4	6.6	9.1	5.8	.....	6.5	6.6
	1860	17.2	11.5	10.1	9.2	.....	10.6	10.3
	1850	16.7	12.6	11.5	9.5	.....	9.5	9.9
Central states	1900	32.4	27.9	27.7	28.2	34.3	31.2	30.7
	1890	31.8	29.7	28.2	27.6	34.7	32.5	31.4
	1880	32.3	26.1	23.6	24.1	.....	29.4	28.0
	1870	33.5	24.4	23.8	22.6	.....	24.9	24.9
	1860	23.4	17.1	14.2	14.9	.....	19.5	18.1
	1850	20.2	11.8	11.5	12.7	.....	14.5	14.3
Western states	1900	4.7	2.9	2.2	2.7	2.0	5.1	4.3
	1890	3.2	2.0	1.8	2.2	2.4	3.6	3.0
	1880	2.6	1.0	1.0	1.1	.....	1.4	1.4
	1870	1.5	1.0	0.8	1.1	.....	1.0	1.1
	1860	0.5	0.4	0.3	0.4	.....	0.2	0.4
	1850	(1)	(1)	(1)	(1)	.....	0.1	0.1
Pacific states	1900	3.8	3.0	2.7	3.2	2.2	3.6	3.3
	1890	3.1	3.3	2.5	3.3	2.7	3.1	3.2
	1880	2.8	2.5	1.8	2.5	.....	2.4	2.4
	1870	2.1	2.2	1.4	1.9	.....	1.6	1.8
	1860	6.3	2.4	3.9	7.8	.....	2.8	3.9
	1850	0.9	0.3	0.4	1.7	.....	0.4	1.5
Outlying districts	1900	0.1	0.2	0.1	0.1	0.1	0.2	0.2
	1890	(1)	(1)	(1)	(1)	(1)	(1)	(1)

[1] Less than one-tenth of 1 per cent.

The actual increase between 1860 and 1870 was somewhat less, and the increase between 1870 and 1880 somewhat greater, than the figures indicate; since the values reported in 1870 were based upon a paper currency, while those of 1860 and 1880 were gold values.

1. *The Middle States.*—Tables LXX and LXXII show that during the entire half century the Middle states occupied the foremost position in manufactures. In 1850, the gross value of products of these states was $472,876,861, constituting 46.4 per cent, or very nearly one-half of the gross value of products for the entire Union. In 1900, the value of products had grown to $4,957,874,935, but the proportion was only 38 per cent of the total for the United States. The relative proportion produced by the Middle states has thus undergone but slight variation in the half century, the growth of these states having been almost on an equality with the growth of the entire Union. This is due to the continuous advance of the great states of New York and Pennsylvania, in which are situated two of the largest manufacturing centers, and to the increasing number of small manufacturing cities, whose growth has been steady and uninterrupted.

2. *The New England States.*—In 1850, the New England states returned a product of $283,372,747; in 1900, the value of products had grown to $1,875,792,081, an increase of over sixfold. Notwithstanding this enormous increase, the per cent of the total value of manufactured products of the New England states to that reported for the whole United States has decreased continuously from 27.8 to 14.4. These states, covering an area of 66,465 square miles, or only 2.2 per cent of the area of the mainland of the United States, exclusive of Alaska, do not grow sufficient food on their rather barren soil to supply their own population, and possess no advantages in the way of local supplies of raw materials. Under these conditions, the steady advance of their manufacturing industries is indicative of the enterprise of their citizens, and of the unusual extent to which their capital has been invested and reinvested in manufactures. The only natural advantages of New England are an abundance of water-power, conveniently located for manufacturing purposes, and a seacoast upon which fine harbors abound, greatly facilitating the interchange of products. These natural conditions have assisted in building up a chain of manufacturing cities, extending along the seacoast from Biddeford, in Maine, to Bridgeport, in Connecticut, while the more important inland manufacturing cities, which owe their development to their excellent water-power, are mostly located at short distances from the coast.

Since the earlier days, the industries of New England have undergone a striking evolution, involving a gradual shifting of the manufacture of the heavier iron and steel products to points nearer the raw materials and fuel supplies; but all the New England states have clung tenaciously and successfully to the manufactures which originally gave them their chief prominence, namely, the textile industries and the manufacture of the machinery required in these industries. Thus New England makes the greater part of the spindles and looms used in the cotton manufacture of the country, and almost as great a proportion of the machinery for wool manufacture. Its preeminence extends to many other branches of machinery, but more particularly the making of fine tools and delicate instruments.

3. *The Central States.*—The most striking phenomenon of the manufacturing development of the United States in the half century has been the rapid advance of the Central states from a comparatively insignificant position to second place among the geographic groups. In 1850, the states of Illinois, Indiana, and Ohio were occupied chiefly with agricultural pursuits, the value of their manufactured products aggregating but $146,348,545, or 14.4 per cent of the total value of products. In 1900, they reported products valued at $4,000,817,987, comprising 30.7 per cent of the total value of products of the whole country, as contrasted with 38 per cent in the Middle states, which in 1850 produced 46.4 per cent of the total value. Nowhere else in the world has there been so rapid a transformation of the occupations of the population. A great variety of causes has contributed to this development and stimulated it. The agricultural resources of the Central states are unsurpassed, their mineral deposits are hardly inferior to those of any other section, their transportation facilities by rivers, by the Great Lakes, and more recently by railroads have rapidly developed. Very early in the history of these commonwealths their citizens began to establish manufacturing plants, in order to use their own materials and to supply their own needs. These establishments were often on a very large scale, and modern in equipment and construction, utilizing the latest improvements in machinery and methods. Supplies for the development of the vast agricultural districts within or contiguous to their boundaries have from the first been produced largely by these establishments. This has been especially true in the manufacture of agricultural implements of every description, so important in the development of the West, and in the production of the wagons, carriages, and tools required on farms. Thus the Central states have been to a large extent self-sustaining in their development, encouraging their manufactures, which, in turn, have nourished and developed their agriculture and their mines.

4. *The Southern States.*—The industrial development of the South, during the decade just closed, has been along lines so different from those prevailing in other parts of the country that it calls for special and more extended treatment. In this group of states, during the census year of 1900, there were 84,256 estab-

lishments engaged in manufacturing and mechanical industries, with a capital amounting to $953,850,192, giving employment to 656,169 wage-earners, or 2.9 per cent of the total population of that section, and yielding products valued at $1,184,398,684, or 9.1 per cent of the total for the country. In 1850 the Southern states produced 9.9 per cent of the manufactured products of the United States.

During the decade ending with 1870 only a very small proportion of the increase of 124.4 per cent in the manufactured products of the United States was reported by the Southern states. This is accounted for by the fact that the South was struggling with debts, and with the general wreck and ruin caused by the Civil War. It had been unable to regain the fortunes which were lost in that struggle, and was without credit. Its railroad lines were lacking in system, and its labor was disorganized. In 1880, the products of this section formed 6.3 per cent of the total value of the products of the country. Since that time the proportion has steadily increased, until at the census of 1900 it reached 9.1 per cent, eight-tenths of 1 per cent below the proportion in 1850. During the half century the increase in value of products was nearly twelvefold. The last two decades brought to the South not only capital and improved machinery, but skilled workmen as well, and firmly established the cotton mill as a factor in the development of the South.

The oldest and most important industries in this section find their raw material at hand in the products of the farm, the forest, and the mine. This points to an agricultural and mining development rather than to a distinctively manufacturing one. Cotton is ginned; wheat, corn, and rice milled; sugar cane crushed; turpentine and rosin distilled; timber cut; and iron ore smelted. The processes involved in these crude manufactures are simple, and require no special skill. Even the farm laborer is familiar with them, and passes without difficulty from the field to the mill. Until recently, therefore, the manufactures of the South have been confined principally to such industries.

In manufacturing processes proper a higher degree of skill and a greater differentiation of labor are required, and profits depend less upon accessibility and cheapness of material than on technical training. Capital was attracted to this section by the abundance of material and the cheapness of labor, and the first true manufacturing processes were carried on as carefully conducted experimental enterprises. The recent increase in cotton mills, cottonseed oil and petroleum refineries, sugar factories, and iron and steel works, shows that a considerable advance has now been made in manufacturing proper.

The distribution of the increase in the population of the Southern states indicates in a marked manner the development of manufacturing, and its draft upon labor which was formerly engaged in agriculture. During the decade the increase of the South in total population was 24.4 per cent; in the rural population, 18.3 per cent; in the population of cities of 4,000 and over, 38.4 per cent; and in incorporated towns of less than 4,000 inhabitants, 52.8 per cent, showing a general tendency toward concentration in towns and cities. A considerable amount of skilled white labor avoids competition with cheap labor by bringing its intelligence to the mills. During the last two decades all these influences have concentrated themselves upon cotton manufacture, making it the most important manufacturing industry in the South.

During the census year there were in the Southern states 401 establishments engaged in cotton manufacturing, with a capital of $124,596,874, 97,559 wage-earners, and products valued at $95,002,059. At the census of 1890 these states had 239 cotton mills, with a capital of $53,827,303, 36,415 wage-earners, and products to the value of $41,513,711. This is an increase of $53,488,348, or 128.8 per cent, in value of products. During the decades from 1870 to 1900, the rates of increase in the value of the cotton-mill products of the Southern states were 43.8, 153.8, and 128.8 per cent, respectively, as against 5.8, 28.9, and 7.8 per cent in all other states. In the New England states, the increases during the same decades were 14.7, 26.3, and 5.8 per cent, respectively. During the last decade, the increase in the value of all cotton-mill products in the United States was $71,218,596; of this increase, $53,488,348, or 75.1 per cent, was shown by the Southern states.

The number of spindles in Southern mills has not increased in so great a ratio as the value of products. The total increase during the decade in the number of spindles in the United States was 4,862,849, of which 2,745,988, or 56.5 per cent, were in Southern mills. During the last three decades, the rates of increase in the number of spindles in Southern mills were 65.3, 186.7, and 176.7 per cent, respectively, as against 48.6, 24.9, and 16.8 per cent in all other states. In the Southern states, the average consumption of cotton per spindle was 164.4 pounds, as against 72.9 pounds in the New England states; the value of products per spindle was $22.09 in the Southern states, as against $14.91 in New England. It thus appears that from a pound of raw cotton the Southern mills produced a product valued at 13.4 cents, while from the same quantity of raw material the New England mills obtained a product valued at 20.4 cents. The difference in the output per spindle of the two sections was caused by the difference in the grade of goods produced by the mills. The coarser grades of goods manufactured by Southern mills require less twisting in their manufacture, making the spindle consumption of cotton greater. The longer hours of employment prevailing in the Southern states

also increase the consumption per spindle; for example, in Massachusetts the labor day is ten hours, while in Georgia and the Carolinas it is eleven.

The distinctively Southern industries, such as cotton ginning, rice milling, molasses making, sugar refining, and turpentine distilling, showed a decided and vigorous growth during the last decade. In all of these industries except turpentine distilling and flour and grist milling, the production fluctuates with the crops immediately supplying them, and thus indicates the agricultural prosperity of the section.

The lumber and timber industry is increasing more rapidly in the South than in any other part of the country. In 1900, there were 13,777 establishments, with a capital of $179,319,952, and 118,491 wage-earners. The value of products increased from $28,156,671 in 1870, to $185,727,890 in 1900, or 559.6 per cent. The increases for the three decades were 35.4, 134, and 108.2 per cent, respectively. During the last decade, the Southern states showed an increase of $96,520,165, or 74.9 per cent of the increase of $128,875,602 for the United States.

The lumber industry is fairly well distributed throughout the South, the five leading states being Arkansas, Tennessee, Louisiana, Texas, and Mississippi, which rank in the order named. Arkansas easily leads, with products valued at $23,959,983.

In 1900, 1,169 tobacco factories reported $36,773,751 capital, 37,307 wage-earners, and products valued at $78,091,650. A comparison with 1890 is not practicable, as three Southern states were then grouped with "all other states," and can not be separated. In 1880, the value of products of the tobacco manufacture in the South was $25,938,212; in 1900 it was $78,091,650, showing an increase of $52,153,438, or 201.1 per cent. This increase was 31.7 per cent of the increase of $164,406,380 for the United States. The Southern states leading in tobacco manufacture were Kentucky, Virginia, North Carolina, and Florida, which rank in that order. Kentucky led in the manufacture of chewing and smoking tobacco and snuff, with North Carolina a close second; Florida in the manufacture of cigars and cigarettes; and Virginia in the stemming and rehandling of tobacco.

In 1900, the Southern states reported all but 6 of the establishments engaged in the manufacture of cottonseed oil and cake. There were 369 establishments in the United States, with $34,451,461 capital, 11,007 wage-earners, and products valued at $58,726,632. In 1890 there were 119 cottonseed oil-mills, with $12,808,996 capital, 5,906 wage-earners, and products valued at $19,335,947, showing an increase in value of products of $39,390,685, or 203.7 per cent.

5. *The Western States.*—The manufacturing development of the Rocky Mountain group of states has been very marked. In 1850, most of this vast area of fertile lands, so rich in mineral deposits, was quite unused, and census enumerators found there nothing in the way of manufactures proper, although $540,230 was reported as the value of products of the neighborhood industries. During the last half century, the manufacturing operations most closely connected with mining found their way into this section, and the smelting and refining of ores constituted the bulk of the $555,482,428 reported in 1900 as the value of the products of these states, which produced 4.3 per cent of the total value of products of the United States.

6. *The Pacific States.*—The Pacific states have had a growth peculiar to themselves, because of their comparative isolation from the rest of the Union, which forces them to depend largely upon their own resources. When the census of 1850 was taken, gold had just been discovered in California, and the situation there was similar to that above described as existing in the Rocky Mountain states. The entire manufacturing development of the Pacific states has taken place, therefore, in the last fifty years. The total value of products in 1900 ($435,670,399) constituted 3.3 per cent of the value of products for the United States. The industrial conditions in this group of states in 1900, considering the value but not the character of products, was about the same as that of the New England states in 1860, and of the Middle states in 1850. From this point of view, the growth of the Pacific group has been remarkable. The character of its industries is still determined largely by its natural resources of farm, forest, and mine, but the recent wars in the Orient, resulting in the opening of new markets, gave to the industries of this section a great stimulus which had only begun to be felt at the time the Twelfth Census was taken.

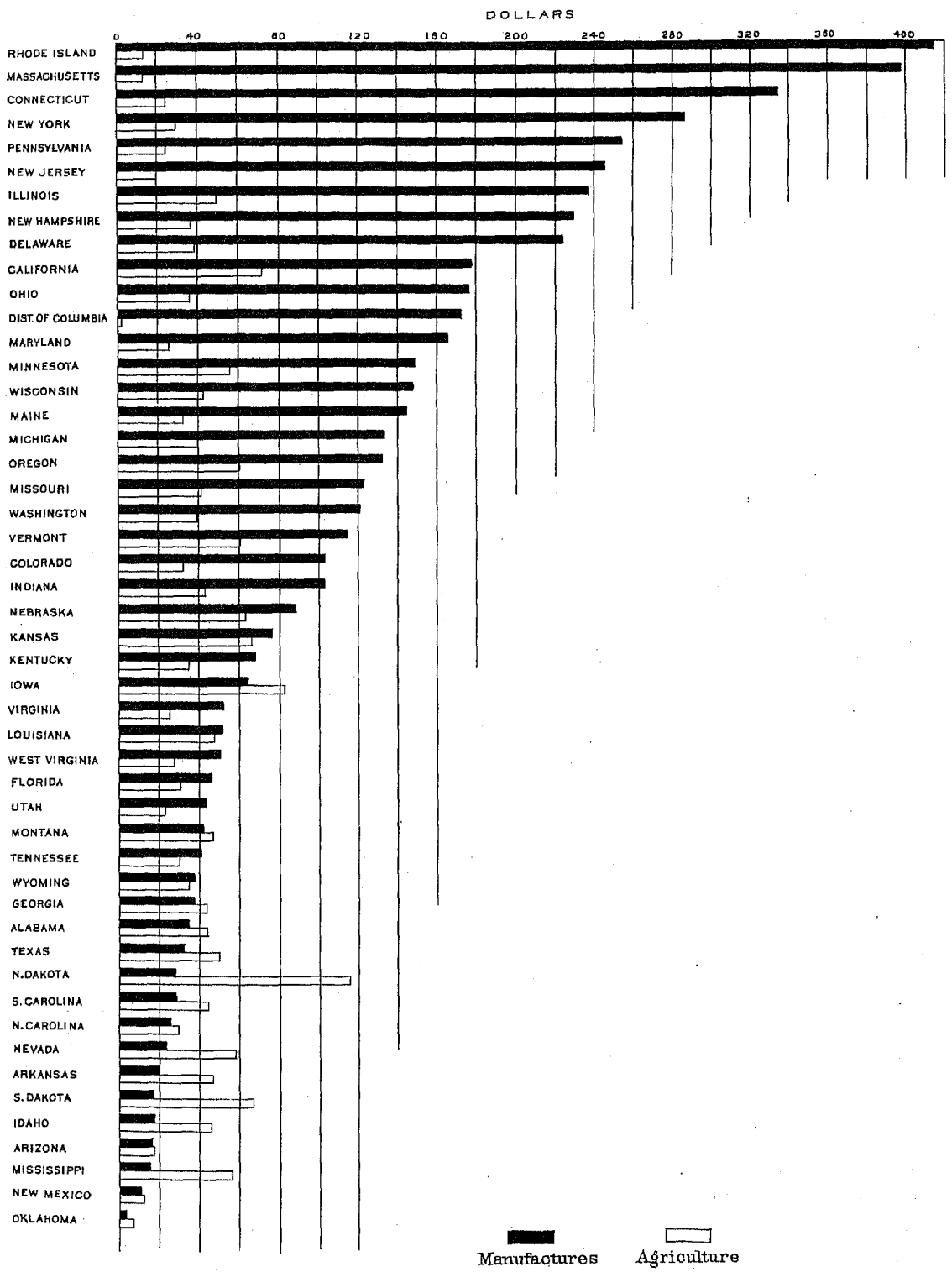
XXXVI.

RELATIVE RANK OF STATES AND TERRITORIES IN POPULATION, AGRICULTURE, AND MANUFACTURES.

In order to present as true a picture as possible of the industrial status of the several states and territories of the Union, another table is given, which shows for the census years 1890 and 1900 the total population of each state and territory; the gross value of its agricultural products, and the gross value of its manufactured products, with its rank in each particular. Another column shows the net value of the manufactured products in each state for 1900, and its rank on this basis also; but this column can not be made comparative, by reason of the different methods of obtaining net value in 1890 and 1900. Additional columns in the same table present the per capita value of the products of agriculture and of manufactures in each state at the two census periods.

Twelfth Census of the United States
William R. Merriam, Director.

PRODUCTS OF MANUFACTURES AND AGRICULTURE PER CAPITA OF THE POPULATION: 1890



PRODUCTS OF MANUFACTURES AND AGRICULTURE PER CAPITA OF THE POPULATION: 1900

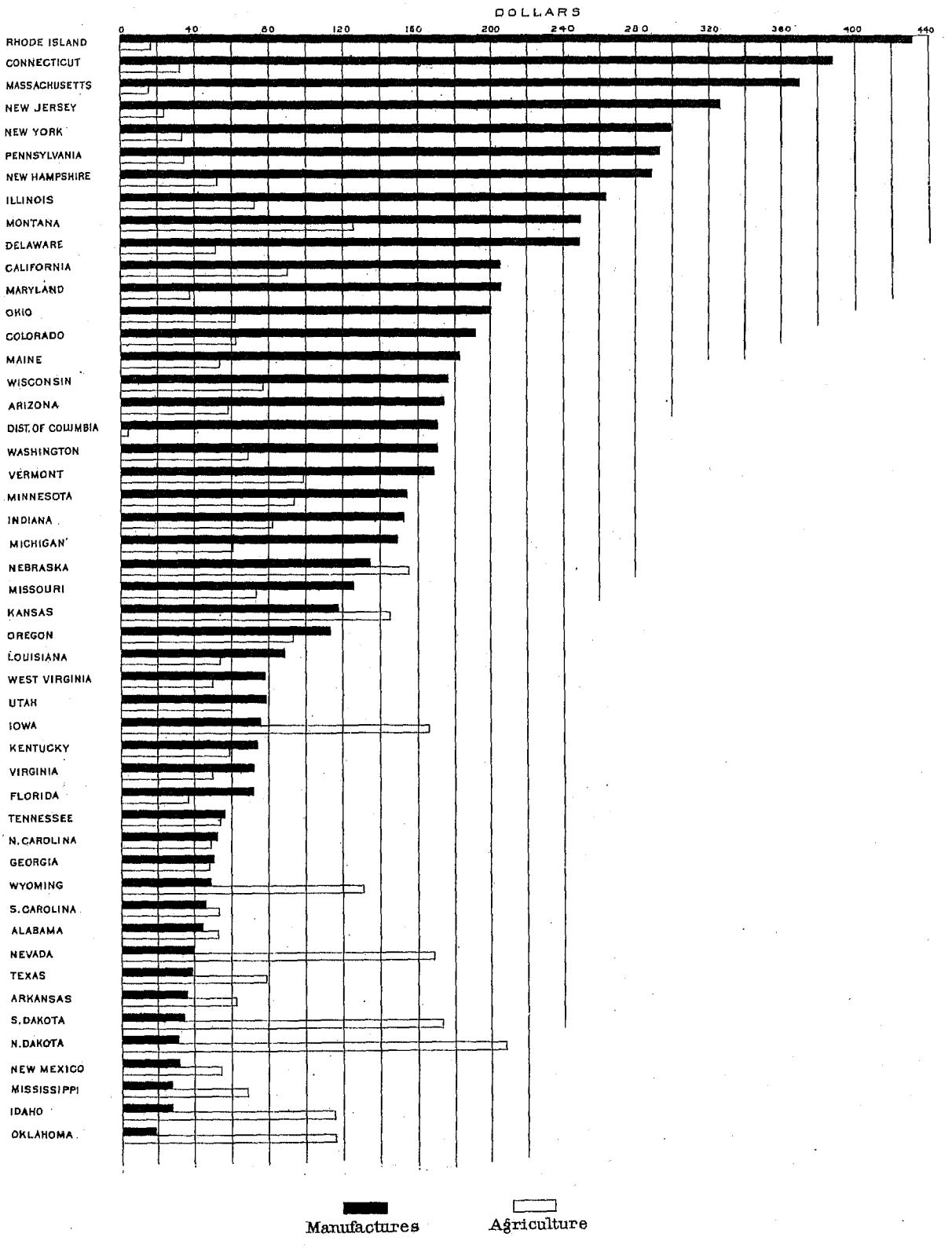


TABLE LXXIII.—RANK OF STATES AND TERRITORIES, IN POPULATION, AGRICULTURE, AND MANUFACTURES: 1890 AND 1900.

