

## CHAPTER VIII.

### RELATIONSHIP OF INDUSTRIES.

*Classification by product of chief value.*—The regular Census method of classifying the reports has been followed in all of the tables given in this volume unless otherwise specified.<sup>1</sup> It has been the object at each census to perfect this classification in the endeavor to make the statistics conform more closely to the natural business grouping. For some industries a greater refinement in classification was possible at the earlier censuses because establishments then frequently manufactured only one class of products. The increase in the size of establishments has often been accompanied by an increase in the variety of products, which has rendered it necessary in some instances to make the classification more general. For example, it would now be impracticable to compile statistics of capital, employees, wages, etc., for the manufactures of "hoes" or "rakes" as distinct classes of agricultural implements, as was done at the census of 1860, when 5 establishments with a capital of \$117,500 and a product of \$224,175 were reported for the manufacture of "hoes," and 83 with a capital of \$105,585 and a product of \$138,118, for the manufacture of "rakes." Establishments that manufacture hoes or rakes now, as a rule, make both kinds of tools and also tools of other varieties, and the statistics are shown under the broader term "agricultural implements."

On the other hand there is a constant tendency toward specialization in some branches of manufactures, and as products become specialized they form new groups. For instance, at the census of 1900 the statistics for carriages and wagons included those for automobiles, but the great increase in the manufacture of these machines demanded the separate classification which was given it at the census of 1905. This industry likewise has become specialized, a number of establishments confining their products to the bodies and parts of automobiles. Therefore the three classes, "carriages and wagons," "automobiles," and "automobile bodies and parts," are closely related. Establishments classified as "carriages and wagons" manufactured during the year 1904, 199 complete automobiles, valued at \$235,675. Large numbers of automobile bodies were also manufactured in the establishments that make the complete vehicle, hence the production of bodies and parts shown as a separate class is

duplicated in the values given for automobiles. A similar relationship and interdependence exists between a number of the 339 classes of industry; comparatively few of them, therefore, should be accepted as confined exclusively to the industry covered by the wording of the classification.

In formulating an official list of classifications there is constant inclination to specialize in order to furnish statistics which will satisfy the demand for detail concerning certain classes of products. If this specialization were carried to the point advocated by some, it would result in a meaningless maze of statistics. No single class would represent all of the establishments engaged in its production, and at the same time no intelligent grouping could be made to bring together the statistics for kindred products. Such a condition exists now, to a limited extent, when the statistics for each of the 339 classifications are considered independently, and the extent of the interdependence is given due weight.

While other, and in some respects more scientific, methods of arranging the statistics have been used, the method of classifying the individual reports according to the product of chief value, though not entirely satisfactory, is the only practical method thus far devised for bringing together all of the data for capital, labor, and materials for the same general class of products.

*Partial products.*—The quantity and value of the principal products are shown for some of the leading industries, irrespective of the capital, employees, and materials employed in their production. For example, 1,869,437 tons of 50° Baumé sulphuric acid were manufactured during the census year. Of this quantity, 24,502 tons were manufactured and sold as a finished product in connection with the manufacture of fertilizers; and 467,614 tons, in connection with the manufacture of sulphuric, nitric, and mixed acids; 94,032 tons were reported as a by-product of establishments engaged in the manufacture of zinc; and 305,256 tons by establishments manufacturing chemicals; 9,588 tons as a by-product of other industries; and 968,445 tons were manufactured and consumed by the establishments producing it. As sulphuric acid is manufactured in connection with a variety of other products, and as large quantities are made that do not appear on the market as such, it is impossible to show the capital, employees, and expenses devoted to its pro-

<sup>1</sup> For description of method of classifying, see page xxvi.

duction. A number of the other products for which quantities are shown in the special reports for the leading industries are manufactured under similar conditions.

It is practically impossible to compile statistics of capital, employees, wages, materials, etc., which pertain exclusively to the total production of any single commodity. In fact, in all industries as classified, commodities are manufactured in connection with others of a similar character. One establishment may be devoted exclusively to the production of a single article, such as common brick, while other establishments engaged in the manufacture of the finer grades of clay products also produce brick, and a combination of these reports to obtain the total production would

result in a total for capital, employees, etc., representing other commodities than common brick. The only way to obtain statistics of capital, employees, wages, and materials for a particular class of products is to confine the enumeration to representative establishments. The object of the census, however, is to make a complete enumeration to show the magnitude of the industries rather than the relationship between capital, expenses, and production.

*Generic groups.*—The 339 classes of industry can be arranged in 14 groups, according to the character of their predominating raw material. The statistics are grouped in this manner in Table LXXIV, and from an economic standpoint it is the most satisfactory arrangement.

TABLE LXXIV.—COMPARATIVE SUMMARY—FOURTEEN GROUPS OF INDUSTRIES: 1905 AND 1900.

GROUP.	Census.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		WAGE-EARNERS AND WAGES.						Miscellaneous expenses.	Cost of materials used.	Value of products, including custom work and repairing.
				Number.	Salaries.	Total.		Average number.						
						Average number.	Wages.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.				
United States.....	1905 1900	216,262 207,562	\$12,686,265,673 \$9,978,825,200	519,751 364,202	\$574,761,231 380,889,091	5,470,321 4,715,023	\$2,011,540,532 2,009,736,799	4,244,538 3,635,236	1,065,884 918,511	159,899 161,276	\$1,455,019,473 905,600,225	\$8,503,049,756 6,577,614,074	\$14,802,147,087 11,411,121,122	
Food and kindred products.	1905 1900	45,790 41,159	1,173,151,276 900,927,187	53,224 45,134	51,456,814 38,560,214	354,054 301,305	164,601,803 125,338,463	264,682 227,282	79,804 63,091	9,568 10,932	131,773,642 75,614,321	2,304,416,564 1,778,644,270	2,845,234,900 2,193,791,594	
Textiles.....	1905 1900	17,042 17,047	1,744,169,234 1,340,633,629	61,907 43,558	69,281,415 50,350,266	1,156,305 1,022,123	410,841,630 341,651,466	492,161 423,573	582,630 521,284	81,514 77,266	190,066,204 128,154,477	1,246,562,061 894,846,961	2,147,441,418 1,628,606,214	
Iron and steel and their products.	1905 1900	14,239 13,874	2,331,498,157 1,538,459,831	82,112 50,098	100,444,686 58,431,509	857,298 737,986	482,357,503 384,233,365	830,274 716,186	18,510 13,779	8,514 8,021	166,896,587 91,955,566	1,179,981,458 993,965,831	2,176,739,726 1,806,278,241	
Lumber and its remanufactures.	1905 1900	32,726 35,181	1,013,827,138 730,067,675	45,555 32,410	48,571,861 29,992,488	735,945 672,655	336,058,173 253,626,194	708,357 647,508	16,673 13,229	10,915 11,918	130,850,824 64,067,774	518,908,150 481,761,505	1,223,730,336 1,000,778,057	
Leather and its finished products.	1905 1900	4,945 5,313	440,777,194 327,804,674	17,233 14,391	18,372,722 14,486,571	255,368 241,662	116,694,140 98,726,369	182,126 109,886	65,843 65,310	7,390 6,400	40,737,343 91,955,566	471,112,921 390,965,831	705,747,470 560,619,254	
Paper and printing.....	1905 1900	30,787 26,605	798,758,312 557,131,055	80,009 48,120	81,808,311 48,898,355	350,205 297,320	185,547,701 139,950,715	250,375 211,378	90,580 73,886	9,250 12,056	138,245,437 75,971,854	308,209,655 213,701,954	857,112,256 605,114,847	
Liquors and beverages.....	1905 1900	6,381 5,740	659,547,620 515,160,244	12,647 9,804	21,421,353 15,925,442	68,340 55,120	45,146,285 33,217,604	66,309 53,210	1,191 952	840 958	223,446,420 186,025,365	139,854,147 92,806,542	501,266,605 382,898,381	
Chemicals and allied products.	1905 1900	9,680 8,812	1,504,728,510 1,139,093,102	45,071 34,417	49,864,233 36,972,907	210,165 182,227	93,965,248 71,594,508	187,881 162,517	20,401 17,817	1,793 1,893	128,879,323 73,008,984	609,351,160 437,637,550	1,031,065,293 735,432,542	
Clay, glass, and stone products.	1905 1900	10,775 11,527	553,846,652 335,400,558	18,768 12,790	21,555,724 13,079,228	285,365 231,753	148,471,903 102,867,050	265,049 211,832	10,854 9,307	9,462 10,614	37,822,036 18,144,850	123,124,392 85,168,409	361,230,422 270,720,065	
Metals and metal products, other than iron and steel.	1905 1900	6,310 5,505	598,340,758 389,735,215	19,471 13,092	24,854,590 15,519,850	211,706 171,963	117,599,837 87,198,156	176,478 141,347	31,348 26,137	3,880 4,479	41,595,062 19,504,372	644,367,583 481,190,510	922,262,456 710,525,157	
Tobacco.....	1905 1900	16,828 14,959	323,983,501 111,517,318	9,236 7,836	8,800,434 8,593,077	159,408 132,526	62,640,303 47,975,331	85,691 76,218	66,301 49,330	7,416 6,978	80,145,016 78,915,293	126,088,608 92,806,542	331,117,081 263,713,173	
Vehicles for land transportation.	1905 1900	7,285 8,739	447,697,020 394,235,576	24,632 16,338	24,334,118 15,169,197	384,577 314,340	221,860,517 163,698,574	381,283 310,810	2,196 2,237	1,098 1,293	29,107,649 19,662,679	334,244,377 267,129,730	643,924,442 505,094,454	
Shipbuilding.....	1905 1900	1,097 1,107	121,623,700 77,341,001	2,480 1,405	3,339,741 2,007,237	50,754 46,747	29,241,087 24,824,738	40,915 45,711	65 34	774 1,002	5,255,506 3,684,811	37,463,179 33,474,896	82,769,239 74,532,277	
Miscellaneous industries...	1905 1900	12,377 11,394	974,316,571 621,318,135	47,406 34,749	50,655,229 32,902,753	390,831 307,296	187,514,312 134,833,266	303,957 237,778	79,398 62,118	7,476 7,400	101,198,364 48,537,620	460,205,501 332,732,413	941,604,873 655,010,866	

The grouping in the above table is controlled by the similarity in the raw material consumed by the industries composing each group, the use of the product being sometimes an important factor. The different classes of products included in each group are indicated

by the group numbers opposite each industry in Tables 1, 3, and 5. In addition to the statistics shown in these and other tables in this volume, monographs containing detailed and technical information have been prepared for the following industries:

Agricultural implements.  
 Automobiles.  
 Beet sugar.  
 Bicycles and tricycles.  
 Boots and shoes.  
 Butter, cheese, and condensed milk.  
 Buttons.  
 Canning and preserving.  
 Carriages and wagons.  
 Cars, steam and street railroad.  
 Chemicals.  
 Clay products.  
 Coke.  
 Cotton manufactures.  
 Cottonseed products.  
 Dyeing and finishing textiles.  
 Dyestuffs and extracts.  
 Electrical machinery, apparatus, and supplies.  
 Explosives.  
 Fertilizers.

Flax, hemp, and jute.  
 Flour and grist mill products.  
 Gas, illuminating and heating.  
 Glass.  
 Gloves and mittens, leather.  
 Hosiery and knit goods.  
 Ice, manufactured.  
 Iron and steel.  
 Leather, tanned, curried, and finished.  
 Lumber and timber products.  
 Metal working machinery.  
 Musical instruments.  
 Needles and pins, and hooks and eyes.  
 Oil, essential.  
 Oilcloth and linoleum.  
 Paints.  
 Paper and wood pulp.  
 Pens and pencils.  
 Petroleum, refining.  
 Printing and publishing.

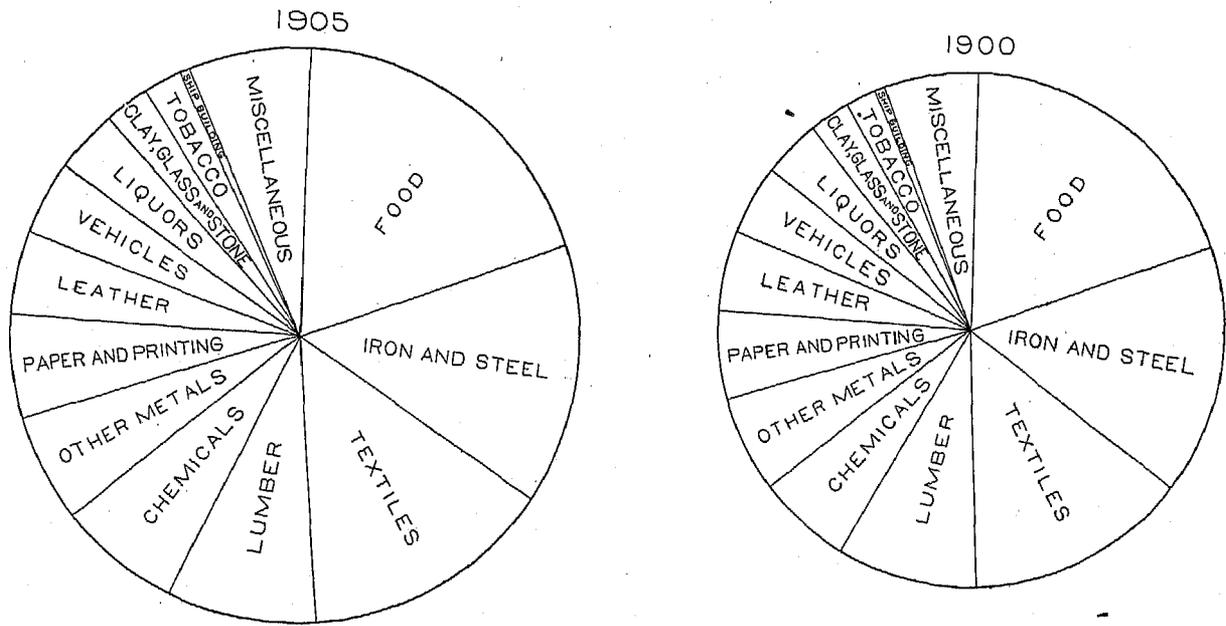
Rice, cleaning and polishing.  
 Salt.  
 Shipbuilding.  
 Silk and silk goods.  
 Slaughtering and meat packing.  
 Smelting and refining, copper.  
 Smelting and refining, lead.  
 Smelting and refining, zinc.  
 Soap.  
 Starch.