STATES.	Year.	Population.	Rank.	Gross value of agricultural products.	Rank.	Gross value of manufactured products.	Rank.	Net value of manufactured products, 1900.	Rank.	Agriculture, per capita, value.	Manufactures, per capita, value.
Alabama	1900	1,828,697	18	$91,387,409	19	$80,741,449	30	$60,949,630	29	$50	$44
	1890	1,513,017	17	66,240,190	17	51,226,605	27			44	34
Arizona	1900	122,931	47	6,997,097	46	21,315,189	41	19,294,742	41	57	173
	1890	59,620	48	1,045,970	47	947,547	48			18	16
Arkansas	1900	1,311,564	25	79,649,490	22	45,197,731	38	28,810,655	37	61	34
	1890	1,128,179	24	53,128,155	21	22,659,179	37			47	20
California	1900	1,482,179	21	131,690,606	14	302,874,761	12	175,425,885	13	89	204
	1890	1,208,130	22	87,033,290	10	213,403,996	12			72	177
Colorado	1900	538,555	31	33,048,576	36	102,830,137	27	84,194,085	22	61	191
	1890	412,198	31	13,136,810	37	42,480,205	28			32	103
Connecticut	1900	908,420	29	28,276,948	38	352,824,106	11	207,934,112	11	31	388
	1890	746,258	29	17,924,810	34	248,336,364	10			24	333
Delaware	1900	184,735	45	9,290,777	45	45,387,630	37	29,378,529	36	50	246
	1890	168,493	42	6,481,590	39	37,571,848	35			38	223
District of Columbia	1900	278,718	41	870,247	49	[1]47,667,622	35	25,540,496	40	3	171
	1890	230,392	39	373,070	49	39,331,437	32			2	171
Florida	1900	528,542	32	18,309,104	40	36,810,243	40	27,831,890	38	35	70
	1890	391,422	32	12,086,330	38	18,222,890	39			31	47
Georgia	1900	2,216,331	11	104,304,476	17	106,654,527	26	78,153,576	24	47	48
	1890	1,837,353	12	83,871,482	12	68,917,020	25			45	38
Idaho	1900	159,147	46	18,051,625	41	4,020,532	48	2,906,144	48	113	25
	1890	84,385	45	3,848,930	43	1,396,096	46			46	17
Illinois	1900	4,821,550	3	345,649,611	2	1,259,730,168	3	840,375,269	3	72	261
	1890	3,826,351	3	184,759,013	1	908,640,280	3			48	237
Indiana	1900	2,516,462	8	204,450,196	9	378,120,140	8	257,976,214	7	81	150
	1890	2,192,404	8	94,759,262	9	226,825,082	11			43	103
Iowa	1900	2,231,468	10	365,411,528	1	164,617,877	17	120,479,720	16	164	74
	1890	1,911,896	10	159,347,844	3	125,049,183	17			83	65
Kansas	1900	1,468,469	22	209,895,542	7	172,129,398	16	136,060,304	15	143	117
	1890	1,427,096	19	95,070,080	8	110,219,805	18			67	77
Kentucky	1900	2,147,174	12	123,266,785	15	154,166,365	18	108,325,261	19	57	72
	1890	1,858,635	11	65,948,485	18	126,719,857	16			35	68
Louisiana	1900	1,381,625	23	72,667,302	23	121,181,683	22	69,785,397	28	53	88
	1890	1,118,587	25	54,343,953	20	57,806,713	26			49	52
Maine	1900	694,466	30	37,113,469	33	127,861,485	21	84,210,956	21	53	183
	1890	661,086	30	22,049,220	28	95,689,500	19			33	145
Maryland	1900	1,188,044	26	43,823,419	29	242,552,990	14	139,056,193	14	37	204
	1890	1,042,390	27	26,443,364	27	171,842,593	14			25	165
Massachusetts	1900	2,805,346	7	42,298,274	31	1,035,198,989	4	657,277,001	4	15	369
	1890	2,238,943	6	28,072,500	26	888,160,403	4			13	397
Michigan	1900	2,420,982	9	146,547,681	13	356,944,082	10	214,559,224	10	61	147
	1890	2,093,889	9	83,651,390	11	277,896,706	8			40	133
Minnesota	1900	1,741,986	19	161,217,304	11	262,655,881	13	190,314,136	12	93	151
	1890	1,301,826	20	71,238,230	14	192,083,478	13			55	148
Mississippi	1900	1,551,270	20	102,492,283	18	40,431,386	39	27,813,332	39	66	26
	1890	1,289,600	21	73,342,995	13	18,705,884	38			57	15
Missouri	1900	3,106,665	5	219,296,970	6	385,492,784	7	256,671,841	8	71	124
	1890	2,679,184	5	109,751,024	7	324,561,993	7			41	121
Montana	1900	231,559	43	28,616,957	37	57,075,824	34	50,159,514	31	124	247
	1890	132,159	44	6,273,415	40	5,507,573	42			47	42
Nebraska	1900	1,066,300	27	162,696,386	10	148,990,102	19	115,278,644	18	153	135
	1890	1,058,910	26	66,887,617	16	93,037,704	20			63	88
Nevada	1900	40,662	49	6,758,337	47	1,643,675	49	1,202,255	49	166	40
	1890	45,761	49	2,705,660	44	1,105,063	47			59	24
New Hampshire	1900	411,588	35	21,929,988	39	118,709,308	24	77,380,702	26	53	288
	1890	376,530	33	13,761,050	35	85,770,549	22			37	228
New Jersey	1900	1,883,669	16	43,657,529	30	611,748,933	6	355,646,950	6	23	325
	1890	1,444,933	18	28,997,349	25	354,573,571	6			20	245
New Mexico	1900	195,310	44	10,155,215	44	5,605,795	46	4,122,500	46	52	29
	1890	153,593	43	1,784,820	46	1,516,195	45			12	10
New York	1900	7,268,110	1	245,270,600	4	2,175,726,900	1	1,325,298,879	1	34	300
	1890	5,997,853	1	161,593,009	2	1,711,577,671	1			27	285
North Carolina	1900	1,893,810	15	89,309,688	20	94,919,663	28	74,575,155	27	47	50
	1890	1,617,947	16	50,070,530	23	40,875,450	31			31	25
North Dakota	1900	312,239	40	64,252,494	26	9,183,114	44	7,313,081	44	206	29
	1890	182,719	41	21,264,938	30	5,028,107	43			116	28
Ohio	1900	4,157,545	4	257,065,826	3	382,488,113	5	523,249,207	5	62	200
	1890	3,672,316	4	133,282,498	4	641,688,064	5			36	175

* [1] Includes governmental establishments.

TABLE LXXIII.—RANK OF STATES AND TERRITORIES, IN POPULATION, AGRICULTURE, AND MANUFACTURES: 1890 AND 1900—Continued.

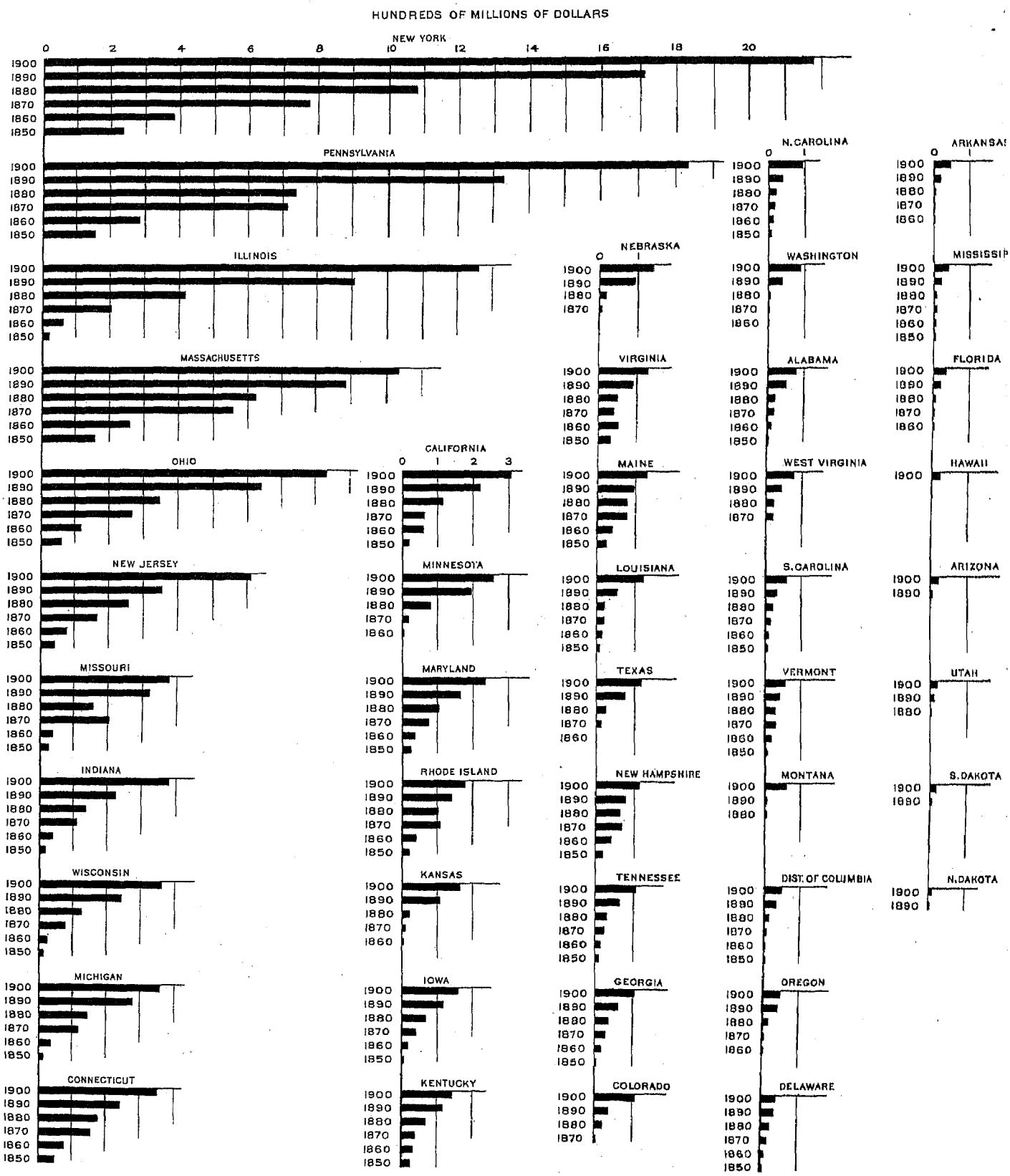
STATES.	Year.	Population.	Rank.	Gross value of agricultural products.	Rank.	Gross value of manufactured products.	Rank.	Net value of manufactured products, 1900.	Rank.	Agriculture, per capita, value.	Manufactures, per capita, value.
Oklahoma	1900	398,331	37	$45,447,744	27	$7,083,938	45	$5,988,291	46	$114	$18
	1890	61,834	46	440,375	48	180,445	49	.....	.....	7	3
Oregon	1900	409,764	36	38,090,969	32	46,000,587	36	30,383,667	35	93	112
	1890	313,767	38	19,026,120	33	41,432,174	30	.....	.....	61	132
Pennsylvania	1900	6,302,034	2	207,895,600	8	1,884,790,860	2	1,104,871,630	2	33	291
	1890	5,258,014	2	121,328,348	5	1,331,794,901	2	.....	.....	23	253
Rhode Island	1900	428,556	34	6,333,864	48	184,674,378	15	118,839,891	17	15	430
	1890	345,506	35	4,218,300	42	142,500,625	15	.....	.....	12	412
South Carolina	1900	1,340,316	24	68,266,912	24	58,748,731	32	48,175,365	32	51	44
	1890	1,151,149	23	51,337,985	22	31,920,681	36	.....	.....	45	28
South Dakota	1900	383,887	38	66,082,419	25	12,231,239	43	10,176,916	43	172	32
	1890	328,808	37	22,047,279	29	5,682,748	41	.....	.....	67	17
Tennessee	1900	2,020,616	14	106,166,440	16	108,144,565	25	77,928,247	25	53	54
	1890	1,767,518	13	55,194,181	19	72,355,286	23	.....	.....	31	41
Texas	1900	3,048,710	6	239,823,244	5	119,414,982	23	83,639,058	23	79	39
	1890	2,235,523	7	111,699,430	6	70,433,551	24	.....	.....	50	32
Utah	1900	274,952	42	16,502,051	42	21,156,183	42	17,128,664	42	60	77
	1890	207,905	40	4,891,460	41	8,911,047	40	.....	.....	24	43
Vermont	1900	343,641	39	33,570,892	35	57,623,815	33	40,760,300	34	98	168
	1890	332,422	36	20,364,980	32	38,340,066	34	.....	.....	61	115
Virginia	1900	1,854,184	17	86,548,545	21	132,172,910	20	96,468,277	20	47	71
	1890	1,655,980	15	42,244,458	24	88,363,824	21	.....	.....	26	53
Washington	1900	511,786	33	34,827,495	34	86,795,051	29	56,430,334	30	68	170
	1890	349,390	34	13,674,930	36	41,768,022	29	.....	.....	39	120
West Virginia	1900	958,800	28	44,768,979	28	74,838,330	31	47,996,315	33	47	78
	1890	762,794	28	20,439,000	31	38,702,125	33	.....	.....	27	51
Wisconsin	1900	2,062,916	13	157,445,713	12	360,818,942	9	245,668,466	9	76	175
	1890	1,686,880	14	70,990,645	15	248,546,164	9	.....	.....	42	147
Wyoming	1900	90,570	48	11,907,415	43	4,301,240	47	2,974,166	47	131	47
	1890	60,705	47	2,241,590	45	2,367,601	44	.....	.....	37	39

The state of Illinois occupies a very striking position in this table. It holds third rank in population, third rank in manufactures, and second rank in agriculture, in which latter respect it has been passed by the state of Iowa since 1890. Its agricultural products were valued at $72 per capita, and its manufactures at $261. New York, although first in population, and first in manufactures, with a per capita product of $300, stands fourth in the value of agricultural products, with a per capita value of products of $34. Pennsylvania is second in population, second in manufactures, and eighth in agriculture. The value of its agricultural products was $33 per capita and of its manufactures, $291. Ohio is fourth in population, fifth in manufactures, and third in agricultural products. The agricultural products were $62, and the manufactures, $200 per capita. Indiana is eighth in population, eighth in manufactures, and ninth in agriculture. The per capita products of its fields and factories were $81 and $150, respectively. These are the states in which agriculture and manufactures have progressed at a pace most nearly equal, although it is true of them all that from census to census, manufactures have gained steadily upon agriculture.

In contrast with the above states, Massachusetts, standing seventh in population, and fourth in manufactures, sinks to thirty-first place in agriculture, the per capita value of its agricultural products being $15, and of its manufactured products, $369. Connecticut stands twenty-ninth in population, eleventh in manufactures, and thirty-eighth in agriculture, the per capita value of its agricultural products being $31, and of its manufactured products, $388. New Jersey stands sixteenth in population, sixth in manufactures, and thirtieth in agriculture, the per capita value of its agricultural products being $23, and of its manufactured products, $325. Rhode Island stands thirty-fourth in population, fifteenth in manufactures, and forty-eighth in agriculture, the per capita value of its agricultural products being $15, and of its manufactured products, $430. Rhode Island produced manufactures of a greater per capita value than those of any other state in the Union. Connecticut stands second in this respect with a per capita product of $388; Massachusetts third, with a per capita product of $369; New Jersey fourth, with a per capita product of $325; New York fifth, with a per capita product of $300; and Pennsylvania sixth, with a per capita product of $291. In these last-named states the increase in the per capita product of manufactures since the census of 1890 has been very striking, as will appear from an examination of the table. Massachusetts is the only one that shows a decrease.

Twelfth Census of the United States
William R. Merriam, Director.

VALUE OF PRODUCTS OF MANUFACTURES BY STATES AND TERRITORIES AT EACH CENSUS: 1850 TO 1900



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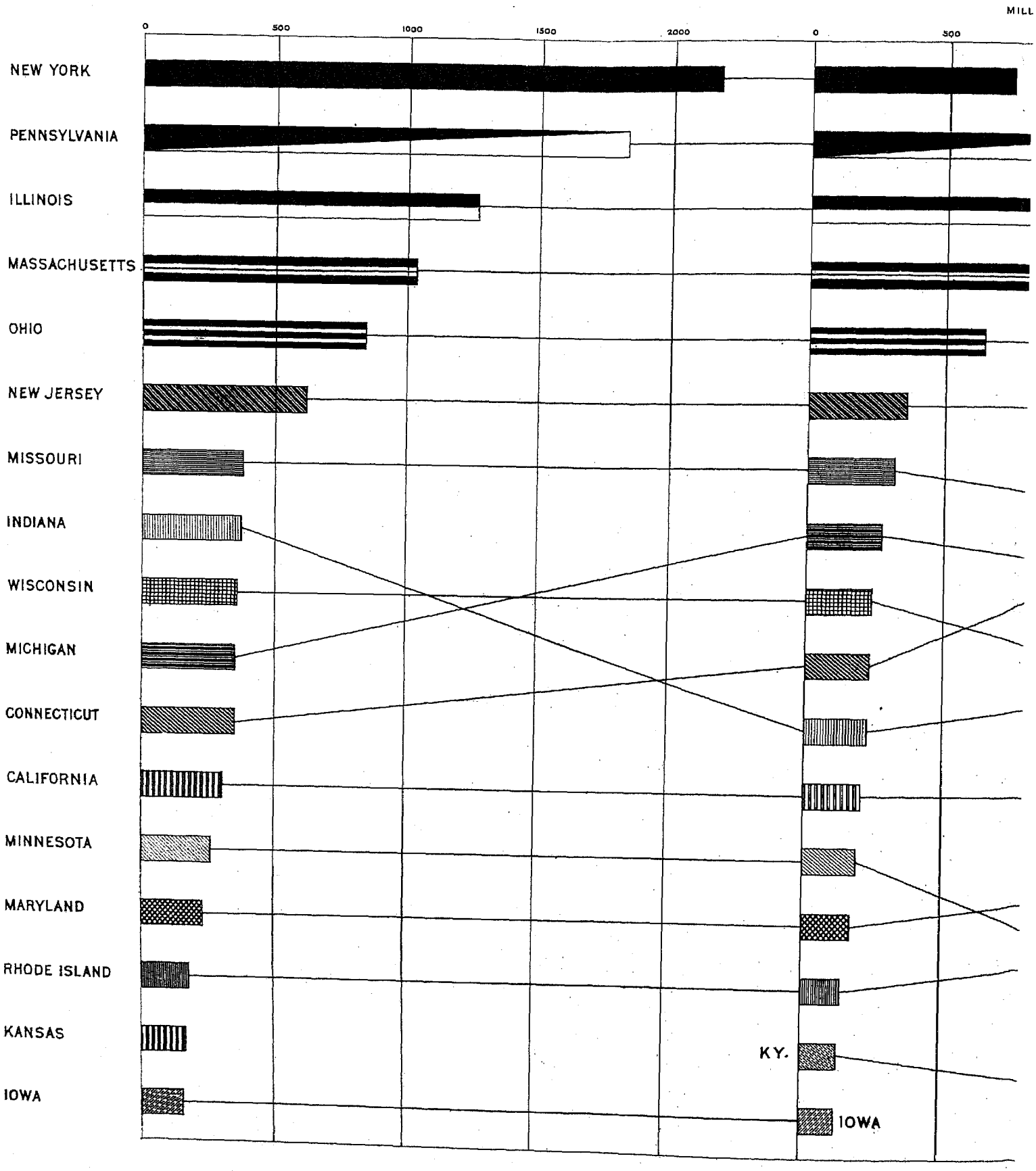
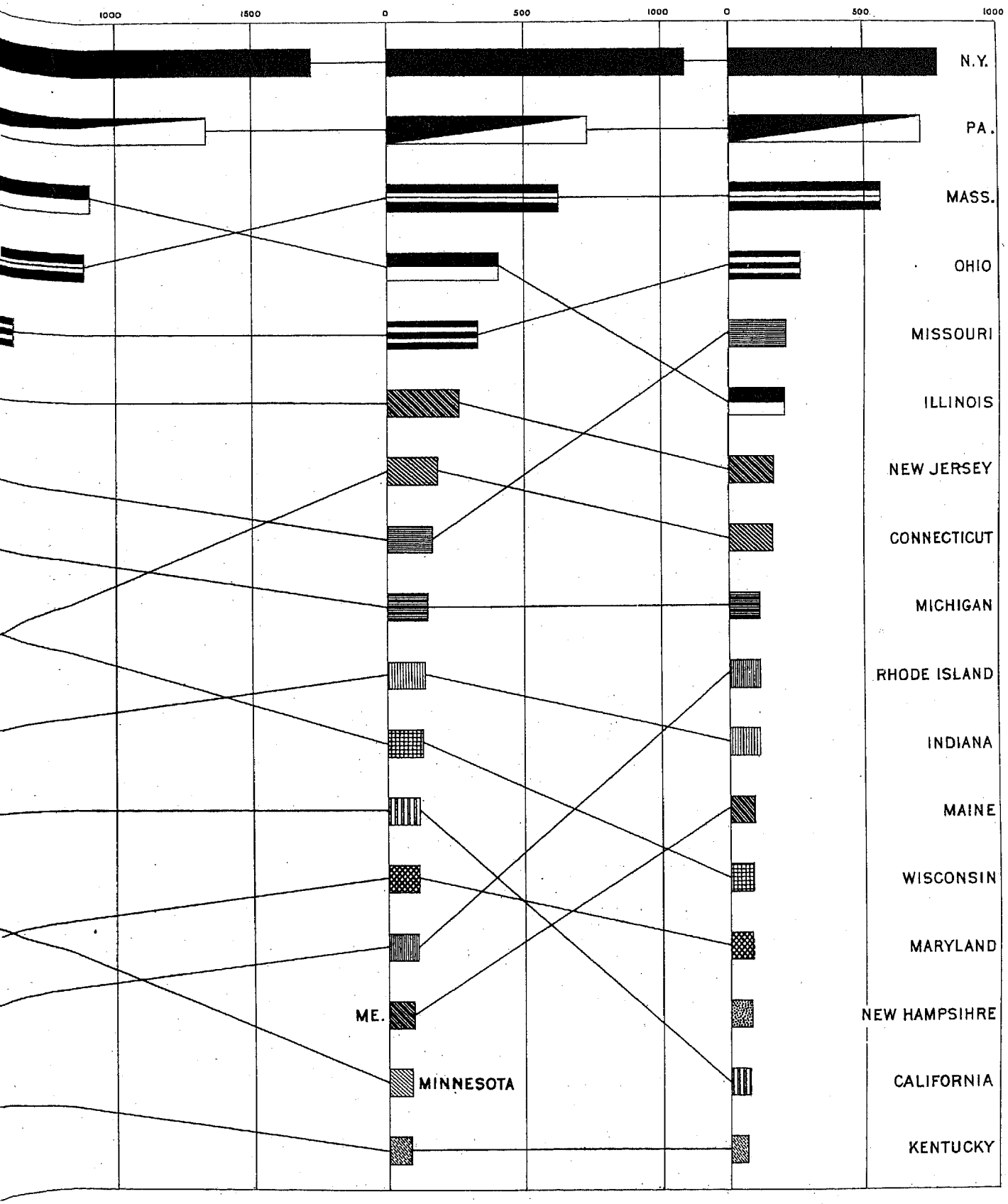
VALUE OF PRODUCTS IN THE SEVENTEE

1900



NTEEN LEADING STATES: 1870 TO 1900



XXXVII.

RANK OF STATES AND TERRITORIES IN MANUFACTURES.

The industrial growth and development of a state are dependent upon several factors, among which are its geographic location, its natural resources, its agriculture, mines, and waterpower, transportation facilities by land and water, proximity to markets and to mineral and agricultural supplies, abundance of capital, and special advantages for particular industries. The territorial extent of a state and the density of its population are often determining factors in its relative rank in manufacturing; this relative rank is therefore of comparatively slight significance. Rhode Island and Connecticut are illustrations of this fact: each produced a larger value of manufactured goods per capita than any other state in the Union, showing the highest degree of manufacturing development, notwithstanding the fact that in total value of products each is surpassed by other and larger states, so that their rank in the latter respect is comparatively low.

New York has stood at the head of the manufacturing states since early in the nineteenth century.

Pennsylvania occupied the third rank in 1840 and 1850, advanced to the second rank in 1860, and has since retained it.

Illinois occupied the sixteenth rank among the states in 1840; advanced to the fifteenth in 1850; to the eighth in 1860; to the sixth in 1870; to the fourth in 1880; and to the third in 1890, a position which it retained in 1900. This is the most notable and rapid advance in position which has occurred in our industrial history.

At the census of 1810, Massachusetts reported the greatest value of products; in 1840 and 1850, it occupied the second rank; fell to the third in 1860, and held it in 1870 and 1880; fell to the fourth in 1890, and continued in the same rank in 1900.

These four states are the only ones which produced in the census year a product exceeding in value $1,000,000,000. The value of their aggregate production was 48.5 per cent of the total for the country.

Ohio was the fourth state in rank in manufacturing at the censuses of 1840, 1850, 1860, and 1870, and fell to the fifth in 1880, where it remained in 1890 and 1900. New Jersey was seventh in 1840; sixth in 1850 and 1860; fell to seventh in 1870; advanced to sixth in 1880; where it remained in 1890 and 1900. These two states stand in a group by themselves, each with a value of products for the census year exceeding $500,000,000, but less than $1,000,000,000. The value of their total production was 11.1 per cent of the total value for the country.

In a third group stand six states, each producing more than $300,000,000, and less than $500,000,000. At the head of this group stands Missouri, which was the nineteenth state in rank in 1840; advanced to tenth in in 1850; fell to eleventh in 1860; advanced to fifth rank in 1870; fell to eighth rank in 1880; advanced to seventh in 1890, and remained there in 1900. Indiana was fourteenth in 1840 and 1850; advanced to tenth in 1860; fell to eleventh in 1870; advanced to tenth in 1880; fell to eleventh in 1890, and advanced to eighth in 1900. Wisconsin was twenty-seventh in 1840; advanced to nineteenth in 1850; to eighteenth in 1860; to thirteenth in 1870; to eleventh in 1880; and in 1890, to ninth, the rank which it still holds. Michigan was twenty-third in 1840; advanced to seventeenth in 1850 and 1860; to ninth in 1870 and 1880; and to the eighth in 1890, falling to tenth in 1900. Connecticut was fifth in 1840, 1850, and 1860; fell to eighth in 1870; advanced to seventh in 1880; fell to tenth in 1890, and to eleventh in 1900. California, which does not appear in the census of 1840, was sixteenth in 1850; advanced to seventh in 1860; fell to sixteenth in 1870; advanced to twelfth in 1880, where it remained in 1890 and 1900. The value of the aggregate production of these six states for the census year was 16.4 per cent of the total for the country.

Minnesota and Maryland were the only two states producing between $200,000,000 and $300,000,000 each in the census year. Minnesota does not appear in the census of 1840; was last in rank in the list of states in 1850; was thirty-second in 1860; advanced to twenty-fifth in 1870; to sixteenth in 1880; to thirteenth in 1890, where it remained in 1900. Maryland was tenth in rank in 1840; advanced to seventh in 1850; fell to twelfth in 1860; and to fourteenth in 1870; advanced to thirteenth in 1880, and fell to fourteenth in 1890, where it remained in 1900.

The data for 1900 given above is summarized in table LXXIV, which also gives the statistics for the remaining states, divided into two groups: Those producing between $100,000,000 and $200,000,000 each and those producing less than $100,000,000 each.

TABLE LXXIV.—*Gross value of products by states and territories, 1900, arranged according to rank.*

[Alaska, Hawaii, and Indian Territory omitted.]