Sulphuric, nitric, and mixed acids.  
 Tin and terne plate.  
 Tobacco.  
 Turpentine and rosin.  
 Varnishes.  
 Wood distillation, not including turpentine and rosin.  
 Wool manufactures.

In the following discussion of the statistics for each of the 14 groups tables giving the statistics for censuses prior to 1880 are presented for some of the important industries. For the statistics from 1880 to 1905, inclusive, reference should be made to Table 1. The grouping in Table LXXIV follows that established and used at the Twelfth Census <sup>1</sup> and shows the progress since 1900 in each of the industrial groups.

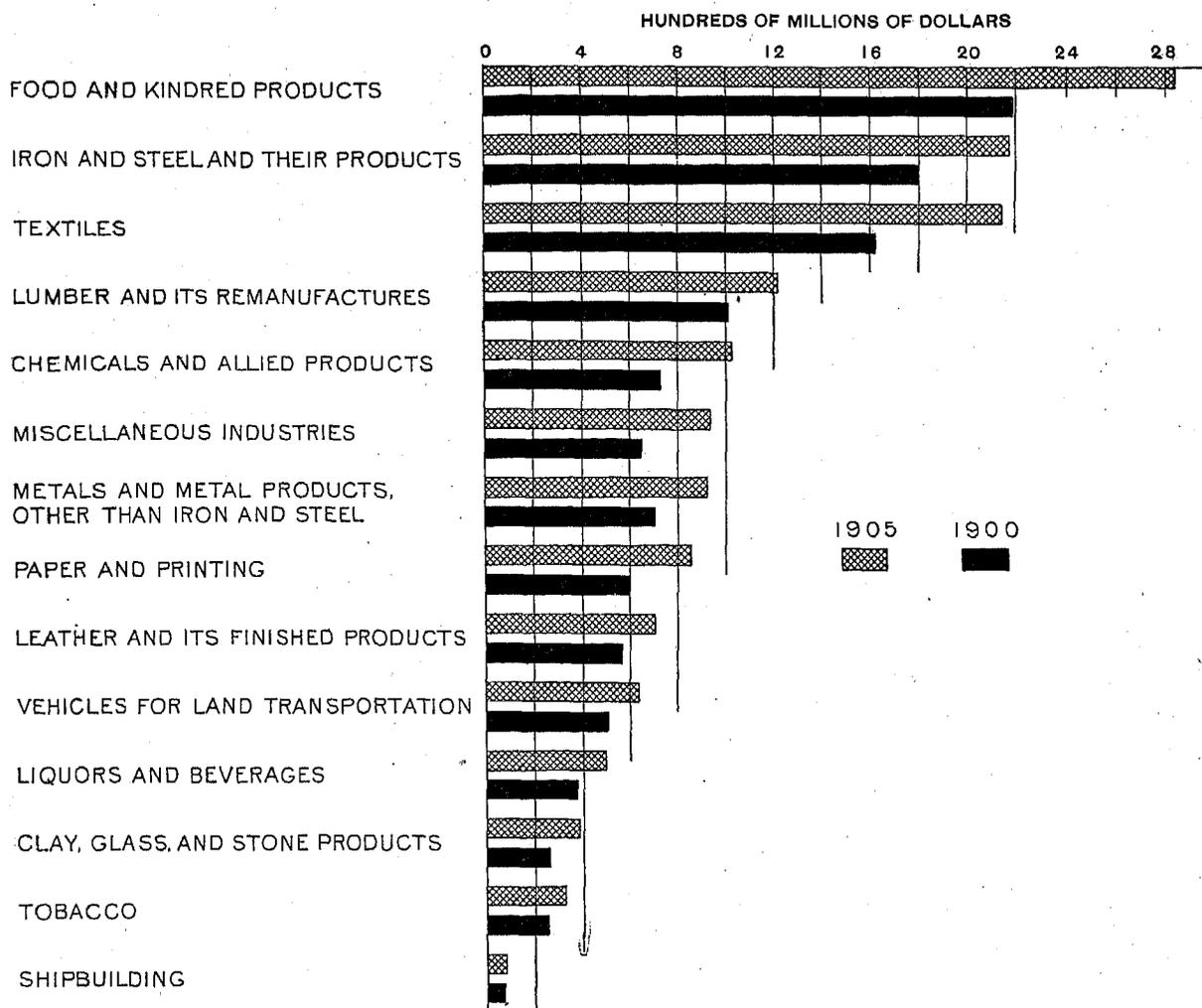
<sup>1</sup> Twelfth Census, Manufactures, Part I, page cxliii.

DIAGRAM 2.—VALUE OF ALL MANUFACTURED PRODUCTS, AND PROPORTIONAL VALUE OF EACH GROUP: 1905 AND 1900.



MANUFACTURES.

DIAGRAM 3.—VALUE OF PRODUCTS FOR GROUPS OF INDUSTRIES: 1905 AND 1900.



FOOD AND KINDRED PRODUCTS.

There is no industry that appeals more directly to the consumer than the manufacture of food products. The group ranked first in gross value of products, but as many of the products are not subjected to the great variety or the complicated processes of manufacture that characterize other industries, there is not such a large number of wage-earners employed, the group ranking sixth in the number reported for the census of 1905. This group is composed of 27 industries, shown separately in Table 3 and the raw materials for most of them are obtained from the products of agriculture. The total cost of materials emanating from this source during the census year was \$1,586,193,096, or 68.8 per cent of the total cost of materials, while those purchased in a partially manufactured form, including all other materials and mill supplies, cost \$668,745,274 and formed only 29 per cent of the total cost of materials.