STATES.	Value of products.	Rank.
$1,000,000,000 AND OVER.		
New York	$2,175,726,900	1
Pennsylvania	1,834,790,860	2
Illinois	1,259,780,168	3
Massachusetts	1,035,198,989	4
FROM $500,000,000 TO $1,000,000,000.		
Ohio	$832,438,113	5
New Jersey	611,748,933	6
FROM $300,000,000 TO $500,000,000.		
Missouri	$385,492,784	7
Indiana	378,120,140	8
Wisconsin	360,818,942	9
Michigan	356,944,082	10
Connecticut	352,824,106	11
California	302,874,761	12
FROM $200,000,000 TO $300,000,000.		
Minnesota	$262,655,881	13
Maryland	242,552,990	14
FROM $100,000,000 TO $200,000,000.		
Rhode Island	$184,074,378	15
Kansas	172,129,398	16
Iowa	164,617,877	17
Kentucky	154,166,365	18
Nebraska	143,990,102	19
Virginia	132,172,910	20
Maine	127,361,485	21
Louisiana	121,181,628	22
Texas	119,414,982	23
New Hampshire	118,709,308	24
Tennessee	108,144,665	25
Georgia	106,654,627	26
Colorado	102,880,137	27
LESS THAN $100,000,000.		
North Carolina	$94,919,663	28
Washington	86,795,051	29
Alabama	80,741,449	30
West Virginia	74,838,330	31
South Carolina	58,748,781	32
Vermont	57,623,815	33
Montana	57,075,824	34
District of Columbia	[1]47,667,622	35
Oregon	46,000,587	36
Delaware	45,387,630	37
Arkansas	45,197,731	38
Mississippi	40,431,386	39
Florida	36,810,243	40
Arizona	21,315,189	41
Utah	21,156,183	42
South Dakota	12,231,289	43
North Dakota	9,183,114	44
Oklahoma	7,083,938	45
New Mexico	5,605,795	46
Wyoming	4,801,240	47
Idaho	4,020,532	48
Nevada	1,643,675	49

[1] Includes governmental establishments.

Another summary along the same lines shows the number of states producing a given value of products at the various censuses from 1850 to 1900.

TABLE LXXV.—*Gross product of states and territories, 1850 to 1900.*

CENSUS YEARS.	NUMBER OF STATES AND TERRITORIES WITH A GROSS VALUE OF PRODUCTS OF—					
	Less than $100,000,000.	$100,000,000 to $199,000,000.	$200,000,000 to $299,000,000.	$300,000,000 to $499,000,000.	$500,000,000 to $999,000,000.	Over $1,000,000,000.
1900[1]	22	13	2	6	2	4
1890	31	6	5	2	3	2
1880	33	8	1	2	2	1
1870	36	5	3	.....	3	.....
1860	35	1	2	1	.....	.....
1850	33	2	1	.....	.....	.....

[1] Exclusive of Alaska, Hawaii, and Indian Territory.

XXXVIII.

RANK OF STATES AND TERRITORIES IN SPECIFIED INDUSTRIES.

In Table 3 of each of the state reports (Report on Manufactures, Part II), the leading industries of the state are separately shown. The rule of selection used in determining the leading industries of a state confined the choice to those industries, excluding hand trades, whose value of products formed either a considerable percentage of the value for all manufactures in the state, or a notable proportion of the value of the total production of the industry in the United States.

It thus happens that the number of industries so treated varies widely in the several states. Thus, while on the first basis of selection, jewelry would not be included as a leading industry in New York, yet, because of the second basis, New York contributing a large proportion of the total jewelry production of the country, this industry was included among the leading industries of that state. On the other hand, in certain of the territories and Rocky Mountain states there were single industries which contributed a large percentage of the total value of products of the state or territory, but whose value of products was insignificant compared with the total value of products of the industry in the United States. Such industries were not included as "leading industries." The number of industries so designated varies from one in several states or territories to thirty-six in the great manufacturing state of New York.

A summary of these tables of the several state or territorial reports brings out some extremely interesting facts in regard to industries. This summary is contained in table LXXVI.

TABLE LXXVI.—RANK OF THE STATES AND TERRITORIES.

		Alabama.	Alaska.	Arizona.	Arkansas.	California.	Colorado.	Connecticut.	Delaware.	District of Columbia.	Florida.	Georgia.	Idaho.	Illinois.	Indiana.	Indian Territory.
1	Agricultural implements							1						1	5	
2	Ammunition															
3	Bags, other than paper															
4	Bicycles and tricycles													1		
5	Boot and shoe cut stock															
6	Boots and shoes, factory product													7		
7	Boots and shoes, rubber															
8	Brass and copper, rolled							1								
9	Brass castings and brass finishing							1								
10	Brassware							1								
11	Carpets and rugs, other than rag															
12	Carriage and wagon materials														2	
13	Carriages and wagons							10	32					5	3	
14	Cars and general shop construction and repairs by steam railroad companies.	18		38	26	7	20		36		32	22		2	5	
15	Cars, steam railroad, not including operations of railroad companies.								8					1	4	
16	Cheese, butter, and condensed milk, factory product					11								4		
17	Chemicals															
18	Clay products[1]													5	7	
19	Clocks							1								
20	Clothing, men's, factory product					9								2	11	
21	Clothing, women's, factory product													3		
22	Coffee and spice, roasting and grinding															
23	Coke	2					4									
24	Confectionery															
25	Copper, smelting and refining			4			5									
26	Cordage and twine															
27	Corsets							1								
28	Cotton, ginning	4			3											
29	Cotton goods	11						8				7				
30	Cutlery and edge tools							1								
31	Dyeing and finishing textiles							7								
32	Electrical apparatus and supplies							8						3		
33	Explosives					1										
34	Fertilizers	9							15		18	6				
35	Fish, canning and preserving		4													
36	Flouring and grist mill products	32			29	14	26		40			18	43	5	6	39
37	Food preparations															
38	Foundry and machine shop products	16				13	21	9	23			22		4	10	
39	Fruits and vegetables, canning and preserving					1			9							
40	Fur goods															
41	Fur hats							1								
42	Furnishing goods, men's															
43	Furniture, factory product													2	7	
44	Gas, illuminating and heating															
45	Glass														2	
46	Gloves and mittens															
47	Glucose													1		
48	Gold and silver, reducing and refining, not from the ore															
49	Hardware							1								
50	Hosiery and knit goods							4								
51	Iron and steel	5					13	16	18					3	4	
52	Iron and steel, pipe, wrought															
53	Ironwork, architectural and ornamental															
54	Jewelry															
55	Lead, smelting and refining						1									
56	Leather, tanned, curried, and finished	21				8			6					7		
57	Liquors, distilled													1	2	
58	Liquors, malt					11	17			23				3	9	
59	Liquors, vinous					1										
60	Lithographing and engraving															
61	Lumber and timber products	19	43	38	6	16	35				22	17	36	27	8	
62	Lumber, planing mill products, including sash, doors, and blinds				21	11						13		4	10	
63	Malt															
64	Marble and stone work															
65	Millinery and lace goods															
66	Monuments and tombstones															
67	Musical instruments, pianos and materials													2		
68	Needles and pins							1								
69	Oil, cottonseed and cake	8			6							2				11
70	Oil, linseed															
71	Oysters, canning and preserving															
72	Paints															
73	Paper and wood pulp							10							9	
74	Patent medicines and compounds															
75	Petroleum, refining															

[1] Includes brick and tile, and pottery, terra cotta, and fire-clay products.

IN SPECIFIED INDUSTRIES: 1900.

Iowa.	Kansas.	Kentucky.	Louisiana.	Maine.	Maryland.	Massachusetts.	Michigan.	Minnesota.	Mississippi.	Missouri.	Montana.	Nebraska.	Nevada.	New Hampshire.	New Jersey.	New Mexico.	New York.	North Carolina.	North Dakota.	Ohio.	Oklahoma.	Oregon.	Pennsylvania.	Rhode Island.	South Carolina.	South Dakota.	Tennessee.	Texas.	Utah.	Vermont.	Virginia.	Washington.	West Virginia.	Wisconsin.	Wyoming.	
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13	8	17	29	....	....	....	16	10	29	9	....	24	43	....	....	34	3	27	....	4	....	35	1	....	....	....	21	6	30	....	12	28	23	11	31	14
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13	10	12	....	30	19	....	9	1	42	7	....	20	....	34	....	45	2	17	27	3	28	23	4	....	35	31	11	16	38	33	15	21	25	8	....	34
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19	26	20	28	24	14	5	8	15	....	11	33	....	....	25	6	....	2	....	....	3	....	....	1	12	....	....	18	27	....	30	17	29	31	7	....	36
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26	....	15	10	18	32	28	2	3	13	21	31	....	....	25	....	41	12	14	....	7	....	24	4	....	30	....	9	11	....	29	20	5	23	1	37	58
8	....	....	26	....	15	7	3	14	28	....	....	32	....	....	9	....	1	16	....	5	....	....	2	....	31	....	19	24	....	18	17	29	23	6	....	59
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....	....	....	3	....	....	....	....	4	....	....	....	....	....	....	....	....	....	10	....	....	....	12	....	....	7	....	9	1	....	....	....	....	....	....	....	....	64
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....	....	....	....	3	13	2	8	....	....	....	....	....	....	6	....	....	1	....	....	7	....	....	4	....	....	....	....	....	....	11	....	....	....	5	....	72
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	73
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	3	....	....	4	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	74
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TABLE LXXVI.—RANK OF THE STATES AND TERRITORIES,

		Alabama.	Alaska.	Arizona.	Arkansas.	California.	Colorado.	Connecticut.	Delaware.	District of Columbia.	Florida.	Georgia.	Idaho.	Illinois.	Indiana.	Indian Territory.
76	Plated and britannia ware	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
77	Printing and publishing, book and job	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	.....	.....	2	.....	.....
78	Printing and publishing, newspapers and periodicals	.....	.....	.....	33	7	17	.....	.....	28	43	.....	.....	3	8	.....
79	Rice, cleaning and polishing	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
80	Rubber and elastic goods	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....
81	Saddlery and harness	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
82	Sewing machines and attachments	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
83	Ship and boat building, wood	.....	.....	.....	.....	.....	.....	.....	.....	.....	19	.....	.....	.....	.....	.....
84	Shipbuilding, iron and steel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
85	Shirts	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
86	Silk and silk goods	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....
87	Silverware	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
88	Slaughtering and meat packing, wholesale	.....	.....	.....	.....	13	21	.....	.....	.....	.....	.....	.....	1	4	.....
89	Slaughtering, wholesale, not including meat packing	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	2	.....	.....
90	Soap and candles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....
91	Sugar and molasses, beet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
92	Sugar and molasses, refining	.....	.....	.....	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
93	Tobacco, chewing, smoking, and snuff	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
94	Tobacco, cigars and cigarettes	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....
95	Tobacco, stemming and rehandling	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
96	Turpentine and rosin	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	.....	.....	.....	.....
97	Woolen goods	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....
98	Worsted goods	.....	.....	.....	.....	.....	.....	6	.....	.....	.....	.....	.....	.....	.....	.....
99	Zinc, smelting and refining	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

IN SPECIFIED INDUSTRIES—Continued.

Iowa.	Kansas.	Kentucky.	Louisiana.	Maine.	Maryland.	Massachusetts.	Michigan.	Minnesota.	Mississippi.	Missouri.	Montana.	Nebraska.	Nevada.	New Hampshire.	New Jersey.	New Mexico.	New York.	North Carolina.	North Dakota.	Ohio.	Oklahoma.	Oregon.	Pennsylvania.	Rhode Island.	South Carolina.	South Dakota.	Tennessee.	Texas.	Utah.	Vermont.	Virginia.	Washington.	West Virginia.	Wisconsin.	Wyoming.	
						4				6		22					1			5			3												76
11				21		4		9		6		16					1		38	5	42	28	2			36		14				26		12		77
			1																						2										78
						1									2					4				7												79
																																			80
												16																5								81
															1																					82
				2																		11										6				83
					2																															84
																	1																			85
						5									1		4						2													86
8	2	15			15	7		14		5		3					9			10		25	11	1									12		87
	10																1			3															89
																	1																			90
			2			4											1						3						3							91
		2			6					1					5			3		7			3												92
					10												1			3			2								4					93
		2																													8				94
									4					5	8							16	2	7	6					9	1					95
				3		1									4								3	2												96
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It appears from this table that of the 354 industries recognized by the Census Office, 99 were included as leading industries in one or more of the states. Of these 99 industries the most widely diffused in the greatest number of states were in the order named: Flouring and grist mill products; lumber and timber products; cars and general shop construction and repairs by steam railroad companies; foundry and machine-shop products; planing-mill products; printing and publishing newspapers and periodicals; liquors, malt; iron and steel; leather, tanned, curried, and finished; and slaughtering and meat packing, wholesale. It is interesting to note that of the 99 industries shown in the table, 40 were each considered as a leading industry in a single state only.

The following summary indicates the states which held the first, second, third, fourth, and fifth ranks in the 99 industries which are represented in the table:

New York ranked first among the states in cheese, butter, and condensed milk, factory product; chemicals; clothing, men's, factory product; clothing, women's, factory product; coffee and spice, roasting and grinding; confectionery; electrical apparatus and supplies; fur goods; furnishing goods, men's; furniture, factory product; gas, illuminating and heating; gloves and mittens; hosiery and knit goods; ironwork, architectural and ornamental; liquors, malt; lithographing and engraving; lumber, planing mill products, including sash, doors, and blinds; millinery and lace goods; musical instruments, pianos, and materials; paints; paper and wood pulp; patent medicines and compounds; printing and publishing, book and job; printing and publishing, newspapers and periodicals; shirts; slaughtering, wholesale, not including meat packing; soap and candles; sugar and molasses, refining; and tobacco, cigars and cigarettes; second in boots and shoes, factory product; carpets and rugs, other than rag; carriages and wagons; flouring and grist mill products; and foundry and machine shop products; third in agricultural implements; cars and general shop construction and repairs by steam railroad companies; jewelry; leather, tanned, curried, and finished; and petroleum, refining; and fourth in silk and silk goods.

Pennsylvania ranked first among the states in carpets and rugs, other than rag; cars and general shop construction and repairs by steam railroad companies; coke; foundry and machine shop products; glass; iron and steel; iron and steel, pipe, wrought; leather, tanned, curried, and finished; and petroleum, refining; second in cars, steam railroad, not including operations of railroad companies; chemicals; clothing, women's, factory product; electrical apparatus and supplies; hosiery and knit goods; liquors, malt; lumber, planing mill products, including sash, doors, and blinds; printing and publishing, newspapers and periodicals; silk and silk goods; tobacco, cigars and cigarettes; and woolen goods; third in clothing, men's, factory product; printing and publishing, book and job; sugar and molasses, refining; and worsted goods; fourth in flouring and grist mill products; lumber and timber products; and paper and wood pulp; and fifth in boots and shoes, factory product; cheese, butter, and condensed milk, factory product; and cotton goods.

Massachusetts ranked first among the states in boot and shoe cut stock; boots and shoes, factory product; boots and shoes, rubber; cotton goods; rubber and elastic goods; woolen goods; and worsted goods; second in cordage and twine; dyeing and finishing textiles; jewelry; leather, tanned, curried, and finished; and paper and wood pulp; third in carpets and rugs, other than rag; and hosiery and knit goods; fourth in confectionery; electrical apparatus and supplies; furniture, factory product; printing and publishing, book and job; printing and publishing, newspapers and periodicals; and sugar and molasses, refining; and fifth in foundry and machine shop products; and silk and silk goods.

Illinois ranked first in agricultural implements; bicycles and tricycles; cars, steam railroad, not including operations of railroad companies; glucose; liquors, distilled; and slaughtering and meat packing, wholesale; second in cars and general shop construction and repairs by steam railroad companies; clothing, men's, factory product; furniture, factory product; musical instruments, pianos, and materials; printing and publishing, book and job; slaughtering, wholesale, not including meat packing; and soap and candles; third in clothing, women's, factory product; electrical apparatus and supplies; iron and steel; liquors, malt; and printing and publishing, newspapers and periodicals; fourth in cheese, butter, and condensed milk, factory product; foundry and machine shop products; and lumber, planing mill products, including sash, doors, and blinds; and fifth in carriages and wagons; clay products; and flouring and grist mill products.

Ohio ranked first in carriage and wagon materials; carriages and wagons; and clay products; second in agricultural implements; food preparations; and iron and steel; third in coffee and spices, roasting and grinding; flouring and grist mill products; foundry and machine shop products; liquors, distilled; soap and candles; and tobacco, cigars, and cigarettes; fourth in boots and shoes, factory product; cars and general shop construction and repairs by steam railroad companies; clothing, women's, factory product; glass; petroleum, refining; and rubber and elastic goods; and fifth in clothing, men's, factory product; electrical apparatus and supplies; liquors, malt; lumber, planing mill products, including sash, doors, and blinds; printing and publishing, book and job; and printing and publishing, newspapers and periodicals.

Connecticut ranked first in ammunition; brass and copper, rolled; brass castings and brass finishing; brassware; clocks; corsets; cutlery and edged tools; fur hats; hardware; needles and pins; and plated and britannia ware; second in sewing machines and attachments; third in rubber and elastic goods; and silk and silk goods; and fourth in hosiery and knit goods; and woolen goods.

New Jersey ranked first in dyeing and finishing textiles; sewing machines and attachments; and silk and silk goods; second in petroleum, refining; and rubber and elastic goods; third in chemicals; clay products; and glass; fourth in iron and steel; jewelry; and worsted goods; and fifth in leather, tanned, curried, and finished; and tobacco, chewing, smoking, and snuff.

California ranked first in explosives; fruits and vegetables, canning and preserving; and liquors, vinous; fourth in slaughtering, wholesale, not including meat packing; and fifth in sugar and molasses, refining.

Indiana ranked second in carriage and wagon materials; glass; and liquors, distilled; third in carriages and wagons; fourth in cars, steam railroad, not including operations of railroad companies; iron and steel; and slaughtering and meat packing, wholesale; and fifth in agricultural implements; and cars and general shop construction and repairs by steam railroad companies.

Michigan ranked second in lumber and timber products; third in cars, steam railroad, not including operations of railroad companies; furniture, factory product; and lumber, planing mill products, including sash, doors, and blinds; and fourth in carriages and wagons; and chemicals.

Rhode Island ranked first in jewelry, and in silverware; second in gold and silver, reducing and refining, not from the ore; and worsted goods; third in dyeing and finishing textiles; and fourth in cotton goods.

Maryland ranked first in fertilizers; and in oysters, canning and preserving; and second in fruits and vegetables, canning and preserving; and in shipbuilding, iron and steel.

Wisconsin ranked first in lumber and timber products; second in cheese, butter, and condensed milk, factory product; third in malt; fourth in agricultural implements; leather, tanned, curried, and finished; and liquors, malt; and fifth in paper and wood pulp.

Missouri ranked first in tobacco, chewing, smoking, and snuff; and fifth in cars, steam railroad, not including operations of railroad companies; confectionery; and slaughtering and meat packing, wholesale.

Louisiana ranked first in bags, other than paper; and in rice, cleaning and polishing; second in sugar and molasses, refining; and third in oil, cottonseed and cake.

Virginia ranked first in tobacco, stemming and rehandling; fourth in tobacco, chewing, smoking, and snuff; and fifth in fertilizers.

Minnesota ranked first in flouring and grist mill products; and third in lumber and timber products, and in oil, linseed.

Maine ranked second in fish, canning and preserving; and in ship and boat building, wooden; and third in paper and wood pulp; and woolen goods.

Texas ranked first in cotton, ginning; and oil, cottonseed and cake; and fifth in saddlery and harness.

Kentucky ranked second in tobacco, chewing, smoking, and snuff; and tobacco, stemming and rehandling; and fourth in liquors, distilled.

Kansas ranked second in slaughtering and meat packing, wholesale; and in zinc, smelting and refining.

Alabama ranked second in coke, fourth in cotton, ginning; and fifth in iron and steel.

Iowa ranked third in cheese, butter, and condensed milk, factory product, and fourth in food preparations.

Colorado ranked first in lead, smelting and refining; fourth in coke; and fifth in copper, smelting and refining.

Florida ranked second in turpentine and rosin, and fourth in tobacco, cigars and cigarettes.

New Hampshire ranked third in boots and shoes, factory product; and fifth in woolen goods.

Georgia ranked first in turpentine and rosin; and second in oil, cotton seed and cake.

Montana ranked second in copper, smelting and refining; and in lead, smelting and refining.

South Carolina ranked second in cotton goods; fertilizers; and rice, cleaning and polishing.

Vermont ranked first in monuments and tombstones; and fifth in marble and stone work.

Washington ranked first in fish, canning and preserving; and fifth in lumber and timber products.

North Carolina ranked third in cotton goods; and in tobacco, chewing, smoking, and snuff.

West Virginia ranked third in coke.

Arkansas ranked third in cotton, ginning.

Utah ranked third in sugar and molasses, beet.

Alaska ranked fourth in fish, canning and preserving.

Mississippi ranked second in cotton ginning; and fourth in oil, cottonseed and cake; and in turpentine and rosin.

Arizona ranked fourth in copper, smelting and refining.

Oregon ranked fifth in fish, canning and preserving.

XXXIX.

THE LOCALIZATION OF INDUSTRIES.[1]

The geographic distribution of the 354 industries which are separately shown in 1900 is presented in General Table 4 of this volume. Many of these industries, notably the "neighborhood industries," show a distribution which approximates the distribution of population, while others are localized within one state or even within one city or town. Fifteen of the industries where this localization is conspicuous have been selected for separate treatment in this section.

Four tables are presented here for each industry. These show: 1, localization by states; 2, localization by cities; 3, specialization of states; 4, specialization of cities.

In all cases where it is possible, the statistics for 1890 have been given in addition to the statistics for 1900. A few of the industries shown were not carried on to any great extent in cities which reported a population of 20,000 or over in 1900. In some of these cases statistics for towns have been added, and in other cases statistics for counties substituted.

Accompanying the four tables for each industry is an analysis of the figures and a brief mention of the most patent causes which may be assigned for the localization shown. A fuller discussion of this phase of the subject is given at the close of the chapter.[2]

Caution is needed at several points in interpreting these tables. In the first place, practically all of the statistics given relate solely to the value of products, since this is in most cases the best single index of the relative importance of an industry in several localities. It will be readily seen, however, that even this is a defective unit of measure in so far as the materials used in an industry in one section are more expensive than those used in the same industry in another section. For example, a comparison based on this unit of measure makes a discrimination against Massachusetts as compared with New York state in the jewelry industry, due partly to the more expensive materials used and goods produced in the latter state. The number of wage-earners in this industry in Massachusetts is nearly double the number shown for New York state, but the value of products is about the same. Secondly, the states and cities shown for a given industry are not always the leading states and cities in that industry. Wherever there were but one or two establishments reported for an industry in any state or city, it has been necessary for reasons given on page xxix, to omit separate statistics for the industry in such localities, even though the value of products was considerably greater than that shown for other states or cities which are included in the tables.

Two other industrial phenomena closely allied to the localization of industries are shown by the statistics which follow; namely, the industrial specialization of certain localities, and the migration of industrial centers. It is the purpose of the third and fourth tables given for each industry to indicate the extent to which specialization has gone. These tables show by percentages how largely certain states or cities are given over to single industries.

Where there has been a migration since 1890 of any of the industries shown, the extent of the movement may be observed by comparing the statistics for 1890 and 1900 in each case. This phase of the subject, however, which is really changes in the localization of the industry, is commented upon in this section only in cases where the movement has been very marked.

1. *Agricultural Implements.*—Tables LXXVII to LXXX show the localization of the agricultural-implement industry by states and cities and the specialization of states and cities in this industry.

TABLE LXXVII.—*Agricultural implements: Localization by states, 1890 and 1900.*

STATES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$101,207,428	$81,271,651	100.0	100.0
Illinois	42,033,796	24,609,660	41.5	30.3
Ohio	13,975,268	14,333,258	13.8	17.6
New York	10,537,254	11,680,842	10.4	14.4
Wisconsin	7,886 363	5,015,512	8.0	6.2
Indiana	6,415,081	5,756,131	6.3	7.1
Michigan	6,339,508	3,955,306	6.2	4.8
Pennsylvania	3,198,471	2,682,718	3.1	3.3
All other states	10,821,687	13,238,224	10.7	16.3

TABLE LXXVIII.—*Agricultural implements: Localization by cities, 1890 and 1900.*

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$101,207,428	$81,271,651	100.0	100.0
Chicago, Ill	24,848,649	11,883,976	24.5	14.6
Springfield, Ohio	5,272,636	5,221,008	5.2	6.4
Racine, Wis	3,001,009	1,979,613	3.0	2.4
South Bend, Ind	2,432,083	2,423,442	2.4	3.0
Peoria, Ill	2,372,329	519,611	2.3	0.6
Milwaukee, Wis	2,296,888	596,873	2.3	0.8
Auburn, N. Y	2,338,191	3,615,572	2.3	4.5
Dayton, Ohio	1,281,658	1,352,150	1.3	1.7
All other cities and outside of cities	57,363,985	53,679,406	56.7	66.0

[1] This section was prepared by Frederick S. Hall, Ph. D., of the division of manufactures.

[2] This subject is very fully treated in recent economic literature. See especially "The Location of Industries," by L. A. Ross, in the Quarterly Journal of Economics, April, 1896; "The Evolution of Modern Capitalism," by J. A. Hobson, Chapters II, III, and IV; "Der Grossbetrieb," by G. Schulze-Gävernitz; "The Philosophy of Manufactures," by Andrew Ure, Chapter III; and "The Localization of Industries," by J. J. Menzies, in the Popular Science Monthly, Vol. 36, page 454. A good bibliography is appended to the article on localization of industry in Palgrave's Dictionary of Political Economy.

TABLE LXXIX.—AGRICULTURAL IMPLEMENTS: SPECIALIZATION OF STATES, 1890 AND 1900.