A feature peculiar to this group is the comparatively small amount added to the cost of the materials by the manufacturing processes. While the form of a large proportion of the material was greatly changed, the

manufacturing processes to which it was subjected were simple and inexpensive when compared with those in other branches of manufactures. Slaughtering and meat packing, wholesale, is a striking example of this. The cost of the material at the census of 1905 amounted to \$706,230,069 and the value of products to \$801,757,137, a difference of \$95,527,068, or an increase of only 13.5 per cent over the cost of the material. A large proportion of the product was sold as fresh meat. The killing of the animals and the preparation of the meat for the market are comparatively simple processes, requiring little labor or machinery and not greatly enhancing the value of the raw material; therefore it is not legitimate to compare this industry, simply as regards value of products, with others in which the material passes through more costly or a larger number of processes before the finished stage is reached. This is true also in a marked degree of several of the industries included in "food and kindred products," and gives the group first rank in cost of materials used and value of products but a comparatively low rank in average number of wage-earners and total wages paid.

RELATIONSHIP OF INDUSTRIES.

cxxvii

As labor is the principal item of cost in the manipulation of material in most branches of manufacture, the total annual wages paid affords a truer basis of comparison. The group ranks seventh in the amount paid annually in wages, and this rank compared with a rank of second for the group "textiles" and first for the group "iron and steel products" may be accepted as a better indication of its relative importance in manufacture.

Large quantities of food and kindred products are made on the farm and in the household, and necessarily they do not enter into this presentation. Some of these products are accounted for in the decennial statistics of agriculture, experience having demonstrated the futility of attempting to include them in manufacturing statistics. In no other group do statistics of

the factory output furnish such an incomplete survey of the industries composing it. Factory production, however, is supplying at a rapidly increasing rate a large number of the products in this group that were once made largely on the farm and in the household.

*Industries allied by uses.*—The group "food and kindred products" in Table 3 does not include beverages, nor products such as salt and baking and yeast powders, which are closely allied by uses to food products. A classification under one group of articles for food and drink and essential constituents of food is presented in Table LXXV. The products are classed according to the character of the predominating raw material, as follows: (1) Animal and fish products, (2) vegetable products, (3) mineral and miscellaneous products.

TABLE LXXV.—COMPARATIVE SUMMARY—FOOD PRODUCTS, BEVERAGES, AND CONDIMENTS: 1905 AND 1900.

INDUSTRY.	Census.	Number of establishments.	Capital.	WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products, including custom work and repairing.
				Average number.	Wages.			
Aggregate.....	1905 1900	52,481 47,249	\$1,871,517,817 1,451,548,519	429,509 363,137	\$212,856,093 161,184,207	\$361,398,317 264,832,521	\$2,457,376,924 1,882,922,191	\$3,374,981,688 2,599,225,252
Animal and fish products.....	1905 1900	10,647 10,744	314,559,489 251,023,085	102,573 98,484	54,056,644 45,280,194	39,271,168 29,293,062	989,106,810 824,630,894	1,139,557,178 965,648,696
Slaughtering and meat packing, wholesale.....	1905 1900	559 557	219,818,627 173,866,377	69,593 64,681	37,090,399 31,033,850	28,032,248 22,658,444	706,230,069 605,223,221	801,757,137 697,056,065
Cheese, butter, and condensed milk.....	1905 1900	8,926 9,242	47,255,556 36,303,164	15,557 12,799	8,412,937 6,145,561	4,074,268 1,574,790	142,920,277 108,841,200	168,182,789 130,783,349
Slaughtering, wholesale, not including meat packing.....	1905 1900	370 325	17,896,063 14,933,804	4,541 3,705	3,236,573 2,358,403	2,509,111 1,371,266	99,626,900 76,873,618	112,157,487 86,723,126
Canning and preserving, fish.....	1905 1900	373 346	19,853,016 19,454,222	6,959 13,355	3,241,740 4,207,414	3,082,771 880,087	15,885,354 13,990,249	26,377,210 21,990,249
Sausage.....	1905 1900	292 198	2,704,246 1,408,897	1,265 878	739,824 453,420	303,952 135,952	5,568,593 3,213,260	8,122,904 4,588,456
Butter, reworking.....	1905 1900	35 10	1,718,751 256,525	404 148	252,130 67,747	263,546 31,032	6,247,029 3,103,822	7,271,086 2,114,935
Lard, refined.....	1905 1900	9 19	1,162,891 1,335,759	441 499	219,387 237,930	160,448 127,500	5,640,178 7,496,845	6,128,601 8,630,901
Oleomargarine.....	1905 1900	14 24	1,550,776 3,023,646	522 1,084	315,736 534,444	522,230 2,489,784	4,397,538 7,639,591	5,573,725 12,499,812
Canning and preserving, oysters.....	1905 1900	60 23	2,599,563 441,691	3,291 1,335	547,900 250,425	232,594 23,607	2,590,872 837,380	3,986,239 1,252,803
Vegetable products.....	1905 1900	38,055 33,392	1,490,039,385 1,145,337,456	308,042 249,153	150,203,543 109,187,103	311,287,965 230,169,505	1,445,161,609 1,039,263,057	2,176,693,177 1,587,772,403
Flour and grist mill products.....	1905 1900	10,051 9,476	265,117,434 189,281,330	39,110 32,226	19,822,196 16,285,163	19,756,711 9,591,182	619,971,161 428,116,757	713,033,395 501,396,304
Liquors, malt.....	1905 1900	1,531 1,507	515,636,792 413,767,233	48,139 39,459	34,542,897 25,776,468	119,462,138 109,160,900	74,911,619 51,598,247	298,358,732 236,914,914
Sugar and molasses, refining.....	1905 1900	344 657	165,408,320 184,033,304	13,549 14,129	7,575,650 6,917,829	8,600,754 7,013,322	244,752,802 221,384,769	277,285,440 239,711,011
Bread and other bakery products.....	1905 1900	18,227 14,836	122,363,327 80,901,926	81,284 60,192	43,179,822 27,804,024	20,493,262 10,414,664	155,999,318 95,051,952	269,009,061 175,368,682
Liquors, distilled.....	1905 1900	805 965	50,101,362 32,540,004	5,355 3,720	2,657,025 1,732,798	95,524,151 73,218,142	25,625,858 15,145,363	131,269,886 96,793,681
Coffee and spice, roasting and grinding <sup>1</sup> .....	1905 1900	451 468	39,903,719 28,436,897	7,315 6,387	3,035,524 2,486,759	7,590,441 3,435,257	72,171,692 55,112,293	91,449,201 69,527,108
Confectionery.....	1905 1900	1,348 962	43,125,408 26,319,195	36,239 26,866	11,699,257 8,020,453	9,474,111 4,454,153	48,810,342 35,354,268	87,087,253 69,643,946
Canning and preserving, fruits and vegetables.....	1905 1900	2,261 1,813	47,020,497 27,795,621	39,088 37,189	10,428,521 8,251,471	5,275,619 2,210,495	51,582,460 37,382,541	78,142,022 56,427,412
Food preparations.....	1905 1900	766 645	51,784,434 21,401,102	11,333 8,214	4,398,348 3,069,343	9,745,251 3,610,737	37,067,862 24,776,625	61,180,416 39,836,882
Malt.....	1905 1900	141 146	47,934,204 39,288,102	2,054 1,990	1,456,908 1,182,513	2,207,711 916,866	23,620,984 14,816,741	30,288,984 19,373,600
Pickles, preserves, and sauces.....	1905 1900	528 424	19,439,540 10,692,677	8,511 7,225	3,068,263 2,238,437	4,060,397 2,506,383	16,634,858 13,875,079	29,606,287 23,477,136