STATES.	VALUE OF PRODUCTS.				PER CENT WHICH AGRICULTURAL IMPLEMENTS FORM OF ALL INDUSTRIES.	
	All industries.		Agricultural implements.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$101,207,428	$81,271,651	0.8	0.9
Illinois	1,259,730,168	908,640,280	42,033,796	24,609,660	3.3	2.7
Wisconsin	360,818,942	248,546,164	7,886,368	5,015,512	2.2	2.0
Michigan	356,944,082	277,896,706	6,339,508	3,955,306	1.8	1.4
Indiana	378,120,140	226,825,082	6,415,081	5,756,181	1.7	2.5
Ohio	832,488,113	641,688,064	13,975,268	14,333,258	1.7	2.2
New York	2,175,726,900	1,711,577,671	10,537,254	11,680,842	0.5	0.7
Pennsylvania	1,834,790,860	1,331,794,901	3,198,471	2,682,718	0.2	0.2
All other states	5,805,880,938	4,025,468,415	10,821,687	13,238,224	0.2	0.3

TABLE LXXX.—AGRICULTURAL IMPLEMENTS: SPECIALIZATION OF CITIES, 1890 AND 1900.

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.				PER CENT WHICH AGRICULTURAL IMPLEMENTS FORM OF ALL INDUSTRIES.	
	All industries.		Agricultural implements.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$101,207,428	$81,271,651	0.8	0.9
Springfield, Ohio	12,777,173	10,760,965	5,272,636	5,221,008	41.3	48.5
Racine, Wis.	12,502,796	8,462,359	3,001,009	1,979,613	24.0	23.4
Auburn, N. Y.	10,591,109	9,634,785	2,338,191	3,615,572	22.1	37.5
South Bend, Ind.	14,236,331	9,812,513	2,432,083	2,423,442	17.1	24.7
Peoria, Ill.	48,871,596	55,535,023	2,372,329	519,611	4.9	0.9
Dayton, Ohio	35,697,695	22,446,572	1,281,658	1,352,150	3.6	6.0
Chicago, Ill.	888,945,311	664,567,923	24,848,049	11,883,976	2.8	1.8
Milwaukee, Wis.	123,786,449	97,503,951	2,296,888	596,873	1.9	0.6
All other cities and outside of cities	11,856,991,688	8,493,713,192	57,368,985	53,679,406	0.5	0.6

Table LXXVII shows a decided localization of this industry in the states of Illinois, Ohio, and New York. The value of the agricultural implements manufactured in these 3 states in 1900 constituted 65.7 per cent of the total for the United States. Illinois easily led all other states with 41.5 per cent of the total.

A feature of the development of the industry during the last ten years has been its remarkable increase in Illinois and its decline in New York and Ohio. The manufacture is forced to establish itself near its chief market on account of the high freight rates charged on its products, occupying, as so many of them do, a large amount of car space. The industry has therefore localized near the center of agriculture and especially of the grain-producing section of the country, and has moved westward from decade to decade, as grain production has gravitated in that direction. All the leading states, except New York, are further favored by the fact that they contain, or are in close proximity to, the largest body of hard-wood timber in North America. These states are also favorably located with reference to their supply of iron, the other important material used.

Table LXXVIII shows the localization of the industry by cities. The development of the manufacture in Chicago during the last decade is the most striking feature brought out by this table, the value of its agricultural implement products having more than doubled. The value of these products made in Chicago in 1900 was nearly one-quarter of the total for the United States. The preëminence of this city in the industry is due to the causes mentioned above, and especially to the excellent transportation facilities which have made Chicago the great distributing point of the middle West. Springfield, Ohio, is the other great center for this industry, the value of its products being 5.2 per cent of the total for the United States. In 1880 the value of its manufacture of agricultural implements was double that reported for Chicago, but the industry has not progressed there since that date.

Tables LXXIX and LXXX show the value of agricultural implements manufactured in each of the above states and cities in comparison with the value of products in all industries.

The specialization of particular localities in this industry is striking in a number of cities, notably Springfield, Ohio; Racine, Wis.; Auburn, N. Y.; and South Bend, Ind.

2. *Boots and Shoes, Factory Product.*—Tables LXXXI to LXXXIV show the localization of the boot and shoe industry, by states and cities, and the specialization of states and cities in this industry.

TABLE LXXXI.—*Boots and shoes: Localization by states, 1890 and 1900.*

STATES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$261,028,580	$220,649,358	100.0	100.0
Massachusetts	117,115,243	116,387,900	44.9	52.7
New York	25,585,631	23,661,204	9.8	10.7
New Hampshire	23,405,558	11,986,003	9.0	5.4
Ohio	17,920,854	8,489,728	6.9	3.9
Pennsylvania	13,235,933	10,354,850	5.1	4.7
Maine	12,295,847	10,335,342	4.7	4.7
Illinois	11,434,842	8,756,824	4.4	4.0
Missouri	11,253,202	4,841,004	4.1	2.2
All other states	28,781,470	25,836,503	11.1	11.7

Table LXXXI indicates a marked localization of the factory manufacture of boots and shoes in Massachusetts, New Hampshire, and Maine, these three states contributing more than half of the total value of products reported for the United States. The relative position of this group of states is, however, somewhat lower than in 1890.

TABLE LXXXII.—*Boots and shoes: Localization by cities, 1890 and 1900.*

[Cities of 20,000 population and over.]

CITIES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$261,028,580	$220,649,358	100.0	100.0
Brockton, Mass	19,844,397	16,171,624	7.6	7.3
Lynn, Mass	16,830,733	20,190,695	6.4	9.2
Haverhill, Mass	15,231,440	16,137,352	5.8	7.3
Cincinnati, Ohio	8,788,424	6,024,454	3.4	2.7
St. Louis, Mo	8,286,156	4,250,960	3.2	1.9
Rochester, N. Y	6,933,111	6,489,382	2.6	3.0
Philadelphia, Pa	5,931,045	6,851,834	2.3	3.1
Brooklyn borough, N. Y	5,733,432	2,489,885	2.2	1.1
Chicago, Ill	5,723,126	7,257,034	2.2	3.3
Manchester, N. H	4,052,204	(1)	1.6	.....
Boston, Mass	3,882,655	1,508,697	1.5	0.7
Columbus, Ohio	3,505,126	359,000	1.4	0.2
Manhattan and Bronx boroughs, N. Y	3,391,063	5,306,411	1.3	2.4
Salem, Mass	2,974,631	1,178,724	1.1	0.5
North Adams, Mass	2,881,474	(2)	1.1	.....
All other cities and outside of cities	147,039,563	126,433,306	56.3	57.3

[1] Not reported separately.
[2] Under 20,000 population in 1890.

TABLE LXXXIII.—BOOTS AND SHOES: SPECIALIZATION OF STATES, 1890 AND 1900.

STATES.	VALUE OF PRODUCTS.				PER CENT WHICH BOOTS AND SHOES FORM OF ALL INDUSTRIES.	
	All industries.		Boots and shoes, factory product.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$261,028,580	$220,649,358	2.0	2.4
New Hampshire	118,709,308	85,770,549	23,405,558	11,986,003	19.7	14.0
Massachusetts	1,035,198,989	888,160,403	117,115,243	116,387,900	11.3	13.1
Maine	127,361,485	95,689,500	12,295,847	10,335,342	9.7	10.8
Missouri	385,492,784	324,561,993	11,253,202	4,841,004	2.9	1.5
Ohio	832,488,113	641,688,064	17,920,854	8,489,728	2.2	1.3
New York	2,175,726,900	1,711,577,671	25,585,631	23,661,204	1.2	1.4
Illinois	1,259,730,168	908,640,280	11,434,842	8,756,824	0.9	1.0
Pennsylvania	1,834,790,860	1,331,794,901	13,235,933	10,354,850	0.7	0.8
All other states	5,234,951,536	3,384,553,922	28,781,470	25,836,503	0.5	0.8

TABLE LXXXIV.—BOOTS AND SHOES: SPECIALIZATION OF CITIES, 1890 AND 1900.

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.				PER CENT WHICH BOOTS AND SHOES FORM OF ALL INDUSTRIES.	
	All industries.		Boots and shoes, factory product.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$261,028,580	$220,649,358	2.0	2.4
Brockton, Mass	26,384,881	21,070,099	19,844,397	16,171,624	75.2	76.8
Haverhill, Mass	24,937,073	25,394,530	15,231,440	16,137,352	61.1	63.5
Lynn, Mass	41,633,845	44,223,845	16,830,733	20,190,695	40.4	45.7
North Adams, Mass	11,682,663	(1)	2,881,474	(1)	24.7	.....
Salem, Mass	12,257,449	8,522,751	2,974,631	1,178,724	23.5	13.8
Manchester, N. H	26,607,600	20,187,295	4,052,204	(1)	15.2	.....
Rochester, N. Y	69,129,820	65,091,156	6,933,111	6,489,382	10.0	10.0
Columbus, Ohio	39,666,848	22,887,586	3,505,126	359,000	8.8	1.6
Cincinnati, Ohio	157,806,834	196,063,983	8,788,424	6,024,454	5.6	3.1
St. Louis, Mo	233,629,733	229,157,343	8,286,156	4,250,960	3.5	1.9
Boston, Mass	206,081,767	210,936,616	3,882,655	1,508,697	1.9	0.7
Brooklyn borough, N. Y	342,127,124	269,244,147	5,733,432	2,489,885	1.7	0.9
Philadelphia, Pa	603,466,526	577,234,446	5,931,045	6,851,834	1.0	1.2
Chicago, Ill	888,945,311	664,567,923	5,723,126	7,257,034	0.6	1.1
Manhattan and Bronx boroughs, N. Y	975,168,202	777,222,721	3,391,063	5,306,411	0.3	0.7
All other cities and outside of cities	9,344,874,467	6,240,632,842	147,039,563	126,433,306	1.6	2.0

[1] Not reported separately.

The industry in the United States had its origin in Massachusetts during the early colonial days, and its greatest development has also been there. Of the total value of products reported for the industries in the United States in 1900, Massachusetts contributed 44.9 per cent, or four times the value of products reported for any other state. In its inception the industry was stimulated in this state by a large local production of leather. This advantage has been lost in recent years through the migration of a part of the leather industry to other states, but the boot and shoe industry still persists, largely because of the momentum acquired during the early years of its history.

Table LXXXII shows the localization of the industry by cities, and indicates that the manufacture is not strictly confined to the larger cities, 41.8 per cent of the total value of products for the United States in 1900 being reported from places with less than 20,000 population. These factory towns in New England are, however, almost all in those sections of Massachusetts, New Hampshire, and Maine, which include or are adjacent to Brockton, Lynn, and Haverhill, Mass., the three great centers of the industry. The value of the boot and shoe products of these cities in 1900 constituted nearly one-fifth of the total reported for the United States. A refinement in the localization of the industry in these three cities is indicated by the fact that Brockton is almost entirely devoted to the manufacture of men's shoes, Lynn to the manufacture of ladies' shoes, and Haverhill to the manufacture of ladies', misses', and children's shoes and slippers.

Tables LXXXIII and LXXXIV show the value of boots and shoes manufactured in each of the above states and cities in comparison with the value of products in all industries. Specialization in this industry naturally appears most marked in Brockton, where the value of boots and shoes manufactured constituted 75.2 per cent of the value of all products; in Haverhill, 61.1 per cent; and in Lynn, 40.4 per cent. North Adams and Salem, Mass., follow, with much larger percentages than are shown for the cities in other states.

3. *Collars and Cuffs.*—Tables LXXXV to LXXXVIII show the localization of the collar and cuff industry by states and cities, and the specialization of states and cities in this industry.

TABLE LXXXV.—*Collars and Cuffs: Localization by states, 1900.*

STATES.	Value of products.	Per cent of total.
United States	$15,769,132	100.0
New York	15,703,541	99.6
All other states	65,591	0.4

TABLE LXXXVI.—*Collars and Cuffs: Localization by cities, 1900.*

[Cities of 20,000 population or over.]

CITIES.	Value of products.	Per cent of total.
United States	$15,769,132	100.0
Troy	13,460,196	85.3
Glens Falls[1]	720,982	4.6
Albany	602,808	3.8
New York	297,415	1.9
All other cities and outside of cities	687,731	4.4

[1] Under 20,000 population.

TABLE LXXXVII.—*Collars and cuffs: Specialization of states, 1900.*

STATES.	VALUE OF PRODUCTS.		Per cent which collars and cuffs form of all industries.
	All industries.	Collars and cuffs.	
United States	$13,004,400,143	$15,769,132	0.1
New York	2,175,726,900	15,703,541	0.7
All other states	10,828,673,243	65,591	(1)

[1] Less than one-tenth of 1 per cent.

TABLE LXXXVIII.—*Collars and cuffs: Specialization of cities, 1900.*

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.		Per cent which collars and cuffs form of all industries.
	All industries.	Collars and cuffs.	
United States	$13,004,400,143	$15,769,132	0.1
Troy	28,209,259	13,460,196	47.7
Glens Falls[1]	4,571,253	720,982	15.8
Albany	24,992,021	602,808	2.4
New York	1,371,358,468	297,415	(2)
All other cities and outside of cities	11,575,269,142	687,781	(2)

[1] Under 20,000 population. [2] Less than one-tenth of 1 per cent.

Table LXXXV shows the very marked localization of the collar and cuff manufacture in the state of New York, the value of this class of goods produced in the state being 99.6 per cent of the total reported for the United States.

Table LXXXVI shows the localization of the industry in the cities of the country, all the cities shown being in New York state. Troy is the great center of the industry, its value of products constituting 85.3 per cent of the total reported for the United States. The chief cause of this very marked localization seems to have been the early start of the industry at Troy, and the consequent development there of a class of operatives skilled in the manual operations which are an important feature of the manufacture. It is claimed that the first detached collars and cuffs ever made were the handiwork of the wife of a Troy blacksmith. The date of the invention is not known, but

the beginning of the manufacture of detached collars and cuffs as a regular industry was made by a Methodist minister in that city nearly three-quarters of a century ago.

Tables LXXXVII and LXXXVIII show the value of collars and cuffs manufactured in each of the above states and cities in comparison with the value of products in all industries. Nearly half of the value of all products manufactured in Troy and 15.8 per cent in Glens Falls is represented by the value of collars and cuffs.

4. *Cotton Goods, Including Cotton Small Wares.*—Tables LXXXIX to XCII show the localization of the cotton industry by states and cities, and the specialization of states and cities in this industry.

TABLE LXXXIX.—*Cotton goods: Localization by states, 1890 and 1900.*

STATES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$339,200,320	$267,981,724	100.0	100.0
Massachusetts	111,125,175	100,202,882	32.8	37.4
South Carolina	29,723,919	9,800,798	8.8	3.7
North Carolina	28,372,798	9,563,443	8.4	3.6
Rhode Island	26,435,675	27,310,499	7.8	10.2
Pennsylvania	25,447,697	18,431,773	7.5	6.9
New Hampshire	22,998,249	21,958,002	6.8	8.2
Georgia	18,457,645	12,035,629	5.4	4.5
Connecticut	15,489,442	15,409,476	4.5	5.7
Maine	14,631,086	15,316,909	4.3	5.7
New York	10,788,003	9,777,295	3.2	3.6
All other states	35,730,631	28,175,018	10.5	10.5

TABLE XC.—*Cotton goods: Localization by cities, 1890 and 1900.*

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$339,200,320	$267,981,724	100.0	100.0
Fall River, Mass.	29,286,526	24,925,764	8.6	9.3
Philadelphia, Pa.	17,620,298	11,514,601	5.2	4.3
Lowell, Mass.	17,046,070	19,789,111	5.0	7.4
New Bedford, Mass.	16,748,783	8,185,286	4.9	3.1
Manchester, N. H.	11,723,508	10,957,219	3.4	4.1
Lawrence, Mass.	8,151,194	6,046,914	2.4	2.3
Pawtucket, R. I.	5,635,455	3,954,960	1.7	1.5
Lewiston, Me.	4,638,115	5,013,337	1.4	1.9
Taunton, Mass.	4,593,466	2,747,816	1.4	1.0
Warwick, R. I.[1]	4,413,357	(2)	1.3	.....
Holyoke, Mass.	3,764,848	4,392,722	1.1	1.6
Augusta, Ga.	3,429,348	3,979,042	1.0	1.4
All other cities and outside of cities.	212,149,352	166,474,952	62.6	62.1

[1] Under 20,000 population. [2] Not reported separately.

Table LXXXIX shows the decided localization of the cotton manufacture in New England, the value of cotton goods produced in Massachusetts, Rhode Island, New Hampshire, Connecticut, and Maine constituting more than half of the total reported for the United States.

The industry was first established in New England, and was favored there in its inception by the climate, cotton spinning requiring a moist atmosphere, and by abundant waterpower. Each of these advantages has become of less importance in recent years, artificial moisture being now preferred to natural humidity, and steam taking the place of water for the purpose of power. Nevertheless, of the total power used in cotton manufacturing in these states in 1900, waterpower constituted 32.6 per cent. Massachusetts led all other states in 1900, as it has done steadily from the start. The proportion of the total value of products manufactured in this state has declined, however, during the last twenty years, from 37.6 per cent in 1880 to 32.8 per cent in 1900. The striking change in the localization of the industry during the last twenty years is its rapid advance in the Southern states, especially in South Carolina, North Carolina, and Georgia. The value of cotton products in these three states constituted 6.2 per cent of the total in 1880, 11.7 per cent in 1890, and 22.6 per cent in 1900. The industry is favored in this section by the accessibility of raw material, the abundant waterpower, and the low cost of living. In 1900 waterpower constituted 34.8 per cent of the total power used in the cotton industry in South Carolina, North Carolina, and Georgia.

Table XC indicates the localization of the manufacture in the New England cities. Three of these cities have extensive waterpower facilities, Lowell and Lawrence, Mass., and Manchester, N. H.—where 49, 36, and 50.4 per cent, respectively, of the total power used in the industry in 1900 was furnished by water, while in Fall River waterpower was once a very important factor.

The distribution by cities shows, however, but a small part of the industry, nearly half of the total value of products in 1900 being reported for localities having a population of less than 20,000. Most of these manufacturing towns are, however, located in the vicinity of the cities specified in Table 14; namely, in the extreme southwestern part of Maine, in southeastern New Hampshire, in the eastern parts of Massachusetts and Connecticut, and scattered through Rhode Island.

TABLE XCI.—COTTON GOODS: SPECIALIZATION OF STATES, 1890 AND 1900.

STATES.	VALUE OF PRODUCTS.				PER CENT WHICH COTTON GOODS, INCLUDING COTTON SMALL WARES, FORM OF ALL INDUSTRIES.	
	All industries.		Cotton goods, including cotton small wares.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$339,200,320	$267,981,724	2.6	2.9
South Carolina	58,748,731	31,926,681	29,728,919	9,800,798	50.6	30.7
North Carolina	94,919,663	40,375,450	28,372,798	9,563,443	29.9	23.7
New Hampshire	118,709,308	85,770,549	22,998,249	21,958,002	19.4	25.6
Georgia	106,654,527	68,917,020	18,457,945	12,035,629	17.3	17.5
Rhode Island	184,074,378	142,500,625	26,435,675	27,310,499	14.4	19.2
Maine	127,361,485	95,689,500	14,631,086	15,316,909	11.5	16.0
Massachusetts	1,035,198,989	888,160,403	111,125,175	100,202,882	10.7	11.3
Connecticut	352,824,106	248,336,364	15,489,442	15,409,476	4.4	6.2
Pennsylvania	1,834,790,860	1,331,794,901	25,447,697	18,431,773	1.4	1.4
New York	2,175,726,900	1,711,577,671	10,788,003	9,777,295	0.5	0.6
All other states	6,915,391,196	4,727,388,119	35,730,631	28,175,018	0.5	0.6

TABLE XCII.—COTTON GOODS: SPECIALIZATION OF CITIES, 1890 AND 1900.

[Cities of 20,00 population or over.]

CITIES.	VALUE OF PRODUCTS.				PER CENT WHICH COTTON GOODS, INCLUDING COTTON SMALL WARES, FORM OF ALL INDUSTRIES.	
	All industries.		Cotton goods, including cotton small wares.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$339,200,320	$267,981,724	2.6	2.9
Warwick, R. I.[1]	6,197,506	(2)	4,413,357	(2)	71.2	.....
Fall River, Mass	43,071,530	32,519,281	29,286,526	24,925,764	68.0	76.6
New Bedford, Mass	25,681,671	17,025,779	16,748,783	8,185,286	65.2	48.1
Lewiston, Me	8,581,354	9,073,856	4,638,115	5,013,337	54.0	55.2
Manchester, N. H	26,607,600	20,187,295	11,728,508	10,957,219	44.0	54.3
Lowell, Mass	44,774,525	42,450,509	17,046,070	19,789,111	38.1	46.6
Taunton, Mass	12,594,814	9,936,829	4,593,466	2,747,816	36.5	27.7
Augusta, Ga	10,041,900	9,244,850	3,429,348	3,979,042	34.1	43.0
Pawtucket, R. I	24,080,328	16,303,729	5,635,455	3,954,960	23.4	24.3
Lawrence, Mass	44,703,278	26,550,725	8,151,194	6,046,914	18.2	22.8
Holyoke, Mass	26,283,964	26,060,315	3,764,848	4,392,722	14.3	16.9
Philadelphia, Pa	603,466,526	577,234,446	17,620,298	11,514,601	2.9	2.0
All other cities and outside of cities	12,128,315,147	8,585,849,669	212,149,352	166,474,952	1.7	1.9

[1] Under 20,000 population.

[2] Not reported separately.

Tables XCI and XCII show the value of cotton goods manufactured in each of the above states and cities in comparison with the value of products in all industries. These tables indicate that the town of Warwick, R. I., was the most specialized center in the cotton industry in 1900, the value of its cotton goods constituting 71.2 per cent of the value of all products manufactured in the town. In Fall River, Mass., this percentage was 68; in New Bedford, Mass., 65.2; and in Lewiston, Me., 54.

5. Fur Hats.—Tables XCIII to XCVI show the localization of the fur hat industry by states and cities and the specialization of states and cities in this industry.

TABLE XCIII.—*Fur hats: Localization by states, 1900.*

STATES.	Value of products.	Per cent of total.
United States	$27,811,187	100.0
Connecticut	7,546,882	27.2
New Jersey	7,211,229	25.9
New York	5,602,458	20.0
Pennsylvania	4,243,352	15.3
Massachusetts	2,630,964	9.5
All other states	576,302	2.1

TABLE XCIV.—*Fur hats: Localization by cities, 1900.*

[Cities of 20,000 population or over.]

CITIES.	Value of products.	Per cent of total.
United States	$27,811,187	100.0
Danbury, Conn[1]	5,007,095	18.0
Newark, N. J	3,453,619	12.4
Philadelphia, Pa	3,075,470	11.1
Orange, N. J	2,496,494	9.0
New York, N. Y	2,241,347	8.1
Norwalk, Conn[1]	1,237,272	4.4
Reading, Pa	1,133,688	4.1
Bethel, Conn[1]	979,629	3.5
All other cities and outside of cities	8,186,573	29.4

[1] Under 20,000 population.

TABLE XCV.—*Fur hats: Specialization of states, 1900.*

STATES.	VALUE OF PRODUCTS.		Per cent which fur hats form of all industries.
	All industries.	Fur hats.	
United States	$13,004,400,143	$27,811,187	0.2
Connecticut	352,824,106	7,546,882	2.1
New Jersey	611,748,933	7,211,229	1.2
New York	2,175,726,900	5,602,458	0.3
Massachusetts	1,035,198,989	2,630,964	0.3
Pennsylvania	1,834,790,860	4,243,352	0.2
All other states	6,994,110,355	576,302	.....

TABLE XCVI.—*Fur hats: Specialization of cities, 1900.*

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.		Per cent which fur hats form of all industries.
	All industries.	Fur hats.	
United States	$13,004,400,143	$27,811,187	0.2
Bethel, Conn.[1]	1,229,651	979,629	79.7
Danbury, Conn.[1]	7,213,555	5,007,095	69.4
Orange, N. J.	4,694,335	2,496,494	53.7
Norwalk, Conn.[1]	5,097,720	1,237,272	24.3
Reading, Pa.	36,902,511	1,133,688	3.1
Newark, N. J.	126,954,049	3,453,619	2.7
Philadelphia, Pa.	603,466,526	3,075,470	0.5
New York, N. Y.	1,371,358,468	2,241,347	0.2
All other cities and outside of cities.	10,847,483,328	8,186,573	0.8

[1] Under 20,000 population.

Table XCIII indicates a decided localization of the fur hat industry in the five Eastern states shown in the table, and especially in the three states, Connecticut, New Jersey, and New York, which together contributed almost three-fourths of the total value of the fur hat products reported for the United States in 1900. Connecticut led all other states in 1900 with 27.2 per cent of the total value of products, closely followed by New Jersey with 25.9 per cent of the total.

Table XCIV shows the localization of the industry by cities and towns. This table indicates that Danbury, Conn., is the greatest fur hat center in the country. Its value of products in 1900 formed 18 per cent of the total reported for the United States. The importance of the industry at this point is due chiefly to the fact that it was established there as early as 1780. Newark, N. J., where the industry was also established at an early date, ranked second in 1900 with 12.4 per cent of the total value of products, while Philadelphia, Pa., Orange, N. J., and New York city followed with 11.1, 9, and 8.1 per cent, respectively.

Tables XCV and XCVI show the value of fur hats manufactured in each of the above states and cities in comparison with the value of products in all industries.

Table XCVI indicates that Danbury, Conn., and the adjoining town of Bethel have specialized in this industry to a greater extent than the other cities and towns named. The value of fur hats manufactured in Bethel constituted 79.7 per cent of the value of all goods manufactured in the town. In Danbury the value of hat products formed 69.4 per cent of the total. Orange, N. J., ranked third as a specialized center, with a percentage of 53.7.

6. *Glass.*—Tables XCVII to C show the localization of the glass industry, by states and cities, and the specialization of states and cities in this industry.

TABLE XCVII.—*Glass: Localization by states, 1890 and 1900.*

STATES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$56,539,712	$41,051,004	100.0	100.0
Pennsylvania	22,011,130	17,179,137	38.9	41.8
Indiana	14,757,883	2,995,409	26.1	7.3
New Jersey	5,093,822	5,218,152	9.0	12.7
Ohio	4,547,083	5,649,182	8.1	13.8
All other states	10,129,794	10,009,124	17.9	24.4

TABLE XCVIII.—*Glass: Localization by cities, 1900.*

[Cities of 20,000 population or over.]

CITIES.	Value of products.	Per cent of total.
United States	$56,539,712	100.0
Pittsburg, Pa.	2,429,686	4.3
Muncie, Ind.	2,381,025	4.2
Millville, N. J.[1]	1,617,373	2.9
Marion, Ind.[1]	1,399,317	2.5
Philadelphia, Pa.	1,347,011	2.4
Washington, Pa.[1]	1,308,029	2.3
Tarentum, Pa.[1]	1,142,311	2.0
Gas City, Ind.[1]	1,021,280	1.8
Alexandria, Ind.[1]	1,015,689	1.8
Elwood, Ind.[1]	1,011,803	1.7
Charleroi, Pa.[1]	1,010,139	1.8
All other cities and outside of cities	40,856,049	72.3

[1] Under 20,000 population.

TABLE XCIX.—GLASS: SPECIALIZATION OF STATES, 1890 AND 1900.

STATES.	VALUE OF PRODUCTS.				PER CENT WHICH GLASS FORMS OF ALL INDUSTRIES.	
	All industries.		Glass.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$56,539,712	$41,051,004	0.4	0.4
Indiana	378,120,140	226,825,082	14,757,883	2,995,409	3.9	1.3
Pennsylvania	1,884,790,860	1,331,794,901	22,011,130	17,179,137	1.2	1.3
New Jersey	611,748,933	354,573,571	5,093,822	5,218,152	0.8	1.5
Ohio	832,438,113	641,688,064	4,547,083	5,649,182	0.5	0.9
All other states	9,347,302,097	6,817,555,665	10,129,794	10,009,124	0.1	0.1

*

TABLE C.—*Glass: Specialization of cities, 1900.*

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.		Per cent which glass forms of all industries.
	All industries.	Glass.	
United States	$13,004,400,143	$56,539,712	0.4
Millville, N. J.[1]	2,610,332	1,617,373	62.0
Tarentum, Pa.[1]	1,980,947	1,142,311	57.7
Charleroi, Pa.[1]	1,871,505	1,010,139	54.0
Alexandria, Ind.[1]	2,929,596	1,015,689	34.7
Gas City, Ind.[1]	2,959,187	1,021,280	34.5
Washington, Pa.[1]	4,667,330	1,308,029	28.0
Marion, Ind.[1]	5,170,435	1,399,317	27.1
Muncie, Ind.	12,106,648	2,381,025	19.7
Elwood, Ind.[1]	9,929,311	1,011,803	10.2
Pittsburg, Pa.	203,261,251	2,429,686	1.2
Philadelphia, Pa.	603,466,526	1,347,011	0.2
All other cities and outside cities	12,153,447,075	40,856,049	0.3

[1] Under 20,000 population.

Table XCVII shows a decided localization of the glass industry in Pennsylvania and Indiana, the value of glass manufactured in these states constituting nearly two-thirds of the total for the United States. The localization of the industry has been changed during the last decade by the decline in Ohio and New Jersey and the remarkable increase in Indiana. The value of the combined glass product of Ohio and New Jersey decreased $1,226,429 during the decade, while the value of the product of Indiana increased about fourfold. This change has been due chiefly to the discovery of new supplies of natural gas in this state. In addition to its cheapness, natural gas is especially adapted for use in glass furnaces. Fuel is the most important item in the cost of materials in the glass industry, the localization of which has always been determined chiefly by this factor. For this reason there has been a continual shifting of the industry during the last twenty years, factories being hastily built, in a locality, upon the discovery of new gas supplies, only to be torn down in a few years when these supplies became exhausted. Pennsylvania has held first rank in glass manufacturing since the beginning of the industry in the United States, due chiefly to its abundant fuel supply, both coal and gas.

Table XCVIII shows the localization of the industry by cities. The most important centers in the manufacture of glass are Pittsburg, Pa., and Muncie, Ind. The value of the combined glass product of these two cities, however, was only 8.5 per cent of the total for the United States. Nearly three-fourths of the total product of the United States was manufactured in small towns and rural districts. This is especially true in Indiana, where the existence of the industry has been due to the supply of gas rather than to general economic conditions.

Tables XCIX and C show the value of glass manufactured in each of the above states and cities in comparison with the value of products in all industries. The specialization of particular localities in this industry is marked. The value of glass products constitutes more than one-half of the value of all manufactured products in Millville, N. J., and Tarentum and Charleroi, Pa. Other cities showing a decided specialization are Alexandria, Ind.; Gas City, Ind.; Washington, Pa.; and Marion, Ind.

7. *Hosiery and Knit Goods.*—Tables CI to CIV show the localization of the hosiery and knit-goods industry, by states and cities and the specialization of states and cities in this industry.

TABLE CI.—*Hosiery and knit goods: Localization by states, 1890 and 1900.*

STATES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$95,482,566	$67,241,013	100.0	100.0
New York	35,886,048	24,776,582	37.6	36.8
Pennsylvania	21,896,063	16,944,237	23.0	25.2
Massachusetts	6,620,257	5,082,087	6.9	7.6
Connecticut	4,043,977	3,771,567	4.2	5.6
All other states	27,036,221	16,666,540	28.3	24.8

TABLE CII.—*Hosiery and knit goods: Localization by cities, 1890 and 1900.*

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$95,482,566	$67,241,013	100.0	100.0
Philadelphia, Pa.	13,040,905	14,932,981	13.7	22.2
Cohoes, N. Y.	5,026,374	5,058,882	5.3	7.5
Amsterdam, N. Y.	4,259,138	[1]	4.5	.....
Lowell, Mass.	3,148,110	731,413	3.3	1.1
Utica, N. Y.	2,514,073	715,178	2.6	1.1
Brooklyn borough, N. Y.	2,112,510	887,986	2.2	1.3
All other cities and outside of cities.	65,381,456	44,915,173	68.4	66.8

[1] Not reported separately.

TABLE CIII.—HOSIERY AND KNIT GOODS: SPECIALIZATION OF STATES, 1890 AND 1900.

STATES.	VALUE OF PRODUCTS.				PER CENT WHICH HOSIERY AND KNIT GOODS FORM OF ALL INDUSTRIES.	
	All industries.		Hosiery and knit goods.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,288	$95,482,566	$67,241,013	0.7	0.7
New York	2,175,726,900	1,711,577,671	35,886,048	24,776,582	1.6	1.4
Pennsylvania	1,834,790,860	1,331,794,901	21,896,063	16,944,237	1.2	1.3
Connecticut	352,824,106	248,336,364	4,043,977	3,771,567	1.1	1.5
Massachusetts	1,035,198,989	888,160,403	6,620,257	5,082,087	0.6	0.6
All other states	7,605,859,288	5,192,567,944	27,036,221	16,666,540	0.4	0.3

TABLE CIV.—HOSIERY AND KNIT GOODS: SPECIALIZATION OF CITIES, 1890 AND 1900.

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.				PER CENT WHICH HOSIERY AND KNIT GOODS FORM OF ALL INDUSTRIES.	
	All industries.		Hosiery and knit goods.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$95,482,566	$67,241,013	0.7	0.7
Cohoes, N. Y.	11,636,130	10,836,260	5,026,374	5,058,882	43.2	46.7
Amsterdam, N. Y.	11,502,316	(1)	4,259,138	(1)	37.0	.....
Utica, N. Y.	19,550,850	15,615,715	2,514,073	715,178	12.9	4.6
Lowell, Mass.	44,774,525	42,450,509	3,148,110	731,413	7.0	1.7
Philadelphia, Pa	603,466,526	577,234,446	13,040,905	14,932,981	2.2	2.6
Brooklyn borough, N. Y.	342,127,124	269,244,147	2,112,510	887,386	0.6	0.3
All other cities and outside of cities	11,971,342,672	8,457,056,206	65,381,456	44,915,173	0.5	0.5

[1] Not reported separately.

Table CI shows that the hosiery and knit goods industry is localized in the states of New York and Pennsylvania, the value of products for these states constituting 60.6 per cent of the total for the United States. New York state led with 37.6 per cent of the total in 1900, followed by Pennsylvania with 23 per cent.

Table CII shows the localization of the industry by cities. Philadelphia, Pa., Cohoes, N. Y., and Amsterdam, N. Y., led all other cities in 1900, the value of their combined products constituting 23.5 per cent of the total for the United States. The distribution by cities shows, however, but a small part of the total value of products. The industry in New York state is carried on largely in scattered cities and towns, most of them, however, near Cohoes, Amsterdam, and Utica, and the same is true to a less extent in Pennsylvania. More than 42 per cent of the total value of products reported for the United States was made outside of cities with a population of 20,000 or over. During the last decade there has been a slight movement of the industry from the larger and older to certain of the newer centers. This is indicated by the decrease of $1,892,076 in the value of products reported for Philadelphia, and of $32,508 in the value of products reported for Cohoes, accompanied by large increases in the value of products for each of the states in which these cities are located.

The hosiery and knit goods manufacture was established in Philadelphia about 1698 and in Cohoes in 1832. The industry in Philadelphia, especially in Germantown, was given its start in 1698, when a large number of skilled hand knitters from the German Palatinate settled in that city.

A great stimulus was given to the industry in Cohoes by the invention of the first power knitting machine used in the world. This was put into operation in 1832 by Egbert Egberts, a manufacturer of that place. Cohoes is favored with abundant waterpower, which is profitably used in this industry. Of the total amount of power used in the knitting mills of this city 75.3 per cent was waterpower. Amsterdam is but 45 miles from Cohoes, and its recent development as a knit-goods center is to be attributed to that fact. The same must be said, moreover, of the growth of the industry in other small towns in the central part of New York state. It is interesting to note a refinement of the localization which is quite marked. Hosiery is manufactured in Philadelphia almost exclusively, while underwear and other knit goods are the chief products of Cohoes.

Tables CIII and CIV show the value of hosiery and knit goods manufactured in each of the above states and cities in comparison with the value of products in all industries. Cohoes and Amsterdam, N. Y., are the most striking instances of specialization in this industry. In 1900 the value of hosiery and knit goods products constituted 43.2 per cent of the value of all manufactured products in Cohoes and 37 per cent in Amsterdam.

8. *Iron and Steel.*—Tables CV to CVIII show the localization of the iron and steel industry by states and cities, and the specialization of states and cities in this industry.

TABLE CV.—*Iron and steel: Localization by states, 1890 and 1900.*

STATES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$803,968,273	$480,954,348	100.0	100.0
Pennsylvania	434,445,200	248,809,071	54.0	57.7
Ohio	138,935,256	67,134,110	17.3	13.3
Illinois	60,303,144	37,173,405	7.5	8.7
New Jersey	24,381,699	8,139,321	3.0	1.9
Indiana	19,338,481	3,063,853	2.4	0.7
Alabama	17,392,483	12,544,227	2.2	2.9
West Virginia	16,514,212	7,490,934	2.1	1.7
New York	13,858,553	15,699,537	1.7	3.6
All other states	78,799,245	40,899,890	9.8	9.5

TABLE CVI.—*Iron and steel: Localization by cities, 1890 and 1900.*

[Cities of 20,000 population, or over.]

CITIES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$803,968,273	$480,954,348	100.0	100.0
Pittsburg, Pa.	90,798,086	49,718,729	11.3	11.5
McKeesport, Pa.	34,339,612	(1)	4.3	.....
Chicago, Ill.	31,620,174	24,317,331	3.9	5.6
Youngstown, Ohio	28,203,866	9,676,050	3.5	2.3
Cleveland, Ohio	24,276,197	15,472,199	3.0	3.6
Johnstown, Pa.	17,884,705	(1)	2.2	.....
Newcastle, Pa.	15,123,463	(1)	1.9	.....
Joliet, Ill.	13,380,090	(1)	1.7	.....
Trenton, N. J.	13,260,787	(1)	1.6	.....
Scranton, Pa.	10,231,139	13,278,299	1.3	3.1
All other cities and outside of cities	524,900,164	318,491,240	65.3	73.9

[1] Not reported separately.

TABLE CVII.—IRON AND STEEL: SPECIALIZATION OF STATES, 1890 AND 1900.

STATES.	VALUE OF PRODUCTS.				PER CENT WHICH IRON AND STEEL FORM OF ALL INDUSTRIES.	
	All industries.		Iron and steel.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$803,968,273	$430,954,348	6.2	4.6
Pennsylvania	1,834,790,860	1,331,794,901	434,445,200	248,809,071	23.7	18.7
West Virginia	74,838,330	38,702,125	16,514,212	7,490,934	22.1	19.4
Alabama	80,741,449	51,226,605	17,392,483	12,544,227	21.5	24.5
Ohio	832,438,113	641,688,064	138,935,256	57,134,110	16.7	8.9
Indiana	378,120,140	226,825,082	19,338,481	3,063,853	5.1	1.4
Illinois	1,259,730,168	908,640,280	60,303,144	37,173,405	4.8	4.1
New Jersey	611,748,933	354,573,571	24,381,699	8,139,321	4.0	2.3
New York	2,175,726,900	1,711,577,671	13,858,553	15,699,537	0.6	0.9
All other states	5,756,265,250	4,107,408,984	78,799,245	40,899,890	1.4	1.0

TABLE CVIII.—IRON AND STEEL: SPECIALIZATION OF CITIES, 1890 AND 1900.

[Cities of 20,000 population or over,]

CITIES.	VALUE OF PRODUCTS.				PER CENT WHICH IRON AND STEEL FORM OF ALL INDUSTRIES.	
	All industries.		Iron and steel.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$803,968,273	$430,954,348	6.2	4.6
McKeesport, Pa	37,074,136	17,432,721	34,339,612	[1]	92.6	.....
Youngstown, Ohio	34,801,101	14,667,260	28,203,856	9,676,050	81.0	66.0
Johnstown, Pa	22,559,890	18,422,989	17,834,705	[1]	79.1	.....
Newcastle, Pa	21,046,842	[1]	15,123,463	[1]	71.9	.....
Joliet, Ill	27,705,104	12,782,933	13,380,090	[1]	48.2	.....
Pittsburg, Pa	208,261,251	126,859,657	90,798,086	49,718,729	44.7	39.2
Trenton, N. J	31,645,695	25,628,223	13,260,787	[1]	41.9	.....
Scranton, Pa	27,646,418	24,341,745	10,231,139	13,278,299	37.0	54.5
Cleveland, Ohio	139,849,806	113,240,115	24,276,197	15,472,199	17.4	13.7
Chicago, Ill	888,945,311	664,567,923	31,620,174	24,817,831	3.6	3.7
All other cities and outside of cities	11,569,804,589	8,354,543,717	524,906,164	318,491,240	4.5	3.8

[1] Not reported separately.

Table cv shows a decided localization of the industry in Pennsylvania and Ohio, the value of the iron and steel products of these states constituting 71.3 per cent of the total for the United States. More than one-half of the iron and steel of the country, measured by its value, was manufactured in Pennsylvania.

Pennsylvania took first rank in the industry soon after its establishment in that state and has held it continuously since that time. The localization of the iron and steel industry is governed almost entirely by natural advantages in the way of deposits of iron ore, coal, and limestone. At first the industry depended upon wood for fuel, and its localization was affected by the distribution of forests, but with the use of coal as fuel this factor was eliminated.

As a result of the introduction of coke as a fuel in blast furnaces and the increased use of the Lake Superior ores as compared with those of Pennsylvania, the center of the iron and steel industry has been transferred from eastern to western Pennsylvania. The excellence of the Connellsville coal for cokeing purposes attracted the blast furnaces from eastern Pennsylvania, where the principal fuel supply is anthracite coal. The rolling mills and steel works naturally followed the blast furnaces, and Allegheny county, which includes the cities of Pittsburg, McKeesport, and Duquesne, became the most important iron and steel center in the United States. This section is also favored by a large production of natural gas, which constituted 22.3 per cent of the total cost of fuel used in rolling mills and steel works in Pennsylvania in 1900.

The iron and steel industry in Ohio may be considered a continuation of the industry in western Pennsylvania. The Ohio furnaces and mills draw their fuel supply from the Connellsville district of Pennsylvania and from West Virginia. Eastern and northeastern Ohio, where the greater portion of the iron product of the state is manufactured, has the advantage of being between the coal fields of Pennsylvania and the iron mines of the Lake Superior region. None of the consuming points in other states, except Pittsburg and the Shenango Valley, in Pennsylvania, receive Connellsville coke so cheaply, and none of the eastern iron centers are so favorably located in relation to the Lake Superior mines.

The industry has developed in Illinois largely on account of the excellent market for iron products in Chicago and the West. This state has the advantage, moreover, of close proximity to the ore supplies of the

Lake Superior region and cheap lake transportation of the ore to the mills, which are located principally in and near Chicago. The supply of fuel for the blast furnaces comes largely from the Connellsville region of Pennsylvania, and the Pocahontas and Flat Top regions of West Virginia.

The iron and steel manufacture in Alabama is entirely separate from the industry in other sections of the country, and its development has been due to purely natural causes—the adjoining supplies of iron ore and coal. Some mills in this state get both their ore and coal from within a half mile of the plant, and in such cases they are able to produce iron at a very low cost.

Table CVI shows the localization of the industry by cities. Pittsburg led all other cities in the manufacture of iron and steel in 1900, with a value of products which was 11.3 per cent of the total for the United States. The distribution by cities, however, shows but slightly more than one-third of the total value of the iron and steel products of the United States, the industry being scattered among a large number of cities and towns in the coal and iron districts.

Tables CVII and CVIII show the value of iron and steel manufactured in each of the above states and cities in comparison with the value of products in all industries. The value of the iron and steel products reported for the states of Pennsylvania, West Virginia, and Alabama was between one-fourth and one-fifth of the value of all the manufactured products of these states. The specialization of particular localities in this industry appears very strikingly in a number of cities, notably McKeesport, Pa., Youngstown, Ohio, and Johnstown, Pa. More than three-quarters of the value of all manufactured products of each of these cities in 1900 was iron and steel. Other cities showing a decided specialization are Newcastle, Pa., Joliet, Ill., Pittsburg, Pa., and Trenton, N. J.

9. *Jewelry.*—Tables CIX to CXII show the localization of the manufacture of jewelry, by states and cities, and the specialization of states and cities in the industry.

TABLE CIX.—*Jewelry: Localization by states, 1890 and 1900.*

STATES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$46,501,181	$34,761,458	100.0	100.0
Rhode Island	13,320,620	8,011,067	28.6	23.0
Massachusetts	10,315,334	5,507,415	22.2	15.9
New York	10,244,624	7,385,139	22.0	21.3
New Jersey	7,379,777	4,724,500	15.9	13.6
Illinois	1,601,308	932,000	3.5	2.6
All other states	3,639,518	8,201,337	7.8	23.6

TABLE CX.—*Jewelry: Localization by cities, 1890 and 1900.*

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$46,501,181	$34,761,458	100.0	100.0
Providence, R. I.	12,719,124	7,801,003	27.4	22.4
Manhattan and Bronx boroughs, N. Y.	9,172,849	5,646,784	19.7	16.3
Newark, N. J.	7,364,247	4,631,500	15.8	13.3
Attleboro, Mass.[1]	5,701,802	(2)	12.3	.....
North Attleboro, Mass.[1]	2,785,567	(2)	6.0	.....
Chicago, Ill.	1,601,308	873,000	3.4	2.5
All other cities and outside of cities.	7,156,284	15,809,221	15.4	45.5

[1] Under 20,000 population. [2] Not reported separately.

TABLE CXI.—JEWELRY: SPECIALIZATION OF STATES, 1890 AND 1900.

STATES.	VALUE OF PRODUCTS.				PER CENT WHICH JEWELRY FORMS OF ALL INDUSTRIES.	
	All industries.		Jewelry.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$46,501,181	$34,761,458	0.4	0.4
Rhode Island	184,074,378	142,500,625	13,320,620	8,011,067	7.2	5.6
New Jersey	611,748,933	354,573,571	7,379,777	4,724,500	1.2	1.3
Massachusetts	1,035,198,989	888,160,403	10,315,334	5,507,415	1.0	0.6
New York	2,175,726,900	1,711,577,671	10,244,624	7,385,139	0.5	0.4
Illinois	1,259,730,168	908,640,280	1,601,308	932,000	0.1	0.1
All other states	7,737,920,775	5,366,984,733	3,639,518	8,201,337	0.0	0.2

TABLE CXII.—JEWELRY: SPECIALIZATION OF CITIES, 1890 AND 1900.

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.				PER CENT WHICH JEWELRY FORMS OF ALL INDUSTRIES.	
	All industries.		Jewelry.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$46,501,181	$34,761,458	0.4	0.4
North Attleboro, Mass.[1]	3,990,731	[2]	2,785,567	[2]	69.8	.....
Attleboro, Mass.[1]	9,442,752	[2]	5,701,802	[2]	60.4	.....
Providence, R. I.	88,168,897	77,467,283	12,719,124	7,801,003	14.4	10.1
Newark, N. J.	126,954,049	93,476,052	7,364,247	4,631,500	5.8	5.0
New York, N. Y. (Manhattan and Bronx boroughs)	975,168,202	777,222,721	9,172,849	5,646,734	0.9	0.7
Chicago, Ill	888,945,311	664,567,923	1,601,308	873,000	0.2	0.1
All other cities and outside of cities	10,911,730,201	7,759,702,704	7,156,284	15,809,221	0.1	0.2

[1] Under 20,000 population. [2] Not reported separately.

Table CIX indicates that the manufacture of jewelry is almost entirely confined to the 4 states, Massachusetts, Rhode Island, New York, and New Jersey. The value of the jewelry manufactured in these states in 1900 constituted 88.7 per cent of the total reported for the United States. In 1890 this percentage was but 73.8. There has thus been a marked increase in the localization of the industry in the 4 states named. Rhode Island was the leading state in the manufacture in 1900, the value of its products constituting 28.6 per cent of the total value reported for the United States.

The localization of the industry in the 4 states mentioned, was principally due to the fact that the first goldsmiths of the colonies located in these states, to be near their best market, the wealthy population of the cities in the Middle and New England states.

Table CX shows the localization of the industry by cities. Attleboro and North Attleboro, Mass., adjoin the city of Providence, R. I., and the three places constitute practically one center for the industry. Table 38 shows that the value of products reported for this group in 1900 constituted 45.7 per cent of the total value reported for the country. New York city ranked second, with 19.7 per cent, and Newark, N. J., third, with 15.8 per cent of the total. A great stimulus was given to the industry in Providence about 1794, when the process of "filling" gold jewelry with cheaper metal was discovered. At about the same time also machinery was applied to the manufacture.

New York city is noted for expensive handmade jewelry, while in Providence, Attleboro, and North Attleboro the products are principally less expensive goods, in the manufacture of which machinery largely takes the place of hand work. Thus the average value of products per wage-earner in New York state in 1900 was $3,390, as compared with an average of $1,838 for Massachusetts and Rhode Island combined.

Tables CXI and CXII show the value of jewelry manufactured in each of the above states and cities in comparison with the value of products in all industries. Table CXII indicates that North Attleboro and Attleboro, Mass., were the most specialized centers of this industry in 1900. The value of the jewelry manufactured in these towns formed 69.8 and 60.4 per cent, respectively, of the value of all manufactured products.

10. *Leather Gloves and Mittens.*—Tables CXIII to CXVI show the localization of the leather glove and mitten industry, by states and cities, in 1900, and the specialization of states and cities in this industry. Statistics for this industry were not published separately in 1890.

TABLE CXIII.—*Leather Gloves: Localization by states, 1900.*

STATES.	Value of products.	Per cent of total.
United States	$16,721,234	100.0
New York	10,854,221	64.9
Illinois	2,454,252	14.7
California	920,624	5.5
Wisconsin	507,495	3.0
All other states	1,984,642	11.9

TABLE CXIV.—*Leather Gloves: Localization by cities, 1900.*

[Cities of 20,000 population or over.]

CITIES.	Value of products.	Per cent of total.
United States	$16,721,234	100.0
Gloversville, N. Y.[1]	6,487,227	38.8
Johnstown, N. Y	2,576,048	15.4
Chicago, Ill	2,209,529	13.2
All other cities and outside of cities	5,448,430	32.6

[1] Under 20,000 population.

TABLE CXV.—*Leather Gloves: Specialization of states, 1900.*

STATES	VALUE OF PRODUCTS.		Per cent which gloves form of all industries.
	All industries.	Gloves.	
United States	$13,004,400,143	$16,721,234	0.1
New York	2,175,726,900	10,854,221	0.5
California	302,874,761	920,624	0.3
Illinois	1,259,730,168	2,454,252	0.2
Wisconsin	360,818,942	507,495	0.1
All other states	8,905,249,372	1,984,642	0.2

TABLE CXVI.—*Leather Gloves: Specialization of cities, 1900.*

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.		Per cent which gloves form of all industries.
	All industries.	Gloves.	
United States	$13,004,400,143	$16,721,284	0.1
Gloversville, N. Y.[1]	9,647,167	6,487,227	67.2
Johnstown, N. Y.[1]	5,480,072	2,576,048	47.0
Chicago, Ill	888,945,311	2,209,529	0.2
All other cities and outside of cities	12,100,327,593	5,448,480	(2)

[1] Under 20,000 population.
[2] Less than one-tenth of 1 per cent.