TABLE LXXV.—COMPARATIVE SUMMARY—FOOD PRODUCTS, BEVERAGES, AND CONDIMENTS: 1905 AND 1900—Con.

INDUSTRY.	Census.	Number of establishments.	Capital.	WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products, including custom work and repairing.
				Average number.	Wages.			
Vegetable products—Continued.								
Glucose.....	1905	9	\$17,045,313	2,870	\$1,774,580	\$1,007,218	\$20,258,022	\$24,596,032
	1900	8	41,011,345	3,288	1,755,170	645,804	15,773,233	21,093,656
Beet sugar.....	1905	51	55,923,450	3,963	2,486,702	1,900,555	14,480,876	24,393,794
	1900	30	20,141,719	1,970	1,092,207	441,384	4,803,790	7,323,857
Rice, cleaning and polishing.....	1905	74	8,821,090	1,492	640,632	615,583	13,315,065	16,296,916
	1900	80	2,691,352	651	265,585	230,203	7,573,522	8,723,726
Chocolate and cocoa products.....	1905	25	8,378,980	2,000	821,851	1,080,888	9,722,555	14,389,690
	1900	24	6,890,732	1,314	525,875	773,527	6,876,682	9,066,192
Liquors, vinous.....	1905	435	17,775,240	1,913	1,001,554	1,591,491	5,693,394	11,097,853
	1900	359	9,838,015	1,163	446,055	532,338	3,189,330	6,547,310
Flavoring extracts.....	1905	377	4,404,986	1,543	653,366	1,050,639	3,935,960	7,772,070
	1900	350	3,313,966	1,251	477,950	460,893	3,290,600	6,398,162
Vinegar and cider.....	1905	568	7,519,853	1,528	725,148	709,875	3,852,233	7,205,460
	1900	613	5,629,930	1,557	652,077	369,098	3,134,313	5,031,092
Cordials and syrups.....	1905	63	1,666,418	600	235,290	442,170	2,148,548	3,569,758
	1900	39	1,153,006	362	116,917	158,157	1,505,096	2,107,132
Mineral and miscellaneous products.....								
	1905	3,779	66,918,943	17,994	8,595,906	10,839,184	23,108,505	58,731,333
	1900	3,113	55,187,977	15,500	6,707,910	5,369,894	19,028,240	45,804,153
Mineral and soda waters.....	1905	3,469	28,100,022	10,870	5,487,901	4,660,029	10,002,292	30,251,150
	1900	2,763	19,726,890	8,788	4,079,770	2,177,049	8,565,351	23,268,876
Baking and yeast powders.....	1905	164	13,232,639	2,449	1,041,606	4,942,676	8,940,076	19,042,521
	1900	191	8,337,723	1,938	717,000	2,432,306	7,126,967	14,588,380
Salt.....	1905	146	25,586,282	4,666	2,066,390	1,235,570	4,166,137	9,437,602
	1900	159	27,123,364	4,774	1,911,140	760,530	3,335,922	7,966,897

<sup>1</sup> In 1905 includes 30 establishments classified as "peanuts, grading, roasting, cleaning, and shelling."

Accepting the 31 industries as representing the production of food products, beverages, and condiments in the United States, it is found that the value of products has increased since 1900, \$775,756,436, or 29.8 per cent. It is impossible to determine how much of this increase in value is due to the increase in prices. There has been a marked increase in prices for many lines of food products since 1900 and this increase has doubtless added to the gross value of products. The quantity of products is the best unit of measure in determining

the increase or decrease in production, but there is such a great variety of food and kindred products that it is impossible to obtain any reliable information concerning the quantity manufactured for all of the industries embraced in this class. It is possible, however, to ascertain the total weight or measure of the product for many, and Table LXXVI shows the production in quantity and value of the principal products of several of these industries for 1900 and 1905.

TABLE LXXVI.—SELECTED PRODUCTS, BY QUANTITY AND VALUE, WITH PER CENT OF INCREASE: 1905 AND 1900.

PRODUCT.	QUANTITY.		Per cent of increase.	VALUE.		Per cent of increase.
	1905	1900		1905	1900	
Beet sugar:						
Granulated, pounds.....	496,618,314	115,686,356	329.3	\$23,493,373	\$5,580,527	321.0
Raw, pounds.....	11,223,607	47,771,719	176.5	431,229	1,642,054	173.7
Butter, pounds.....	531,478,141	420,126,546	26.5	113,189,453	84,079,754	34.6
Cheese, pounds.....	317,144,872	281,972,324	12.5	28,011,700	26,519,829	7.9
Condensed milk, pounds.....	308,485,182	186,921,787	65.0	20,149,282	11,888,792	69.5
Canned goods:						
Fish—						
Canned, pounds.....	264,840,432	164,315,405	61.2	10,983,779	14,051,559	20.9
Salted, pounds.....	115,218,145	123,409,131	16.6	6,200,556	5,193,627	19.4
Smoked, pounds.....	35,430,619	21,064,066	68.0	2,362,740	957,741	146.7
Fruits, pounds.....	295,780,355	293,637,273	0.7	11,644,042	11,311,062	2.9
Vegetables, pounds.....	1,672,750,438	1,142,327,265	46.4	45,202,148	28,734,508	57.5
Dried fruits, pounds.....	343,579,623	89,439,406	392.1	15,664,784	4,757,065	229.5
Flour and grist mill products:						
Buckwheat flour, pounds.....	175,354,062	143,190,724	22.5	4,379,359	3,190,152	37.3
Corn meal and corn flour, barrels.....	23,624,693	27,838,811	115.1	56,308,556	52,167,739	8.1
Hominy and grits, pounds.....	756,861,398	291,726,145	159.4	8,465,420	2,567,084	229.4
Rye flour, barrels.....	1,503,100	1,442,339	4.1	5,892,108	4,146,565	42.1
Wheat flour, barrels <sup>2</sup> .....	104,013,278	99,763,777	4.3	489,258,514	333,997,686	43.8
Salt, barrels.....	17,128,572	15,187,819	12.8	9,326,583	7,901,836	18.0

<sup>1</sup> Decrease.