Table CXIII shows a remarkable localiization of the industry in New York, the value of the gloves and mittens manufactured in this state constituting nearly two-thirds of the total for the country.

Table CXIV shows the localization of the industry by cities. More than half of the gloves and mittens manufactured in the United States, measured by their value, were made in Gloversville and Johnstown, which are adjoining cities in the east central part of New York state. Chicago was the only other center of importance, its value of products constituting 13.2 per cent of the total for the country.

The preeminence of Gloversville and Johnstown in the manufacture of gloves and mittens is due chiefly to an industrial momentum gathered during the one hundred and forty years in which the industry has been carried on in this locality, and to the fact that the process of manufacture demands a manual dexterity acquired only by years of training. It is claimed that the first gloves made in the United States were made at this point about 1760, by families brought from Scotland by Sir William Johnson and settled on his grant. Many of these settlers had been glove makers and members of the glove guilds of Scotland, and brought with them the patterns, needles, and threads needed in their industry. It was not, however, until about 1809 that gloves were manufactured in commercial quantities. At that time an enterprising glove maker of Johnstown began to carry his product to Albany on horseback. Since then Gloversville and Johnstown have become the recognized centers of the industry in the United States, many skilled glove makers from England, France, and Germany having established themselves there. These localities have thus had the advantage of an abundant supply of skilled labor, the most important factor in the localization of the industry, the cost of transportation on both raw materials and finished products being insignificant in comparison.

Tables CXV and CXVI show the value of leather gloves manufactured in each of the above states and cities in comparison with the value of products in all industries. The specialization of particular localities in this industry is naturally most striking in Gloversville and Johnstown. The value of gloves and mittens manufactured in Gloversville constituted more than two-thirds and in Johnstown nearly one-half of the value of all manufactures in those cities.

11. *Leather, Tanned, Curried, and Finished.*—Tables CXVII to CXX show the localization of the industry known as leather, tanned, curried, and finished, by states and cities, and the specialization of states and cities in this industry.

TABLE CXVII.—*Leather: Localization by states, 1890 and 1900.*

STATES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$204,038,127	$172,136,092	100.0	100.0
Pennsylvania	55,615,009	49,931,716	27.3	29.0
Massachusetts	26,067,714	28,044,815	12.8	16.3
New York	23,205,991	23,454,853	11.3	13.6
Wisconsin	20,074,373	11,161,850	9.8	6.5
New Jersey	13,747,155	11,069,467	6.7	6.4
Delaware	9,400,504	4,106,894	4.6	2.4
Illinois	7,847,835	8,240,803	3.9	4.8
California	7,405,981	5,729,278	3.6	3.3
All other states	40,673,565	30,396,416	20.0	17.7

TABLE CXVIII.—*Leather: Localization by cities, 1890 and 1900.*

[Cities of 20,000 population or over.]

CITIES	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$204,038,127	$172,136,092	100.0	100.0
Philadelphia, Pa	18,187,231	12,682,297	8.9	7.4
Newark, N. J	10,857,192	8,309,667	5.3	4.8
Milwaukee, Wis	10,267,835	8,429,814	5.0	4.9
Wilmington, Del	9,379,504	4,015,694	4.6	2.3
Chicago, Ill	6,979,289	7,395,371	3.4	4.3
All other cities and outside of cities	148,367,076	131,303,249	72.8	76.3

TABLE CXIX.—LEATHER: SPECIALIZATION OF STATES, 1890 AND 1900.

STATES.	VALUE OF PRODUCTS.				PER CENT WHICH LEATHER, TANNED, CURRIED, AND FINISHED FORMS OF ALL INDUSTRIES.	
	All industries.		Leather, tanned, curried, and finished.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$204,038,127	$172,136,092	1.6	1.8
Delaware	45,387,630	37,571,848	9,400,504	4,106,894	20.7	10.9
Wisconsin	360,818,942	248,546,164	20,074,373	11,161,850	5.6	4.5
Pennsylvania	1,834,790,860	1,331,794,901	55,615,009	49,931,716	3.0	3.7
Massachusetts	1,035,198,989	888,160,403	26,067,714	28,044,815	2.5	3.2
California	302,874,761	213,403,996	7,405,981	5,729,278	2.4	2.7
New Jersey	611,748,933	354,573,571	13,747,155	11,069,467	2.2	3.1
New York	2,175,726,900	1,711,577,671	23,205,991	23,454,853	1.1	1.4
Illinois	1,259,730,108	908,640,280	7,847,835	8,240,803	0.6	0.9
All other states	5,378,122,960	3,678,168,449	40,673,565	30,396,416	0.8	0.8

TABLE CXX.—LEATHER: SPECIALIZATION OF CITIES, 1890 AND 1900.

[Cities of 20,000 population and over.]

CITIES.	VALUE OF PRODUCTS.				PER CENT, WHICH LEATHER TANNED, CURRIED, AND FINISHED FORMS OF ALL INDUSTRIES.	
	All industries.		Leather, tanned, curried, and finished.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$204,038,127	$172,136,092	1.6	[1] 1.8
Wilmington, Del	34,053,324	24,568,125	9,379,594	$4,015,694	27.5	16.3
Newark, N. J	126,954,049	93,476,652	10,857,192	8,309,667	8.6	8.9
Milwaukee, Wis	123,786,449	97,603,951	10,267,835	8,429,814	8.3	8.6
Philadelphia, Pa	603,466,526	577,234,446	18,187,231	12,682,227	3.0	2.2
Chicago, Ill	888,945,311	664,567,923	6,979,289	7,395,371	0.8	1.1
All other cities and outside of cities	11,227,194,484	7,915,086,186	148,367,076	131,303,249	1.3	1.7

[1] Not reported separately.

Table CXVII indicates a marked localization of this industry in the three states, Massachusetts, New York, and Pennsylvania, these states producing in 1900 more than half of the total value of products reported for the United States. They have also led in the production of leather since 1850. Massachusetts reached its greatest production in 1880, when its value of products formed 19.4 per cent of the total reported for the United States. The production of New York was greatest in 1870, when its value of products constituted 23.3 per cent of the total. Both the percentage of the total and the absolute production have decreased in these two states since 1880, until in 1900 the value of their leather products constituted but 12.8 and 11.3 per cent, respectively. In Pennsylvania, however, both the production and the per cent of the total have increased steadily since 1850. In 1880 the state gained first rank, a position it held both in 1890 and 1900. In the latter year the value of the leather products of the state constituted 27.3 per cent of the total for the United States. Wisconsin was the fourth state in rank both in 1890 and 1900, reporting 6.5 and 9.8 per cent, respectively, of the total value of products.

The leather industry in the United States probably had its origin in Lynn, Mass., about 1630, although the Virginia colony also claimed the distinction of being the first to engage in tanning. The migration of the industry from Massachusetts and New York to Pennsylvania and the Central and Western states, which began about 1880, was due to the exhaustion of the tan-bark supply in the two states first named. In almost all sections this industry is dependent upon a local supply of oak or hemlock bark, the principal materials used in the tanning process. As the forests of these trees become exhausted in one locality, the industry moves to centers where supplies of bark are still to be found.

Table CXVIII shows the localization of the tanning industry by cities. It appears from this table that tanning is not an urban industry to any great extent. More than half of the total value of products reported for the United States in 1900 was reported for localities with a population of less than 20,000. Philadelphia, Pa., is the only city which has become an important center in the industry, and this is due to the fact that tanning is there carried on chiefly by means of chemical tanning materials.

Tables CXIX and CXX show the value of leather tanned, curried, and finished, in each of the above states and cities in comparison with the value of products in all industries. Wilmington, Del., is the only city included in Table CXX which shows a marked specialization in this industry. The value of its leather products in 1900 constituted 27.5 per cent of the value of all goods manufactured in the city during that year.

12. *Paper and Wood Pulp.*—Tables CXXI to CXXIV show the localization of the paper and wood-pulp industry by states and counties.

TABLE CXXI.—*Paper and wood pulp: Localization by states, 1890 and 1900.*

STATES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$127,326,162	$78,937,184	100.0	100.0
New York	26,715,628	14,192,240	21.0	18.0
Massachusetts	22,141,461	[1] 21,524,173	17.4	27.3
Maine	13,223,275	3,281,051	10.4	4.2
Pennsylvania	12,267,900	[1] 7,838,299	9.6	9.9
Wisconsin	10,895,576	4,475,368	8.6	5.7
New Hampshire	7,244,733	1,282,022	5.7	1.6
Ohio	6,543,513	[2] 7,209,750	5.1	9.1
Michigan	4,217,869	2,919,166	3.3	3.7
All other states	24,076,207	16,215,115	18.9	20.5

[1] Does not include the value of products of 2 wood-pulp establishments not reported separately.
[2] Does not include the value of products of 1 wood-pulp establishment not reported separately.

TABLE CXXII.—*Paper and wood pulp: Localization by counties, 1900.*

COUNTIES.	Value of products.	Per cent of total.
United States	$127,326,162	100.0
Hampden county, Mass	10,341,545	8.1
Coos county, N. H	4,936,739	3.9
Outagamie county, Wis	4,783,750	3.8
Saratoga county, N. Y	4,768,278	3.7
Jefferson county, N. Y	3,757,577	3.0
Washington county, N. Y	3,655,413	2.9
Worcester county, Mass	2,971,111	2.3
Niagara county, N. Y	2,799,845	2.2
Philadelphia county, Pa	2,635,749	2.1
Cumberland county, Me	2,586,666	2.0
Berkshire county, Mass	2,571,289	2.0
All other counties	81,519,200	64.0

TABLE CXXIII.—PAPER AND WOOD PULP: SPECIALIZATION OF STATES, 1890 AND 1900.

STATES.	VALUE OF PRODUCTS.				PER CENT WHICH PAPER AND WOOD PULP FORM OF ALL INDUSTRIES.	
	All industries.		Paper and wood pulp.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$127,326,162	$78,937,184	1.0	0.8
Maine	127,361,485	95,689,500	13,223,275	3,281,051	10.4	3.4
New Hampshire	118,709,308	85,770,549	7,244,783	1,282,022	6.1	1.5
Wisconsin	360,818,942	248,546,164	10,895,576	4,475,368	3.0	1.8
Massachusetts	1,035,198,989	888,160,403	22,141,461	[1]21,524,173	2.1	2.4
Michigan	356,944,082	277,896,706	4,217,869	2,919,166	1.2	1.1
New York	2,175,726,900	1,711,577,671	26,715,628	14,192,240	1.2	0.8
Ohio	832,438,113	641,688,064	6,543,513	[2]7,209,750	0.8	1.1
Pennsylvania	1,834,790,860	1,331,794,901	12,267,900	[1]7,838,299	0.7	0.6
All other states	6,162,411,464	4,091,313,325	24,076,207	16,215,115	0.4	0.4

[1] Does not include the value of products of 2 wood pulp establishments, not reported separately.
[2] Does not include the value of products of 1 wood pulp establishment, not reported separately.

TABLE CXXIV.—*Paper and wood pulp: Specialization of counties, 1900.*

COUNTIES.	VALUE OF PRODUCTS.		Per cent which paper and wood pulp from of all industries.
	All industries.	Paper and wood pulp.	
United States	$13,004,400,143	$127,326,162	1.0
Coos county, N. H.	9,416,296	4,935,789	52.4
Outagamie county, Wis.	9,127,604	4,783,750	52.4
Washington county, N. Y.	7,313,307	3,655,413	50.0
Saratoga county, N. Y.	15,038,794	4,768,278	31.7
Jefferson county, N. Y.	13,738,196	3,757,577	27.4
Hampden county, Mass.	73,569,063	10,341,545	14.1
Cumberland county, Me.	18,947,126	2,586,666	13.7
Niagara county, N. Y.	23,662,842	2,799,845	11.8
Berkshire county, Mass.	30,291,305	2,571,289	8.5
Worcester county, Mass.	138,789,964	2,971,111	2.1
Philadelphia county, Pa.	603,466,526	2,635,749	0.4
All other counties.	12,061,039,120	81,519,200	0.7

Table CXXI shows that the industry was localized in 1900 chiefly in New York, Massachusetts, Maine, and New Hampshire, the value of the products in these states constituting more than half of the total reported for the United States. New York led all other states in 1900 with 21 per cent of the total, having taken the lead from Massachusetts during the decade. The value of products reported for New York was nearly doubled during the decade, while the value of the combined products of New Hampshire and Maine in 1900 was nearly six times that of 1890.

The chief causes for the localization of the industry in these sections, and in the northeastern part of New York state, are the supply of spruce and poplar, the timber chiefly used in making wood pulp; the existence of waterpower necessary to operate cheaply the heavy grinding machinery; the quality of the water supply, i. e., its suitability for use in mixing the pulp; and the large adjacent market furnished by the newspaper press of the cities of the New England and Middle states.

The chief spruce supplies of the United States are located in Maine, New Hampshire, Vermont, and New York, and then are supplemented by large quantities of Canadian wood imported into New Hampshire and New York. The development of the manufacture in Wisconsin is also due largely to an abundance of wood, but the preeminence of Massachusetts in the industry is chiefly due to the abundant waterpower furnished by the Connecticut River at Holyoke, in Hampden county, and to the early start obtained by the manufacture at this point. Having no special advantage in a supply of wood, this center still remains chiefly a producer of high-grade writing and book papers. The dependence of the industry upon waterpower is indicated by the fact that this contributed almost exactly two-thirds of all the power used in the industry in 1900, a larger proportion than is shown for any other industry.

The manufacture of paper and wood pulp is not a city industry, and the narrower localization is therefore shown in this case by counties (table CXXII). It appears from this table that no one county contains a marked percentage of the total value of products. There is, however, a noteworthy localization of the industry along the Connecticut, Little Androscoggin, Kennebec, and other New England rivers, a localization which is not indicated clearly in table CXXII, because there were often less than three establishments located in one county in 1900, and such counties are necessarily omitted from the table.

Tables CXXIII and CXXIV show the value of paper and wood pulp manufactured in each of the above states and counties in comparison with the value of products in all industries. A number of counties show a marked specialization in this industry, the value of paper and pulp products constituting about one-half of the value of all manufactured products in Coos county, N. H., Washington county, N. Y., and Outagamie county, Wis. Saratoga and Jefferson counties, N. Y., show the same specialization, but in a less degree.

13. *Pottery, Terra Cotta, and Fire-clay Products.*—Tables CXXV to CXXVIII show the localization of the pottery industry, by states and cities, and the specialization of states and cities in this industry.

TABLE CXXV.—*Pottery, terra cotta, and fire-clay products: Localization by states, 1900.*

STATES.	Value of products.	Per cent of total.
United States	$44,263,386	100.0
Ohio	11,851,225	26.8
New Jersey	8,940,723	20.2
Pennsylvania	8,127,429	18.4
New York	2,389,449	5.4
Illinois	2,143,521	4.9
Missouri	1,662,150	3.7
All other states	9,148,889	20.6

TABLE CXXVI.—*Pottery, terra cotta, and fire-clay products: Localization by cities, 1900.*

[Cities of 20,000 population or over.[

CITIES.	Value of products.	Per cent of total.
United States	$44,263,386	100.0
Trenton, N. J	4,785,142	10.8
East Liverpool, Ohio[1]	4,105,200	9.3
Pittsburg, Pa	2,118,902	4.8
St. Louis, Mo	1,257,572	2.8
Zanesville, Ohio	1,245,262	2.8
New York, N. Y	1,144,780	2.6
All other cities and outside of cities	29,606,528	66.9

[1] Under 20,000 population.

TABLE CXXVII.—*Pottery, terra cotta, and fire-clay products: Specialization of states, 1900.*

STATES.	VALUE OF PRODUCTS.		Per cent which pottery, terra cotta and fire-clay products form of all industries.
	All industries.	Pottery, terra cotta, and fire-clay products.	
United States	$13,004,400,143	$44,263,386	0.3
New Jersey	611,748,933	8,940,723	1.5
Ohio	832,488,113	11,851,225	1.4
Pennsylvania	1,834,790,860	8,127,429	0.4
Missouri	385,492,784	1,662,150	0.4
Illinois	1,259,780,168	2,143,521	0.2
New York	2,175,726,900	2,389,449	0.1
All other states	5,904,472,385	9,148,889	0.2

TABLE CXXVIII.—*Pottery, terra cotta, and fire-clay products: Specialization of cities, 1900.*

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.		Per cent which pottery, terra cotta, and fire-clay products form of all industries.
	All industries.	Pottery, terra cotta, and fire-clay products.	
United States	$13,004,400,143	$44,263,386	0.3
East Liverpool, Ohio[1]	5,459,043	4,105,200	75.2
Zanesville, Ohio	7,468,889	1,245,262	16.7
Trenton, N. J	31,645,695	4,785,142	15.1
Pittsburg, Pa	203,261,251	2,118,902	1.0
St. Louis, Mo	233,629,733	1,257,572	0.5
New York, N. Y	1,371,358,468	1,144,780	0.1
All other cities and outside of cities	11,151,577,114	29,606,528	0.3

[1] Under 20,000 population.

Table CXXV shows a localization of the industry in New Jersey, Ohio, and Pennsylvania, the value of the pottery products manufactured in these states constituting nearly two-thirds of the total for the United States. Ohio led all other states in 1900, the value of her pottery products constituting more than a quarter of the total reported for the United States.

Table CXXVI shows the localization of the industry by cities. Trenton, N. J., and East Liverpool, Ohio, were the most important centers in 1900. The value of the pottery products of Trenton constituted 10.8 per cent, and of East Liverpool 9.3 per cent of the total reported for the United States. The chief cause of this localization has been the skilled labor from abroad which settled at these points, where a manufacture of coarse pottery from local deposits of clay had already developed. The industry is one in which skilled hand work prevails to an unusual degree, and the special labor supply is therefore an important element in its localization. Both Trenton and East Liverpool, moreover, have facilities for transporting their heavily cased products by water; and both, being near the great coal supply of the country, are able to obtain abundant and cheap fuel for baking their wares.

The manufacture of brick and the coarser grades of earthenware was begun at Trenton at an early date, the products being sold chiefly east of the Alleghenies. Ohio has an abundance of clay suitable for the manufacture of coarse pottery, and the farmers early began the manufacture of such wares to supply the settlements west of the Allegheny Mountains, shipping their products down the Ohio and Mississippi rivers as far as New Orleans. Skilled workmen from Staffordshire, England, and from pottery centers on the Continent, were attracted to both Trenton and East Liverpool, and gradually the manufacture of porcelain and other fine-grade pottery was introduced. These latter have now become the most important products, although the clay used for the purpose in Trenton is brought from Middlesex county, more than 50 miles distant, and none of the fine clay used in East Liverpool is found within hundreds of miles of that city. The demand for sanitary porcelain of all kinds in New York city and Philadelphia has stimulated its manufacture at Trenton, while many of the manufacturers in East Liverpool have made a specialty of fine china ware.

Tables CXXVII and CXXVIII show the value of pottery, terra cotta, and fire-clay products manufactured in each of the above states and cities in comparison with the value of products in all industries. The specialization of particular localities appears most strikingly in the case of East Liverpool, Ohio, where the value of pottery products constituted more than three-quarters of the value of all products manufactured in the city.

14. *Silk and Silk Goods.*—Tables CXXIX to CXXXII show the localization of the silk and silk-goods industry by states and cities, and the specifications of states and cities in this industry.

TABLE CXXIX.—*Silk and silk goods: Localization by states, 1890 and 1900.*

STATES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$107,256,258	$87,298,454	100.0	100.0
New Jersey	39,966,662	30,760,371	37.3	35.2
Pennsylvania	31,072,926	19,357,546	29.0	22.2
New York	12,706,246	19,417,796	11.9	22.2
Connecticut	12,378,981	9,788,951	11.5	11.2
Massachusetts	5,957,532	5,557,569	5.5	6.4
All other states	5,173,911	2,416,221	4.8	2.8

Table CXXIX shows a decided localization of the silk industry in New Jersey and Pennsylvania, the value of the silk and silk goods manufactured in these two states in 1900 constituting almost exactly two-thirds of the total reported for the United States. A marked feature in the development of the industry during the last decade is the large reduction in the value of products for the state of New York. The value of the silk product of this state constituted 22.2 per cent of the total in 1890, and only 11.9 per cent in 1900. A great many silk manufacturers of New York city have moved their machinery to New Jersey and Pennsylvania, on account of cheaper rents and the larger supply of specially skilled labor in these sections.

TABLE CXXX.—*Silk and silk goods: Localization by cities, 1890 and 1900.*

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$107,256,258	$87,298,454	100.0	100.0
Paterson, N. J	26,006,156	22,058,624	24.2	25.3
New York, N. Y.[1]	6,757,544	13,579,462	6.3	15.6
Philadelphia, Pa	4,531,794	8,059,604	4.2	9.2
West Hoboken, N. J	3,961,054	(2)	3.7	.....
Scranton, Pa	3,616,885	2,055,200	3.4	2.4
Allentown, Pa	3,467,792	1,694,342	3.2	1.9
Jersey City, N. J	1,274,550	1,066,000	1.2	1.2
Brooklyn borough, N. Y	1,042,199	1,049,475	1.0	1.2
All other cities and outside of cities	56,598,284	37,735,747	52.8	43.2

[1] Manhattan and Bronx boroughs. [2] Not reported separately.

TABLE CXXXI.—SILK AND SILK GOODS: SPECIALIZATION OF STATES, 1890 AND 1900.

STATES.	VALUE OF PRODUCTS.				PER CENT WHICH SILK AND SILK GOODS FORM OF ALL INDUSTRIES.	
	All industries.		Silk and silk goods.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$107,256,258	$87,298,454	0.8	0.9
New Jersey	611,748,933	354,573,571	39,966,662	30,760,371	6.5	8.7
Connecticut	352,824,106	248,336,364	12,378,981	9,788,951	3.5	3.9
Pennsylvania	1,834,790,860	1,331,794,901	31,072,926	19,357,546	1.7	1.5
New York	2,175,726,900	1,711,577,671	12,706,246	19,417,796	0.6	1.1
Massachusetts	1,035,198,989	888,160,403	5,957,532	5,557,569	0.6	0.6
All other states	6,994,110,355	4,837,994,373	5,173,911	2,416,221	0.1	0.3

TABLE CXXXII.—SILK AND SILK GOODS: SPECIALIZATION OF CITIES, 1890 AND 1900.

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.				PER CENT WHICH SILK AND SILK GOODS FORM OF ALL INDUSTRIES.	
	All industries.		Silk and silk goods.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$107,256,258	$87,298,454	0.8	0.9
West Hoboken, N. J	5,491,760	(1)	3,961,054	(1)	72.1	.....
Paterson, N. J	52,287,975	42,263,531	26,006,156	22,058,624	49.7	52.2
Allentown, Pa	16,947,722	8,876,565	3,467,792	1,694,342	20.5	19.1
Scranton, Pa	27,646,418	24,341,745	3,616,885	2,055,200	13.1	8.4
Jersey City, N. J	77,225,116	37,376,322	1,274,550	1,066,000	1.7	2.8
New York, N. Y. (Manhattan and Bronx boroughs)	975,168,202	777,222,721	6,757,544	13,579,462	0.7	1.7
Philadelphia, Pa	603,466,526	577,234,446	4,531,794	8,059,604	0.7	1.4
Brooklyn borough, N. Y	342,127,124	269,244,147	1,042,199	1,049,475	0.3	0.4
All other cities and outside of cities	10,904,039,300	7,635,877,806	56,598,284	37,735,747	0.5	0.5

[1] Not reported separately.

*

Table CXXX shows the localization of the silk industry by cities. Paterson, N. J., is preeminently the silk manufacturing center of the United States, though the tendency of the industry to spread is shown by the reduction in the percentage of the total value of silk products manufactured in Paterson from 25.3 per cent in 1890 to 24.2 per cent in 1900, and by a corresponding increase which has occurred in the percentage of the total value of products manufactured in cities and towns of minor importance in the industry. Paterson owes its supremacy in the silk manufacture to its proximity to New York city, the principal market for the sale of silk goods; to the early start of the power manufacture at this point; to the abundant waterpower furnished by the Passaic River; and to the large supply of labor skilled in the hand processes of silk manufacturing, which was attracted thither from Italy and other European countries. Moreover, the machine shops which were early established in Paterson employed large numbers of laboring men whose wives and children were glad to take employment in silk mills.

Tables CXXXI and CXXXII show the value of silk goods manufactured in each of the above states and cities in comparison with the value of products in all industries. The specialization of particular localities in this industry appears most strikingly in the cities of Paterson and West Hoboken, N. J., in which the value of silk and silk goods constituted about one-half and three-fourths, respectively, of the value of all manufactured products in those cities.

15. *Slaughtering and Meat Packing, Wholesale.*—Tables CXXXIII to CXXXVI show the localization of the slaughtering and meat-packing industry, by states and cities and the specification of states and cities in this industry.

TABLE CXXXIII.—*Slaughtering and meat packing, wholesale: Localization by states, 1890 and 1900.*

STATES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$698,206,548	$433,252,315	100.0	100.0
Illinois	279,842,835	200,414,531	40.1	46.3
Kansas	76,829,139	44,592,671	11.0	10.3
Nebraska	71,018,339	24,026,876	10.2	5.5
Indiana	42,891,243	6,924,801	6.2	1.6
Missouri	42,229,127	14,789,012	6.0	3.4
Massachusetts	27,505,698	16,692,851	3.9	3.9
Iowa	25,296,518	19,615,386	3.6	4.5
New York	19,624,187	34,848,582	2.8	8.0
Ohio	19,609,304	13,280,649	2.8	3.1
Pennsylvania	17,826,697	14,110,303	2.6	3.3
Wisconsin	13,601,125	8,393,754	1.9	1.9
Maryland	6,209,857	4,311,412	0.9	1.0
All other states	55,722,479	31,251,487	8.0	7.2

TABLE CXXXIV.—*Slaughtering and meat packing, wholesale: Localization by cities, 1890 and 1900.*

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1900	1890	1900	1890
United States	$698,206,548	$433,252,315	100.0	100.0
Chicago, Ill	248,811,997	194,119,148	35.6	44.9
Kansas City, Kans	73,205,027	39,927,192	10.5	9.2
South Omaha, Nebr	67,716,724	(1)	9.7	.....
St. Joseph, Mo	19,009,332	(1)	2.7	.....
Indianapolis, Ind	18,382,679	5,403,018	2.6	1.2
St. Louis, Mo	12,267,532	8,562,430	1.8	2.0
Buffalo, N. Y	9,631,187	7,719,970	1.4	1.7
Cincinnati, Ohio	9,532,057	6,903,303	1.4	1.5
Cleveland, Ohio	7,514,470	4,810,993	1.1	1.1
Milwaukee, Wis	5,980,340	7,890,117	0.8	1.9
Baltimore, Md	5,308,334	4,311,412	0.8	1.0
Philadelphia, Pa	5,128,823	9,146,513	0.7	2.1
Manhattan and Bronx boroughs, N. Y	4,855,076	19,122,072	0.7	4.4
All other cities, and outside of cities	210,862,970	125,336,147	30.2	29.0

[1] Not reported separately.

TABLE CXXXV.—SLAUGHTERING AND MEAT PACKING, WHOLESALE: SPECIALIZATION OF STATES, 1890 AND 1900.

STATES.	VALUE OF PRODUCTS.				PER CENT WHICH SLAUGHTERING AND MEAT PACKING, WHOLESALE, FORM OF ALL INDUSTRIES.	
	All industries.		Slaughtering and meat packing, wholesale.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$698,206,548	$433,252,315	5.4	4.6
Nebraska	143,990,102	93,037,794	71,018,339	24,026,876	49.3	25.8
Kansas	172,129,398	110,219,805	76,829,139	44,592,671	44.6	40.5
Illinois	1,259,730,168	908,640,280	279,842,835	200,414,531	22.2	22.1
Iowa	164,617,877	125,049,183	25,296,518	19,615,386	15.4	15.7
Indiana	378,120,140	226,825,082	42,891,243	6,924,801	11.3	3.1
Missouri	385,492,784	324,561,993	42,229,127	14,789,012	11.0	4.6
Wisconsin	360,818,942	248,546,164	13,601,125	8,393,754	3.7	3.4
Massachusetts	1,035,198,989	888,160,408	27,505,698	16,692,851	2.7	1.9
Maryland	242,552,990	171,842,593	6,209,857	4,311,412	2.6	2.5
Ohio	882,438,113	641,688,064	19,609,304	13,280,649	2.8	2.1
Pennsylvania	1,884,790,860	1,331,794,901	17,826,697	14,110,303	1.0	1.1
New York	2,175,726,900	1,711,577,671	19,624,187	34,848,582	0.9	2.0
All other states	4,018,792,880	2,590,493,350	55,722,479	31,251,487	1.4	1.2

TABLE CXXXVI.—SLAUGHTERING AND MEAT PACKING, WHOLESALE: SPECIALIZATION OF CITIES, 1890 AND 1900.

[Cities of 20,000 population or over.]

CITIES.	VALUE OF PRODUCTS.				PER CENT WHICH SLAUGHTERING AND MEAT PACKING, WHOLESALE, FORM OF ALL INDUSTRIES.	
	All industries.		Slaughtering and meat packing, wholesale.			
	1900	1890	1900	1890	1900	1890
United States	$13,004,400,143	$9,372,437,283	$698,206,548	$433,252,315	5.4	4.6
South Omaha, Nebr.	70,080,941	(1)	67,716,724	(1)	96.3	.....
Kansas City, Kans.	82,768,943	44,079,389	73,205,027	39,927,192	88.4	90.6
St. Joseph, Mo	31,690,736	11,916,141	19,009,332	(1)	60.0	.....
Chicago, Ill	888,945,311	664,567,925	248,811,997	194,119,148	28.0	29.2
Indianapolis, Ind	68,607,579	36,426,974	18,382,679	5,403,018	26.8	14.8
Buffalo, N. Y.	122,230,061	100,052,208	9,631,187	7,719,970	7.9	7.7
Cincinnati, Ohio	157,806,334	196,063,983	9,532,057	6,903,303	6.0	3.5
Cleveland, Ohio	139,849,806	113,240,115	7,514,470	4,810,993	5.4	4.3
St. Louis, Mo.	233,629,733	229,157,343	12,267,532	8,562,430	5.3	3.7
Milwaukee, Wis.	123,786,449	97,503,951	5,980,340	7,890,117	4.8	8.1
Baltimore, Md	161,249,240	141,723,599	5,308,334	4,311,412	3.3	3.0
Philadelphia, Pa.	603,466,526	577,234,446	5,128,823	9,146,513	0.9	1.6
Manhattan and Bronx boroughs, N. Y.	975,168,202	777,222,721	4,855,076	19,122,072	0.5	2.5
All other cities and outside of cities	9,345,119,782	6,383,248,490	210,862,970	125,336,147	2.3	2.0

[1] Not reported separately.

Table CXXXIII shows a decided localization of slaughtering and meat packing in the middle West, the value of products for Illinois, Kansas, Nebraska, Indiana, and Missouri being 73.5 per cent of the total for the United States. Illinois easily led all other states in 1900, with 40.1 per cent of the total.

Slaughtering and meat packing, as the industry is now understood, had its beginning at Cincinnati, Ohio, about 1818. Since that time the center of the industry has moved gradually westward, following the development of new cattle and swine producing sections. This tendency has been intensified by the perfection of artificial refrigeration and refrigerator cars, which has made the difference between the cost of transporting live stock, and meat as a finished product, sufficient to induce packers to establish plants near the stock-raising or stock-fattening sections. These sections, in turn, are determined by the production of grain, principally corn and hay, so that the localization of the packing industry is influenced in a large degree by the production of these agricultural staples. All of the five states mentioned above, whose value of meat products constituted nearly three-quarters of the total for the country, are located in the great corn belt of the middle West.

A distinguishing feature of this industry is its dependence upon good railroad facilities. Hence the localization by cities, as shown in table CXXXIV is natural. The value of the slaughtering and meat packing products of Chicago, Ill., constituted more than a third of the total for the United States; of Kansas City, Kans., 10.5 per cent; and of South Omaha, Nebr., 9.7 per cent. The combined value of these products for the three cities was more than half of the total for the United States.

Tables CXXXV and CXXXVI show the value of slaughtering and meat packing in each of the above states and cities in comparison with the value of products in all industries. In 1900 slaughtering and meat packing constituted nearly half the value of all products in Nebraska, 44.6 per cent in Kansas, and 22.2 per cent in Illinois. The specialization of particular localities in this industry appears most strikingly in the case of South Omaha, Nebr., where the value of slaughtering and meat packing products in 1900 constituted 96.3 per cent of the value of all manufactured products. The per cent was 88.4 for Kansas City, Kans.; 60 for St. Joseph, Mo.; and 28 for Chicago, Illinois.

16. *Summary of Localized Industries.*—For the sake of comparison, the most marked instances of localization shown in the preceding tables are combined in tables CXXXVII and CXXXVIII. These tables include also several additional industries which show a marked localization.

TABLE CXXXVII.—*Localization of specified industries by states: Summary, 1900.*

SPECIFIED INDUSTRIES.	Value of products in the United States.	States.	Value of products in the state named.	Per cent of the United States in the state named.
Collars and cuffs	$15,769,132	New York	$15,703,541	99.6
Plated and britannia ware	12,608,770	Connecticut	9,538,397	75.7
Oysters, canning and preserving.	3,670,134	Maryland	2,417,331	65.9
Leather gloves and mittens.	16,721,234	New York	10,854,221	64.9
Clocks	7,157,856	Connecticut	4,545,047	63.5
Coke	35,585,445	Pennsylvania	22,282,358	62.6
Safes and vaults	3,927,867	Ohio	2,407,655	61.3
Whips	2,734,471	Massachusetts	1,651,221	60.4
Liquors, vinous	6,547,310	California	3,937,871	60.1
Brassware	17,140,075	Connecticut	9,269,159	54.1
Iron and steel	803,968,278	Pennsylvania	434,445,200	54.0
Carpets and rugs, other than rag.	48,192,351	Pennsylvania	23,113,058	48.0
Corsets	14,878,116	Connecticut	6,846,964	46.0
Boots and shoes, factory product.	261,028,580	Massachusetts	117,115,243	44.9
Agricultural implements.	101,207,428	Illinois	42,033,796	41.5
Slaughtering and meat packing, wholesale.	698,206,548	Illinois	279,842,835	40.1
Turpentine and rosin	20,344,888	Georgia	8,110,468	39.9
Cotton, ginning	14,748,270	Texas	5,886,923	39.9
Liquors, distilled	96,798,443	Illinois	38,208,076	39.5
Glass	55,539,712	Pennsylvania	22,011,130	38.9
Hosiery and knit goods	95,432,566	New York	35,886,048	37.6
Silk and silk goods	107,256,258	New Jersey	39,966,662	37.3
Silverware	10,569,121	Rhode Island	3,834,408	36 3
Salt	7,966,897	New York	2,698,691	33 9
Cotton goods	339,200,320	Massachusetts	111,125,175	32.8
Jewelry	46,501,181	Rhode Island	13,320,620	28 6
Leather, tanned, curried, and finished.	204,038,127	Pennsylvania	55,615,009	27.3
Fur hats	27,811,187	Connecticut	7,546,382	27.2
Pottery, terra cotta, and fire-clay products.	44,263,386	Ohio	11,851,225	26.8
Paper and wood pulp	127,326,162	New York	26,715,628	21.0

TABLE CXXXVIII. *Localization of specified industries, by cities: Summary, 1900.*

[Cities of 20,000 population or over.]

INDUSTRIES.	Value of products in the United States.	Cities.	Value of products in the city named.	Per cent of the United States in the city named.
Collars and cuffs	$15,769,132	Troy, N. Y.	$13,460,196	85.3
Oysters, canning and preserving.	3,670,134	Baltimore, Md	2,364,968	64.4
Coke	35,585,445	Connellsville, Pa.[1]	17,128,112	48.1
Brassware	17,140,075	Waterbury, Conn.	8,188,492	47.8
Carpets and rugs, other than rag.	48,192,351	Philadelphia, Pa.	21,986,062	45.6
Gloves	16,721,234	Gloversville, N.Y.[2]	6,487,227	38.8
	16,721,234	Johnstown, N. Y.[2]	2,576,048	15.4
	16,721,234	Chicago, Ill	2,209,529	13.2
Silverware	10,569,121	Providence, R. I.	3,834,408	36.3
	10,569,121	Manhattan and Bronx boroughs, N. Y.	2,741,994	25.9
Slaughtering and meat packing, wholesale.	698,206,548	Chicago, Ill	248,811,997	35.6
	698,206,548	Kansas City, Kans.	73,205,027	10.5
Plated and britannia ware	12,608,770	Meriden, Conn	4,129,896	32.8
Jewelry	46,501,181	Providence, R. I.	12,719,124	27.4
	46,501,181	Manhattan and Bronx boroughs, N. Y.	9,172,849	19.7
	46,501,181	Newark, N. J	7,364,247	15.8
	46,501,181	Attleboro, Mass.[2]	5,701,802	12.3
Agricultural implements.	101,207,428	Chicago, Ill	24,848,649	24.5
Silk and silk goods	107,256,258	Paterson, N. J	26,006,156	24.2
Tobacco, chewing, smoking, and snuff.	103,754,362	St. Louis, Mo	24,411,307	22.7
Corsets	14,878,116	Bridgeport, Conn.	3,224,198	21.7
	14,878,116	New Haven, Conn	1,893,956	12.7
Worsted goods	120,314,344	Lawrence, Mass.	24,678,138	20.5
	120,314,344	Providence, R. I.	16,603,252	13.8
	120,314,344	Philadelphia, Pa.	16,242,250	13.5
Fur hats	27,811,187	Danbury, Conn.[2]	5,007,095	18.0
	27,811,187	Newark, N. J.	3,453,619	12.4
	27,811,187	Philadelphia, Pa.	3,075,470	11.1
Brass castings and brass finishing.	30,343,044	Waterbury, Conn.	5,050,539	16.6
Woolen goods	118,430,158	Philadelphia, Pa.	18,340,012	15.5
Fruits and vegetables, canning and preserving.	56,668,313	Baltimore, Md.	8,477,178	15.0
Hosiery and knit goods	95,482,566	Philadelphia, Pa.	13,040,905	13.7
Iron and steel	803,968,273	Pittsburg, Pa	90,798,086	11.3
Pottery, terra cotta, and fire-clay products.	44,263,386	Trenton, N. J	4,785,142	10.8
Leather, tanned, curried, and finished.	204,038,127	Philadelphia, Pa.	18,187,231	8.9
Cotton goods	339,200,320	Fall River, Mass.	29,286,526	8.6
Boots and shoes, factory product.	261,028,580	Brockton, Mass.	19,844,397	7.6
Glass	56,539,712	Pittsburg, Pa	2,429,686	4.3

[1] Connellsville district.
[2] Under 20,000 population.

It appears from table CXXXVIII that the manufacture of collars and cuffs is the most extremely localized industry in the country, 85.3 per cent of the value of the products being reported for Troy, N. Y. Other industries which show extreme localization are oysters, canning and preserving, with 64.4 per cent in Baltimore, Md.; gloves, with 54.2 per cent in the adjoining cities of Gloversville and Johnstown, N. Y.; coke, with 48.1 per cent in the Connellsville district, Pa.; brassware, with 47.8 per cent in Waterbury, Conn.; and carpets, with 45.6 per cent in Philadelphia, Pa.

17. *Summary of Specialized Centers.*—Table CXXXIX shows the statistics of the most specialized centers mentioned above. In this table the specialization of each city or town is shown upon the basis of wage-earners employed, since this is much more accurate than the value of products as a basis for comparison between industries, such as slaughtering and meat packing or jewelry, which use expensive materials, and pottery or glass, in which comparatively cheap materials are used.

TABLE CXXXIX.—*Specialization of cities, by specified industries: Summary, 1900.*

[Cities of 20,000 population or over.]

SPECIFIED INDUSTRIES.[1]	SPECIALIZED CENTERS.	AVERAGE NUMBER OF WAGE-EARNERS IN SPECIALIZED CENTERS.		
		All industries.	Specified industry.	Per cent of specialization.
Slaughtering and meat packing, wholesale.	South Omaha, Nebr.	6,606	5,938	89.9
	Kansas City, Kans.	10,544	7,664	72.7
Iron and steel	McKeesport, Pa	7,605	6,753	88.8
	Youngstown, Ohio	9,150	6,644	72.6
	Newcastle, Pa	4,992	3,320	66.5
	Johnstown, Pa	6,116	3,871	63.3
Pottery, terra cotta, and fire-clay products.	East Liverpool, Ohio[2]	4,473	3,908	87.4
Fur hats	Bethel, Conn.[2]	780	671	86.0
	Danbury, Conn.[2]	4,296	3,113	72.5
	Orange, N. J	2,712	1,497	55.2
Glass	Tarentum, Pa.[2]	1,420	1,152	81.1
	Charleroi, Pa.[2]	1,270	983	79.1
	Millville, N. J.[2]	2,290	1,463	63.9
	Gas City, Ind.[2]	1,427	890	62.4
	Alexandria, Ind.[2]	1,903	985	51.8
Cotton goods	Fall River, Mass.	32,780	26,371	80.4
	Warwick, R. I.[2]	5,544	4,361	78.7
	New Bedford, Mass.	16,409	12,286	74.9
	Lewiston, Me.	7,159	4,804	64.3
	Manchester, N. H	19,032	10,616	55.8
Boots and shoes	Brockton, Mass.	10,986	8,498	77.4
	Haverhill, Mass	10,600	7,376	69.6
Silk and silk goods	West Hoboken, N. J	3,028	2,306	76.2
	Paterson, N. J	30,190	15,943	52.8
Gloves, leather	Gloversville, N. Y.[2]	8,111	6,075	74.9
	Johnstown, N. Y.[2]	3,884	2,816	59.6
Jewelry	North Attleboro, Mass.[2]	2,162	1,550	71.7
	Attleboro, Mass.[2]	5,106	2,886	56.5
Collars and cuffs	Troy, N. Y.	21,564	14,822	68.7
Worsted goods	Lawrence, Mass.	22,358	10,998	49.2
Hosiery and knit goods	Cohoes, N. Y	8,673	3,685	42.5
Agricultural implements	Springfield, Ohio	6,638	2,359	35.6
Plated and britannia ware	Meriden, Conn	7,531	2,048	27.2
Brassware	Waterbury, Conn	14,914	2,616	17.5
Corsets	Bridgeport, Conn	19,301	2,984	15.5
Leather, tanned, curried, and finished.	Wilmington, Del	16,055	2,454	15.3

[1] Statistics for paper and wood pulp and coke not shown by cities.
[2] Under 20,000 population.

It appears from table CXXXIX that South Omaha, Nebr., was the most specialized industrial center in the United States in the year 1900. The number of wage-earners engaged in slaughtering and meat packing constituted 89.9 per cent of the total number employed in all industries in the city during that year.

18. *The Universal Character of the Localization of Industries.*—The tables presented in this chapter indicate statistically the localization of the industries selected. In some of these cases the causes are apparent, while in others there is a variety and complexity of causes which makes an explanation of the phenomenon a very difficult matter. Most of these causes are not local or even national in their character, for they operate in all industrial nations to bring about the same results. Nearly all of the industries shown above have a localization in England which is quite as marked as that in this country. In Russia there are over 500 villages devoted to the various branches of wood work, in one village practically nothing being made except spokes for the wheels of vehicles, in another nothing but the bodies, etc. Moreover the phenomenon is not a modern one.

for it has appeared in every manufacturing country as soon as local communities have developed trade with each other. A lawyer's handy book written about 1250, and quoted by J. E. Thorold Rogers in his "Six Centuries of Work and Wages," tells of the localization of scarlet cloth in Lincoln, burnet at Beverly, russet at Colchester, needles at Wilton, razors at Leicester, etc.

19. *The Localization of Business Houses in Cities.*—Before discussing the various causes which explain the localization of manufactures, it is necessary to mention an analogy which is sometimes suggested by way of explanation, i. e., the localization of wholesale and retail houses within cities. Every large city has its leather, its dry goods, and its tea and coffee district, and the reason is not hard to find. Leather store number two establishes itself near leather store number one chiefly in order to catch the eye and hence the trade of those purchasers of leather who pass that way as customers of the older establishment. But buyers of manufactured products do not go to the factory towns and cities in any such manner to make their purchases.[1] These are accomplished through jobbers and selling agents scattered over the country. There is thus only a superficial similarity between the localization of commercial houses within a city and the localization of special forms of manufacturing in certain cities and towns.

20. *The Causes of Localization.*—Seven of the various advantages which give rise to the localization of industries may be stated as follows: 1, nearness to materials; 2, nearness to markets; 3, waterpower; 4, a favorable climate; 5, a supply of labor; 6, capital available for investment in manufactures; 7, the momentum of an early start.

All of these advantages except the last operate to prescribe the broad area within which an industry is economically possible. The exact point within this area at which it shall be actual—i. e., the center of localization—is usually the result of a more or less chance decision made in the early days of the region's settlement by some pioneer in the industry. Once successfully started, the manufacture gains a momentum which enables it to persist in the original locality long after the earlier general advantages it possessed have disappeared. The industries shown in tables LXXVII to CXXXVI were selected partly because their localization illustrates the advantages here mentioned. It should be noticed, however, that in almost every case, several of the above causes may be assigned, the actual localization being thus often a resultant of forces which act in nearly opposite directions.

21. *Nearness to Materials.*—The localization of several of the industries included in the above tables illustrates this advantage—the paper industry near the spruce and poplar forests; the tanning industry near the chief tanning materials; slaughtering and meat packing near the stock-raising centers; the manufacture of agricultural implements near the great hard-wood forests and the iron-producing centers; the pottery industry near its clay; the recent growth of cotton manufacturing near the cotton fields; and the beginnings of shoe manufacturing in Massachusetts near the supply of leather. Other striking illustrations of the effect of materials upon localization are shown in tables CXXXVII and CXXXVIII, from which it appears that, measured by the value of products, 64.4 per cent of the oyster canning and preserving was carried on in Baltimore; 48.1 per cent of the coke was manufactured in the Connellsville district; 22.7 per cent of the chewing and smoking tobacco and snuff was manufactured in St. Louis; and 15 per cent of the fruit and vegetable canning and preserving was done in Baltimore.

Fuel is regarded, for census purposes, as a material of manufacture, and the influence of its supply is very marked in the localization of the glass industry near the natural gas wells, and in the iron industry in Pennsylvania and Alabama.

22. *Nearness to Markets.*—This is an important factor in the localization of all industries, its influence upon the localization of manufacturing in general being especially apparent. Nearly 48 per cent of the manufacturing of the country is in Massachusetts, Connecticut, Rhode Island, New York, New Jersey, and Pennsylvania—not so much because there is better waterpower or more abundant material for manufactures in these states, but very largely because the greatest population was there when the manufacturing developments of the country began. The influence of the market in causing a migration of manufacturing in general may be observed by comparing the movement of the center of manufactures and of the center of population since 1850, as shown on page CLXXI. The center of manufactures has moved steadily westward, following roughly the movement of the center of population.

Eight of the above 15 selected industries are localized east of the Alleghenies chiefly because they became established in this section at a time when it was the only important market in the country. In certain of these industries the influence of the market upon the localization has been especially marked, i. e., the iron and steel industry in Illinois, the manufacture of agricultural implements, the paper and pulp manufacture, and the jewelry and silk industries.

Nearness to materials and nearness to markets, in so far as these expressions are used with reference to an effect upon localization, mean more than mere geographical distance. They include the general accessi-

[1] The modern effort to eliminate the middleman leads to dealing direct with the factory towns and cities, and may seem to contradict this last statement. But the achievements in this direction thus far are too small to have any effect upon the localization of industries, and are, therefore, disregarded here.

There are certain other advantages attaching to business centers within a city, especially to wholesale centers, which are directly analogous to the advantages of a specialized manufacturing city or town, as these latter are explained later in this chapter. Access to the point where buyers congregate is, however, the important factor in the localization of business houses; and since this is practically absent in the localization of manufacturing establishments, no satisfactory explanation of the latter can be based upon the analogy.

bility to materials or markets, affected as this is by the supply or lack of good and cheap means of communication. Waterways have thus had a tremendous influence upon the localization of industries, for they have allowed localities through which they passed to make an early start in manufacturing, and by the momentum thus acquired to retain their prominence in many cases, even after the building of railroads has removed the special advantages which they at first possessed.

It is evident, moreover, that the importance of the two advantages just explained varies greatly among the several industries according as their products are easily and cheaply transportable or are transported only with great difficulty and at a great expense. In all industries where the product is not transportable, such, for example, as the construction of houses, the market controls the localization absolutely. It is plain, also, that the power of materials and market over industry is less, just in proportion as the materials and products are more easily and more cheaply shipped. From the manufacturer's standpoint it is always a counting of the costs of shipment. If these are heavy, the industry tends to locate where the amount of transportation will be least, but if they are light, the influence of materials and market is so slight that it often disappears altogether. The words "heavy" and "light," as used in this connection, are not to be understood in an absolute sense, but relative to the value of the material or product transported. A cheap and heavy raw material, such as clay, will be carried only a very short distance. Transportation charges, after a few hundred miles, would constitute too large a part of the cost of manufacture. But an equal weight of this same clay after its value has been trebled by being converted into pottery might be carried a long distance before the shipping costs would become prohibitory.

The industries mentioned above as influenced largely by their market and the source of materials used—paper, iron and steel, slaughtering, pottery, and leather—are those in which the materials or products have a great weight or bulk in comparison with their value, and in which, therefore, freight charges are a very important element of costs.

23. *Waterpower.*—This has been in the past a very important advantage, but to-day its influence upon localization of industries is not very apparent. Naturally, this influence was greatest before the days of steam. All industries requiring power grouped themselves along those waterways which had a good natural fall. This early impetus, combined with forces to be described later, has tended to perpetuate such industries in their original locations, even when steam has become more important, as a source of power, than water.

It is interesting in this connection to compare the manufacture of cotton goods with the manufacture of shoes. Power has been applied to some branches of the cotton manufacture for more than a hundred years, while shoe manufacturing has been a power industry less than half that time. Largely as a result of this fact, water supplies 31 per cent of the power used in the cotton industry to-day and but 4.6 per cent of that used in the manufacture of shoes. That is to say, the localization of both industries began in the early days, but the manufacture of shoes, being for years a hand industry, was independent of waterpower, while the cotton manufacture, of necessity, sought the waterways. When the necessity for power in the shoe manufacture arose, the industry was too thoroughly established away from the sources of waterpower, and recourse was had to steam. Waterpower has been an important factor in the localization of 3 of the other industries specified above—silk goods, hosiery and knit goods, and the pulp manufacture.