<sup>2</sup> Includes Graham flour.

Since the value of product is the value at the factory or mill and does not represent the cost to the consumer the figures in the table should not be used to measure the differences in the average final cost per unit of measure of the commodities shown. The table indicates plainly, however, that since 1900 the general trend has been toward higher prices, which was particularly marked in the case of manufactures of grain.

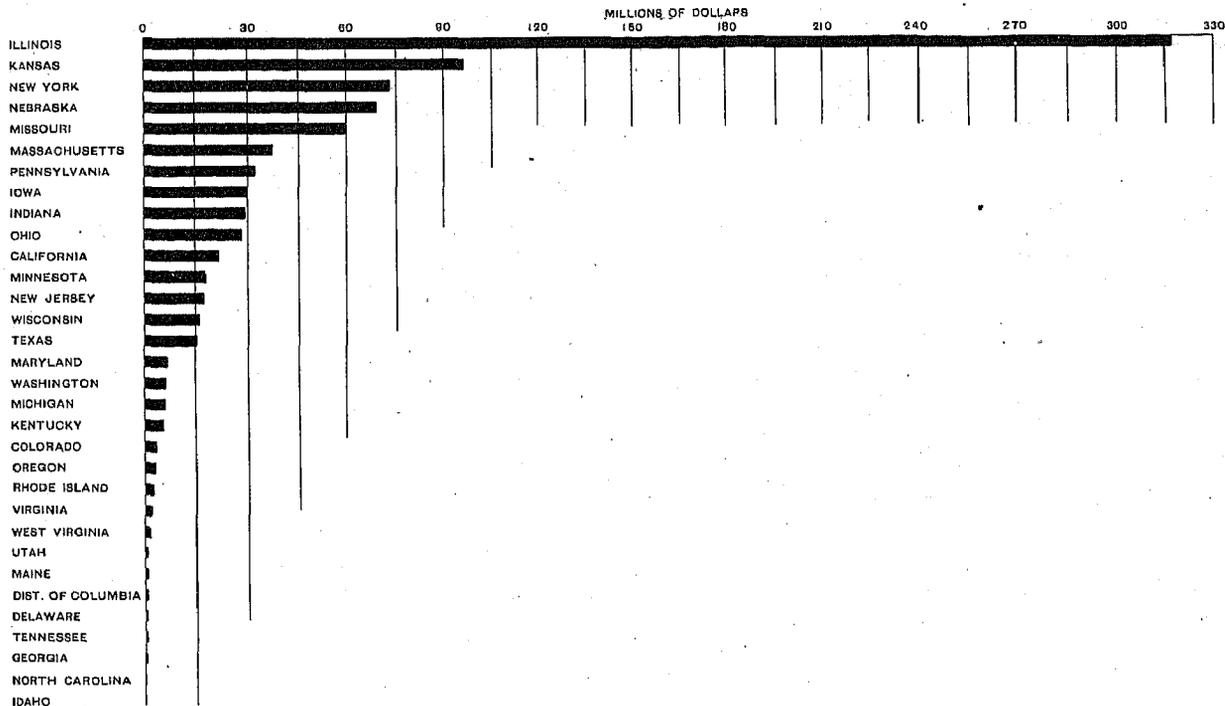
ANIMAL AND FISH PRODUCTS.

The gross value of the products of this subgroup of

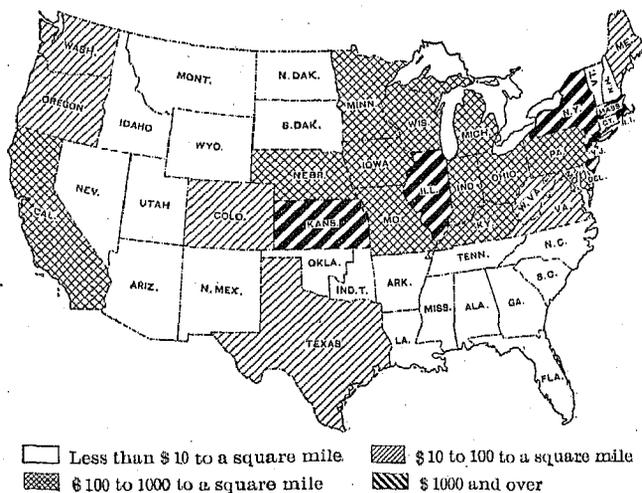
industries amounted to \$1,139,557,178 for the census of 1905 and comprised 33.8 per cent of the products as shown by Table LXXV.

*Slaughtering and meat packing.*—The slaughtering and meat packing industry is the most important of the group, the value of its products constituting 80.2 per cent of the total. The 929 establishments engaged in the industry reported that 50,568,943 cattle, hogs, sheep, and calves were slaughtered during the year 1904, as compared with 46,115,375 during the year ending May 31, 1900, an increase of 4,453,568, or 9.7 per cent.

DIAGRAM 4.—SLAUGHTERING AND MEAT PACKING—VALUE OF PRODUCTS BY STATES AND TERRITORIES: 1905.



MAP 1.—Slaughtering and meat packing—value of products per square mile: 1905.



The line of demarcation between an establishment of the character to be included in the census of factory industries and one to be excluded is sometimes very difficult to draw, and the slaughtering industry is a good

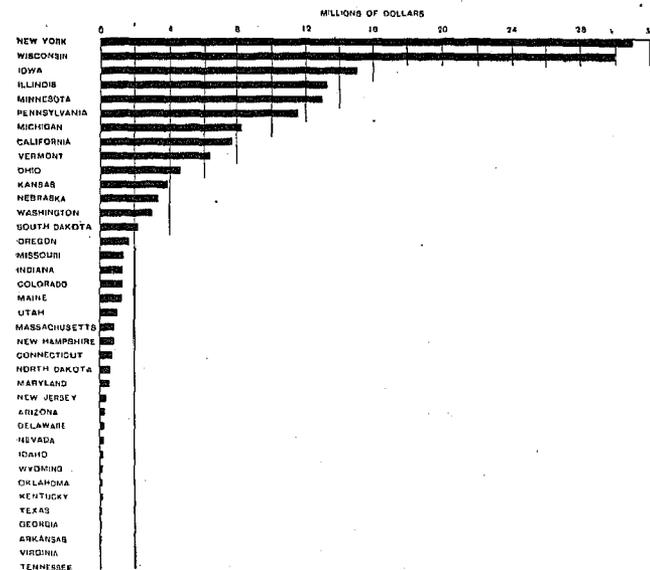
illustration of this difficulty. At the census of 1850, which was the first to present statistics for the industry, it was designated as "pork and beef packing." In 1870 it was reported as "meat, cured and packed, not specified," "meat packed, beef," "meat packed, pork," and "butchering." At the census of 1880 the designation was "slaughtering and meat packing, not including retail butchering." At that of 1890, as in 1900 and 1905, it was "slaughtering and meat packing, wholesale," and "slaughtering, wholesale, not including meat packing." The statistics for butchering at the census of 1870 included slaughtering, wholesale and retail, while meat packing was classified separately under the other three designations. With the increase in the facilities for disposing of fresh meats through refrigeration and other processes the packing industry became, in many instances, an adjunct of the slaughtering, and therefore the four designations used in 1870 were in 1880 narrowed down to one, which included all slaughtering and meat packing except retail butchering, thus eliminating from the Census reports establishments engaged in retail slaughtering or butchering. At the

census of 1890 it was found that the statistics for establishments engaged in both slaughtering and meat packing could with profit be presented separately from those engaged in slaughtering only, and this was accordingly done, but it was still the endeavor to limit the statistics to establishments engaged in a wholesale business.

The term "wholesale" is generally applied to an establishment that does not sell its product directly to the consumer, but disposes of it to merchants, thus allowing it to pass through more than one mercantile transaction. But sometimes butchers who, for the most part, slaughter only for their own retail trade, will, because of the perishable character of the product, sell at wholesale. Also many of the larger retail butchers make a practice of selling large weights to other butchers, although the larger part of their products may be disposed of at retail. The establishment of abattoirs, where slaughtering and other work is done for a number of butchers, facilitates the disposition of the products at either wholesale or retail, as the exigency of business demands. Therefore, in answer to the inquiry, "Do you do a wholesale business?" a considerable proportion of these retail butchers might answer, "Yes." The report of their business would therefore be secured, although their wholesale trade might form only a small proportion of the year's transactions.

Under these conditions establishments enumerated at one census would possibly be omitted at a subsequent census, and the same class of establishments might not be enumerated at the same census in all sections of the country. Therefore the statistics can be accepted as representing establishments engaged

DIAGRAM 5.—Butter, cheese, and condensed milk—value of products by states and territories: 1905.



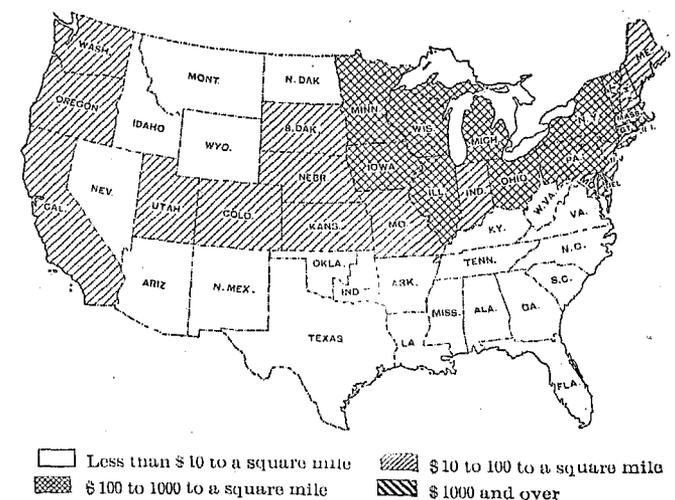
The statistics represent all products of the factories, including all grades of butter and cheese, cream and

wholly or very largely in the wholesale trade, but not as the total for all establishments that were in any way engaged in a wholesale business.

While the killing of the animal and the dressing of the meat enhance the value of the raw materials, these processes alone would hardly warrant the including of slaughtering as a manufacture. The making of sausage, canned meats, lard, oil, soap, fertilizers, chemicals, and numerous other products which are adjuncts of the slaughtering industry, are, however, properly classed as manufactures, and the scope of the census covers practically all of them. The statistics for the manufacture of sausage and of refined lard must in every instance be considered in connection with those for the wholesale slaughtering and slaughtering and meat packing establishments, because the larger proportion of both lard and sausage is now manufactured in such establishments.

*Butter, cheese, and condensed milk.*—Next to slaughtering and meat packing the manufacture of butter, cheese, and condensed milk is the most important industry included in the group of animal and fish products. The gross value of products for the three branches of industry that consume milk as raw material amounted to \$168,182,789, or 5 per cent of the food products, as shown by Table LXXV, and 14.8 per cent of the animal and fish group. As compared with 1900 there was an increase of \$37,399,440, or 28.6 per cent, in value of products. During the decade ending with 1900 there was an increase of \$70,147,644, or 115.7 per cent. A considerable proportion of the materials used in the industry "butter, reworking" are the products of the butter factories and therefore are duplicated in the group total.

MAP 2.—Butter, cheese, and condensed milk—value of products per square mile: 1905.



milk from the separators, dried casein, skimmed cheese, whey, and also every variety of condensed milk. They

do not include the operations of cream separating stations, unless the station is operated as a part of a regular butter or cheese factory. At the census of 1905 many establishments which produced butter in 1900 were reported as skimming stations. It is evident that the manufacture of butter is being concentrated in larger establishments, the small plants being often transformed into skimming stations which act as "feeders" to the central station where the butter is manufactured. This accounts for the decrease in the number of establishments shown for some states.

The manufacture of butter and cheese is so closely allied to agricultural pursuits that it is frequently impossible to make a satisfactory distinction between the operations of the farm and the factory. In many sections of the country farms are devoted exclusively to the production of butter and other dairy products, and, as the establishments are operated by power and employ constantly a number of wage-earners, they really belong to the factory industries. The products of such establishments, however, are reported among the products of agriculture, and their enumeration in the census of manufactures would be a duplication. Whether an establishment of the class indicated is to be excluded has been determined largely, however, by the magnitude of its operations and the character of its equipment and market. At the census of 1900, 1,071,745,127 pounds of butter were reported as made on farms, a quantity more than double that made in the butter factories at that census, but as 553,606,101 pounds of the farm product were reported as consumed on the farms, there remained but 518,139,026 pounds available for competition with the factory products. Accepting the figures for the farm production of 1900 as the production at the census of 1905, the total production of butter would be 1,603,223,268 pounds. Even this enormous quantity, however, can not be accepted as representing the total production of butter in the United States, since at the Twelfth Census it was estimated that 40,000,000 pounds were made by persons owning one or two cows each, the statistics for which were neither included in the reports for manufacture nor in those for agriculture.<sup>1</sup> Unlike the manufacture of butter, most of the cheese produced is made in the cheese factories, the census of 1900 showing but 16,372,330 pounds made on farms, of which 1,679,788 were retained for farm consumption and 14,692,542 pounds were sold. Accepting the farm production of cheese as reported at the Twelfth Census as the quantity produced by farmers at the census of 1905, the total production of cheese would be 333,517,202 pounds.