24. *A Favorable Climate.*—This has also an influence which is discernible in the localization of industries. The influence of a moist climate, which is also even throughout the day, upon cotton spinning in New Bedford and Fall River, Mass., has been mentioned above. More often, however, the advantage of a favorable climate makes itself felt through its invigorating effect on labor.

25. *A Supply of Labor.*—Two other advantages must be mentioned, for there are times when they have considerable weight. These are the supply of labor and the supply of capital and credit facilities. The "supply of labor" is something far from mobile. It is very human, with all the attachments of home and friends. It can be easily lured into a new industry which is established "at home" or near by, but the wages paid must be considerably greater to attract it into other sections. Manufacturing industries tend, therefore, to become established in a section where there is a good supply of labor. The New England towns have been preeminently of this type. All about them were farms which had reached the point of exhaustion, and could therefore employ profitably only a small part of the rising generation. The surplus labor thus created gravitated naturally to the nearest town in search of employment, and the early development of numerous manufactures was thus made easy. For a similar reason there can be no extensive manufacture in those parts of the West where the increasing population is mostly absorbed in agriculture which is still incompletely developed.

26. *A Supply of Capital.*—It is almost equally important to have a supply of local capital. Although most large enterprises are now financed from the great financial centers, the plants are located usually in places which have already become industrial centers in a smaller way through the efforts of the people there, and by means of their money. The cotton mills which are springing up through the South just now illustrate the tendency of a town to own itself in the

early stages of its industrial life, and Fall River affords a most remarkable illustration of the perseverance of this tendency. A prosperous town, therefore, where the people are "making money," is, in so far, a favorable locality for the establishment of manufacturing industries of some sort. Outside capital will undoubtedly be solicited, but it will be obtained more easily and more surely after the people themselves "have taken largely of the stock." Banking facilities exert a similar influence, making the community's capital more available for investment than it would otherwise be. All of these considerations have operated to favor the early development of manufacturing centers in New England and the Middle Atlantic states, agriculture absorbing a large share of the available local capital in the Southern and Western states. One of the causes which led to the establishment of the cotton manufacture in New Bedford about 1850 was the supply of local capital set free about that time by the decline in the whaling industry.[1]

27. *The Momentum of an Early Start.*—The various advantages which have been described thus far can be expressed in dollars and cents. The places possessing these advantages attract manufacturers on account of the comparatively low cost there of producing and marketing goods. But these advantages in almost all cases account for localization only in its broader sense. They prescribe an industry's possible area, but they fail to explain the most marked form of localization—that within a single city or town, or group of cities and towns.

Somewhere within the possible area—made such because of the advantages just described—an enterprising man started the pioneer establishment of a certain industry. Why was this place chosen rather than any other within the possible area? Or why was this industry chosen rather than any other for which this place was suited? This is the first problem, and the second follows naturally: Why, after the first factory had become established, was it to the advantage of competitors to choose the same spot for their establishments, rather than other localities within the possible area? The solution of the first problem in the case of any industry is to be found by reference to its early history in this country.

In most cases it will be found that the original establishment of an industry in a locality was largely a matter of chance. The shoe industry in Lynn, Mass., is a case in point. In the early colonial days this settlement had its quota of cobblers, who made as well as repaired the shoes for the region thereabout, but did not attempt a broader market. In 1750, however, John Adams Dagyr, a Welshman, and a skilled shoemaker, settled in Lynn, and began to teach his apprentices the art of fine shoemaking. It soon became known that shoes were being made in Lynn nearly as good as the best made abroad, and as early as 1764 Dagyr was spoken of in a Boston newspaper as "the celebrated shoemaker of Essex."[2] Had this man settled in Roxbury, Mass., rather than Lynn, the bias toward shoe manufacturing might have become established in that quarter, and Roxbury instead of Lynn might to-day be one of the three great shoe centers of the United States.

The nature of many a city's industry has been shaped in just this way in the early days of its history by the decision of one man. Instances of this have been cited in the preceding paragraphs, in connection with the localization of collars and cuffs, hosiery and knit goods, jewelry, gloves, and fur hats.

The decision of the pioneer in an industry at a given point rests on various grounds. He establishes usually an industry with which he is familiar because of experience obtained elsewhere. Several of the above selected industries have been established in their respective localities by the emigration from Europe of individual skilled workmen or groups of skilled workmen. The town where such a man chances to settle is taken for a location of the industry in most cases without much questioning whether or not it is better adapted for it than any other town. But if he searches for a suitable place, his chance acquaintance with one locality, or the offer of a friend to assist him if he establishes there, often influences his decision at the expense of another and perhaps more suitable locality where he has never visited, or where no acquaintance appeared to offer inducements. In many instances towns offer inducements to manufacturers, such as exemption from taxation for a period of years, and such efforts have often been successful in building up an entirely new industry in the town.

But if the industry is to be perpetuated and to increase in the locality, the original establishment must succeed, for it is the influence of its success which causes other establishments to spring up around it. In the early history of every industry numerous enterprises fail, not so much because of the unfitness of the locality chosen, as because of the unfitness of the man who attempts to carry on the industry at that point.

28. *The Habit of Industrial Imitation.*—It is only after the first enterprise has succeeded in any locality, that the real localizing process begins. The mainspring of this process is the habit of industrial imitation—a habit as powerful as it is universal, and so important in this connection that it warrants a somewhat closer analysis.

It has been shown above that one of the normal requisites of an industrial locality is a good supply of local labor and local capital. Suppose the enterprising man establishes himself in such a community and succeeds there. His success proves that the economic conditions are favorable—that he is within the possible area of that industry. But it does more, it creates a

[1] Report of the Industrial Commission. Vol. XIV, page 535.

[2] Lynn, Fifty Years a City, page 66.

local bias toward this particular industry. This bias affects all three classes necessary to its expansion; entrepreneurs, capitalists, and laborers.

In the first place entrepreneurs naturally choose the existing industry rather than establish a new one. On the assumption of a prosperous and growing town, there is continually arising a class of enterprising men who wish to embark in manufacturing for themselves, and they naturally choose an industry with which they are familiar—one which they have actually seen succeed. It requires courage to be an industrial pioneer; more courage, in fact, than most men possess. They have read, perhaps, of much larger profits being made in branches of manufacturing not carried on in their neighborhood; they may have visited towns in another part of the country where some such industry has been very successful, and they are tempted to establish this industry in their town, rather than to imitate the establishment which has been operating there successfully. The chances are great, however, that they will resist the temptation of larger profits, in favor of what they regard as surer profits, and will choose the local industry. The other industry may be just as safe, but the probability of success if they follow the beaten path has been emphasized to them each day as they have watched the smoking chimney of the local factory, and have noticed the rise of the proprietor from moderate circumstances to comparative affluence. Their choice of this industry becomes, therefore, almost inevitable. Moreover, it is probable that the men who thus launch out for themselves have been employees or foremen in the local factory. They are relatives, perhaps, of the proprietor, and are familiar with all the details of this industry, while in any other they would have all to learn. This last feature has been illustrated in fully half of the industries specified above.

In the second place, the capital needed to finance the new establishment—in addition to that supplied by the new entrepreneur himself—is much more easily obtained if the new establishment is to produce the same line of goods as the one already in existence. If a loan is desired for the establishment of an outside and less familiar industry, there is naturally a raising of the interest rate as a means of insurance; or the stock, if offered for sale, will for the same reason sell at a lower figure.[1]

In the third place, the best grade of local labor prefers to have employment in an industry which seems to offer a future rather than in one which seems in the nature of an experiment. This influence is comparatively slight, however, for all ordinary labor takes such employment as is offered without much questioning.

[1] The opposition of the manufacturer or the manufacturers already established in the industry must, however, be counted on in many cases, especially if the products made are for sale in a comparatively limited market. As far as such opposition seems likely to develop, the advantage above described is counteracted, local investors becoming doubtful regarding the safety of their money under such circumstances.

29. *Economic Advantages of Specialized Centers.*—All the above decisions—the decision of the pioneer in the industry, and the decisions of the few who follow immediately in his steps—seem to be made with but little consideration of the economic advantages which the locality chosen may possess for carrying on the industry in question—i. e., the possibility of producing cheaper at this point than elsewhere, or being better able there to market the products. Very quickly, however, certain decided economic advantages emerge. Workmen, skilled in the specialty for which the center begins to be known, flock there and wait their chance "to be taken on at one of the mills." In many cases an immigration of skilled labor from corresponding centers abroad sets in. East Liverpool, Ohio, was at one time chiefly an English town as the result of such immigration. A pool of specially skilled labor is thus formed which acts as a powerful inducement to the expansion of the industry from within, while at the same time it draws prospective manufacturers to this center from without.

The use of machinery has, however, tended to lessen the importance of a specially skilled labor supply. In proportion as an industry becomes automatic, its localization becomes independent of its supply of special labor. It is interesting to note in this connection that 6 of the 15 industries shown in tables LXXVII to CXXXVI, on account of their marked localization, are industries in which hand work constituted for many years the most important part of the operations. In some instances, such as the glove, collar, and hat manufacturing, hand work is still an important factor, while in the manufacture of boots and shoes hand work persisted to a large extent as late as 1870.

In a specialized community of this sort the contact of workmen and employers with each other results in a mutual improvement in manufacturing methods. Laborers "talk shop" more or less when not at work, and the devices adopted in one establishment for making the work easier are soon adopted in all. Similarly, it is easy for a manufacturer in such a place to note the experiments with patented improvements carried on in another establishment, and to adopt such improvements just as soon as their value is demonstrated, by paying the royalty demanded.

In the course of time another advantage arises in such a specialized center—the possibility of subdividing the processes of manufacture among several establishments—a division of labor among employers. In the Massachusetts shoe cities, for example, there are establishments which make only uppers, and others which make only "findings" (counters, shanks, heel stiffeners, etc.). Soon, also, subsidiary industries spring up for the supply of the special machinery and tools required. As a result, new and up-to-date tools and machinery may be had in such centers with the least possible delay, and existing machinery may be kept continually in repair.

Thus a town's specialization increases its supply of specialized labor and specialized machinery. These in turn react to increase the specialization of the town. Success breeds success in an almost geometrical ratio. Cause and effect propel each other in a continually expanding circle, the self-created local advantages becoming in time so powerful that they entirely neutralize the greater general advantages of location which other localities may have come to possess.

30. *Conclusion.*—In conclusion, it should be noted that in proportion as a country develops industrially and upon a larger scale; in proportion, moreover, as there is a mobility of labor and freedom from the influence of inherited and over-conservative ideas, the localization of industries tends to be governed increasingly by purely economic considerations and less by the fortuitous considerations which accounted in many cases for localization in earlier years. The influence of industrial combination in this direction has already become marked. The system of uniform bookkeeping, introduced in many such combinations, enables managers to know accurately the comparative advantages of several localities for the industry in question, and to redistribute their production accordingly.

XL.

LIMITATIONS UPON THE USE OF CENSUS STATISTICS.

Of the very many limitations upon the use of census figures which accumulating experience has disclosed, some have already been adverted to in connection with different topics elsewhere discussed; but as there are many others which have nowhere been definitely recognized or discussed in the reports of earlier censuses, it seems desirable to include in the present report the following definite statement regarding these limitations.

The census statistics of manufactures are useful in determining the relative importance of states, cities, and other communities in manufacturing, together with their relative growth in this branch of production. They are also useful in determining the progress made in different branches of manufacturing in the country as a whole and in its various subdivisions. The comparative tables, as presented in the censuses of 1880, 1890, and 1900, enable the rate of growth to be determined in all these instances with a degree of accuracy sufficient for all practical purposes. They make it possible to ascertain the gross value of manufactured products, the average number of persons employed, and the total amount paid in wages, at the several periods; with sufficient accuracy to be of value in economic and sociological discussions. They show the general industrial condition of the country at the time of census taking, reflecting both national and local prosperity or depression, and to this extent they can be safely used as a basis for legislative and administrative action.

But when it comes to the secondary analyses of the census statistics of manufactures, and the basing of conclusions upon the exact relations which exist between two groups of figures, extreme caution is necessary; for unless there is a thorough understanding of the conditions under which the statistics of manufactures are gathered and aggregated, these analyses will result in conclusions altogether misleading, and often at direct variance with the facts as determined by the individual experience of single manufacturing establishments or groups of such establishments. It is never safe to generalize from a great mass of figures such as the Census Office presents, and then apply such generalizations to particular cases, and expect thereby to deduce either a uniform rule or uniform ratio. Certain of the analyses which have been made by those who undertake the study of census figures for the purpose of arriving at fixed conclusions regarding the conditions prevailing in industrial operations may be referred to for the purpose of warning the public against the impropriety of attempting such analyses.

1. *Profits of Manufacturing.*—At the censuses of 1890 and 1900 the Census Office has attempted to obtain a full account of the more important items which together make up the cost of the products; but there still remain many items of expense of which it is impossible to obtain a record, and for this and for other reasons the census figures throw no light whatever upon the profits of manufacturing or upon the relative shares of the increment from manufacturing which fall to capital and to labor respectively. The items of expense, which the census reports separately, are salaries, wages, miscellaneous expenses, and materials used. Combining these several items as a total cost of products and deducting this sum from the gross value of products returned, we have a figure which is sometimes assumed to represent the profit of the entrepreneur. At the census of 1890 these figures were as follows:

TABLE CXL.—*Cost and value of products: 1890.*

Gross value of products		$9,372,437,283
Cost of materials used	$5,162,044,076	
Total salaries and wages paid	2,283,216,529	
Miscellaneous expenses	631,225,035	
Total cost		8,076,485,640
Excess of gross value of products over total cost		1,295,951,643

At the census of 1900 the corresponding figures were as follows:

TABLE CXLI.—*Cost and value of products: 1900.*

Gross value of products		$13,004,400,143
Cost of materials used	$7,345,413,651	
Total salaries and wages paid	2,726,045,110	
Miscellaneous expenses	1,027,755,778	
Total cost		11,099,214,539
Excess of gross value of products over total cost		1,905,185,604

Such a calculation would make it appear that the profit of manufacturing was nearly $1,300,000,000 in

1890, or equal to more than one-half of the total wages paid. The total capital invested in manufactures at that census was $6,525,156,486, or, including the value of hired property, $7,681,381,543, and the average rate of profit on capital invested would therefore appear to be nearly 17 per cent. The census of 1890 warned readers against such a misuse of the figures by means of a footnote in which it was stated that the difference between the cost of manufacturing and the value of products at the place of production did not show the true average profit or earnings because the costs reported did not include an allowance for depreciation in plant or for mercantile risks.[1] This note accompanies a table, however, which shows for each industry reported the average cost of manufacturing products valued at $100. The total cost of such production in all the industries taken together is stated to have been $86.17, and in the footnote is a caution that the difference between $100 and $86.17 is not to be assumed to represent the profit in manufactures. Criticising this table, Prof. Richmond Mayo-Smith declares that the accompanying explanation "seems to me entirely inadequate to justify the publication of the table."

It is impossible to draw correct conclusions from such a table. Not only do the figures take no cognizance of the depreciation in the plant, but they are defective in not including other important costs. The expenses incident to the sale of products are entirely omitted. It is true that manufacturers attempt to add the entire amount of such expenses to the price of the products; but in so far as this is not possible, there remains a cost which the manufacturers must stand, but which is not accounted for in the census figures. Moreover, these figures take no cognizance of the interest on capital invested. They ignore the element of losses due to bad debts, which is also a large sum when scattered over such an enormous value of product. They ignore the fact that there is always an element of risk, and more or less of speculation, in marketing manufactured products. If opportunity favors, the producer sells at a high price and makes a profit. If the market is against him, he may lose his profit or he may even sell at a loss. The difference between the factory value and the actual selling value of products is a field of statistics into which the Census Office can not successfully enter. It would include so many different and additional parties in interest that the inquiry, even if it could be successfully made, would have no value for the purpose of ascertaining even approximately the profits of manufacturing. These profits vary in a marked degree in different industries, in different establishments carrying on the same industry, and in different years. They are dependent upon a multitude of considerations, which can not be shown or known, and it is impossible to say from the figures given how much of the value in excess of the apparent cost of manufacturing is a profit resulting from that manufacture.[2]

Moreover, the schedules at both censuses were so constructed in the grouping of accounts current with the live capital or assets as to prevent showing a true balance sheet of the business of any establishment reporting. As a matter of fact, it was impossible to determine from the schedules received whether the business had been conducted at a profit or at a loss during the year covered by the report. Still again, an insurmountable obstacle to any calculation showing the profit of manufacturing lies in the fact that the value of products given is a gross value and is not a true or net value, as has been elsewhere explained in this report. This element of duplication entering into the returns of products so complicates and entangles the statistics as to render abortive any attempt to elicit nice calculations of the kind under discussion.

That the general manufacturing business of the country was carried on at a profit during the census year, and that the result of the entire operations was a substantial addition to the permanent wealth of the country, may be fairly inferred from the figures. But whether the increment thus arising was on the average more or less than the corresponding increment in ordinary mercantile, banking, or other commercial pursuits, or the increment from agricultural or mining operations, it is impossible to ascertain from any data which the Census Office can supply, and the attempt to ascertain it from this data can only result in false conclusions.

2. *Percentage of Interest Earned upon Capital.*—For the same reasons, it is impossible to ascertain, even approximately, what percentage of interest was earned upon the capital invested in manufacturing during the census year. Additional reasons why such computation is impossible are given on page xcvi, where the returns for capital are discussed and the defective and illusory character of these returns pointed out.

3. *Average Earnings of Wage Workers.*—It is not possible to ascertain from census statistics anything definite and satisfactory regarding the average earnings of those who are employed at wages in the manufacturing industries of the country. The various reasons why this is not possible are given on pages cxi

[1] Eleventh Census of the United States, 1890, Manufacturing Industries, Part I, page 49.

[2] Commenting upon this point, Professor Mayo-Smith writes as follows:

"All such calculations are a delusion and a snare. * * * If the table is useless as showing actual profit in the sense of excess of value of the final product over cost of production, it is still more valueless for showing the relation of the reward of the entrepreneur to capital invested, trade risk, and his own energy and ability. But surely in considering whether profits are excessive or not (which is the latent thought in all attempts to measure profits) this is the essential thing. The statistical method is entirely inadequate for the solution of such a problem, and the presentation of figures (themselves notoriously imperfect) in such a way as to induce the unwary to believe that they have a solution, is not only misleading but mischievous." *Statistics and Economics*, pages 342 and 343.

to cxxiii, where the statistics of employees and wages are discussed.

4. *Distribution of Manufacturing Values between Capital and Labor.*—It follows, from what has been said above, that it is impossible to gain from census figures any definite knowledge of the respective shares of capital and of labor in the increment that results from manufacturing. The definite amount of money paid out during the census year in the form of wages has been ascertained, with what may be regarded as a satisfactory degree of accuracy, to be $2,322,333,877, and this sum we know to be the contribution which manufactures return to the wage-earning class as a result of the operations carried on, but what relation this sum bears to the interest earned on the total capital invested, or what relation it bears to the general profits of manufacturing, it is impossible even to guess, as the result of any analysis of these figures; and the attempt to ascertain it by such an analysis, in view of the conditions surrounding the compilation of the statistics, can only be pronounced a statistical perversion.

The census machinery is not organized in a manner that will permit the ascertainment of such relations, and census methods preclude drawing any trustworthy conclusions along these lines. Such relations can only be determined with any degree of reliability by special investigations of typical establishments in typical lines of industry, having that particular object definitely in view; and even then, the results must be modified if an attempt is made to generalize from typical establishments to the whole body of manufactures, by taking into consideration the fluctuations which constantly occur in every line of industry tending to alter the relations of the several elements in the problem.

5. *The "Labor Cost" of Production.*—It is not possible to ascertain from the census statistics the so-called labor cost of production, either in manufactures in general or in any specific line of manufactures. The reasons why this is so may be explained in some detail. The three items of the census reports upon which such a calculation would depend are labor, materials, and products, and a close analysis of these reveals the fact that they are merely relative terms, each standing for the same thing, in a different form, in one or the other of the stages of a series of industrial conversions. The whole process of industry is a mere transformation of labor into material, and material into product, by the aid of capital; and in the bringing together of the results of these processes in a census there is no point at which one is so distinct from the two others that the dividing line can be sharply defined. Such being the case, there can exist no significance or scientific value in the ratio of average wages to average product per wage-earner, or of wages to value of product, or of the cost of materials to value of product, as these items are ordinarily combined in census statistics.

The following comparison between "labor cost" (percentage of total wages to value of products) and average wages in three selected industries will illustrate the absurdity of basing any conclusions upon such a comparison:

TABLE CXLII.—*Labor cost in three industries.*

INDUSTRY.	Per cent of wages to value of products.	Average wages.
Iron and steel	15.0	$548
Cotton goods	25.6	286
Flouring and grist mill products	3.2	478

The reason for the variations shown in these instances is apparent. The value of products in any industry is dependent to an extent upon the labor of the wage-earners employed in that industry, but it is also dependent upon the cost and character of the materials used; and this, in turn, is dependent upon the use of crude materials, or materials which have already passed through one or more processes of manufacture. By reason of the increasing specialization of industry, and the accompanying tendency in manufacturing establishments to utilize partially finished materials, which have been made in other establishments, the census figures show, from decade to decade, a constant tendency toward an increase in the cost of materials compared with the "labor cost." The necessary mathematical consequence of this tendency, in any .lculations such as we are considering, is to reduce the percentage of the labor cost to the value of products. But that this does not represent a real reduction in the labor cost must be obvious to anyone who takes into consideration the fact that the semi-manufactured materials which enter increasingly into the computation are themselves chiefly the results of labor in earlier stages of manufacturing operations, and may properly be regarded, therefore, as a part of the labor cost, if they are to be considered at all in the endeavor to establish any such relationship. Moreover, the original crude materials, especially agricultural products, owe so much of their value to labor that it is possible in the final analysis to resolve all but an almost negligible minimum of their cost into a cost for labor.

Some illustrations may be given of the manner in which all this operates to affect the census statistics and to render futile any attempt to extract from them a true percentage of labor cost. In the textile manufacture there are many mills which carry on simultaneously all the processes of manufacture, taking the raw cotton or wool, as it comes from the field or the farm, and carrying it through the several stages, until the finished cloth is ready for the market. In a few cases the process is carried a step further, and clothing is made in the same mill. In all such mills the percentage of labor cost will be apparently high, by reason of the low

value of the material operated upon in comparison with the highly finished products. In another mill, devoted exclusively to weaving, all the yarns consumed will be purchased and will appear in the census figures under the head of materials. They possess, in their semi-manufactured form, high value as compared with the crude materials in the first mill, and by reason of this greater value the percentage of labor cost will appear to be very much less. This discrepancy will appear in the figures, notwithstanding the fact that the rates of wages paid in the two mills under consideration may be identical for the same services, and the relative earnings of the operatives identical in amount. In the census tabulation, mills operating under these diverse conditions are all grouped together. From such a total, it is clear, no percentage of labor cost can be calculated which has any real significance, or which gives any true idea of the percentage which labor constitutes in the combined operations of all the mills thus grouped together.

What thus occurs in the textile industries, occurs everywhere, and it is increasingly true that all lines of industry tend more and more to specialization, and therefore to an increased use of semi-manufactured materials in their processes; so that in no branch of census statistics can any computation be made which will indicate the true percentage of labor cost in manufactures. As is shown elsewhere, the value of materials used, and consequently the value of products, is swelled in the progress of census compilation by a series of duplications, often rising to three or four in number. For these duplications in the value of products there is no offset in the wage column, and thus again it is seen that computations of the kind under discussion are impossible from the census figures.

6. *Conclusion.*—The precautionary warnings above given, against the misuse or abuse of the census statistics of manufactures, might be extended to still other instances in which refinements of analysis have been made the basis of false economic deductions concerning the relations of capital and labor. In concluding this section of the report, which embodies the interpretation of the chief statistician in charge of manufactures at the Twelfth Census, of the statistics therein contained, the writer feels constrained to make record, as the result of experience and observation during the progress of the work, of his conviction that the science of statistics, as applied to manufactures, is yet in its infancy, and offers larger opportunity for advance and improvement than any other branch of statistical work. It may in time become possible to utilize these statistics in the search for the truth, along some of the lines in which, as above indicated, the results of such use are at present certain to involve a large element of error. The establishment of a permanent census office was the first and the indispensable essential to the realization of this ideal. In such an office, the experts trained at one census can immediately devote themselves, on its completion, to a study of the points at which improvement is possible and necessary; and the interval between the completion of one census and the commencement of another can be profitably devoted to the study. In the opportunity thus afforded lies the prospect that each successive census of manufactures will be, as it can be and should be, an immense advance, from the scientific point of view, upon its predecessor.

The object of the science of statistics is to present *the truth*, in the several fields of human experience, in measurable terms. Statistics of manufactures have to do with the most complex, the most varying, and the most important phases of modern civilization. They are far more important, from this point of view, and can be made still more useful, than those which pertain to any other branch of census inquiry. And yet, singularly enough, they comprise the branch of census work to which the least study has been devoted by economic students in this country, and to which the least attention has been paid in the official investigations of the great industrial nations of the world. The Twelfth Census of manufactures has been able to make some advance over the similar censuses of the past, and it is a precursor of the still greater advance which can and will take place at each decade in the future.