*Canning and preserving, fish and oysters.*—In 1905 there was reported for these two industries a combined value of products amounting to \$30,363,449, or 2.7 per cent of the subgroup "animal and fish products," an in-

crease of \$7,111,397, or 30.6 per cent, over the value reported in 1900. The preserving of fish by drying, salting, etc., is frequently done in connection with the catch, and as commercial fisheries do not form a part of the census of manufactures, the figures do not represent the entire fishery industry. They include all establishments where the preservation or canning of fish or oysters was carried on to any extent, but they do not include establishments which were engaged exclusively in catching and shipping fresh fish or oysters.

#### VEGETABLE PRODUCTS.

These products include those depending upon vegetable growth for their raw material. At the census of 1900 the gross value of these products amounted to \$1,587,772,403 and in 1905 to \$2,176,693,177, an increase of \$588,920,774, or 37.1 per cent. The amount of the increase is more than three times that of the animal and fish group and forty-five times that of the mineral group. In 1900 the products of the group formed 61.1 per cent of all food products, as shown by Table LXXV, and in 1905, 64.5 per cent.

*Flour and grist mill products.*—This is the principal industry of the group. It furnishes the major portion of the material consumed in the manufacture of bread and other bakery products, and part of the materials for other industries.

The instructions to the field force of the census of 1905 directed that no reports be secured for custom flour, feed, and grist mills, grinding exclusively for toll and local consumption. To be included in the factory census the mill must have done at least some merchant grinding during the year 1904. While there are a large number of small custom gristmills throughout the country, their omission from the census has no appreciable effect on the statistics other than to cause a decrease in the number of establishments, and their importance is being rapidly lessened by the more general distribution of the products of the large merchant mills. The custom mills are generally located at a distance from the ordinary routes of travel, and the comparatively small economic value of the statistics for them would not justify the expense incident to their enumeration, which would necessarily be much greater per establishment than for the other portion of the industry.

A considerable proportion of the products of the flour and grist mills, such as the 6,913,572,697 pounds of feed and the 8,937,251,392 pounds of offal, are intended for animal food. Flour is the most important product for human consumption. The production of wheat flour (including Graham flour) increased from 99,763,777 barrels in 1900 to 104,013,278 at the census of 1905, or 4.3 per cent.

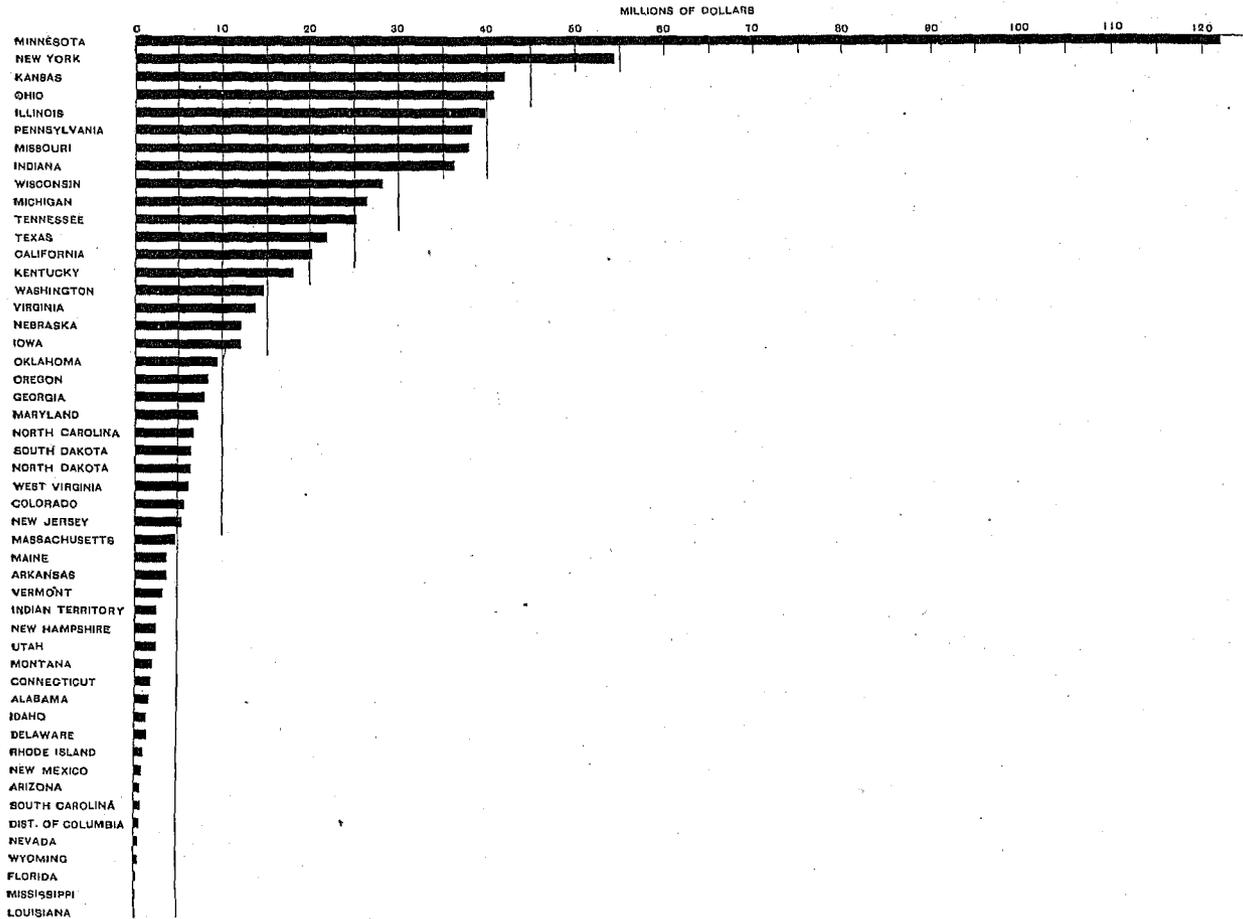
During the fiscal year ending June 30, 1900, there were exported 18,703,564 barrels of domestic rye and wheat flour, or 18.5 per cent of the total production.

<sup>1</sup>Twelfth Census, Agriculture, Part I, page clxxxiii.

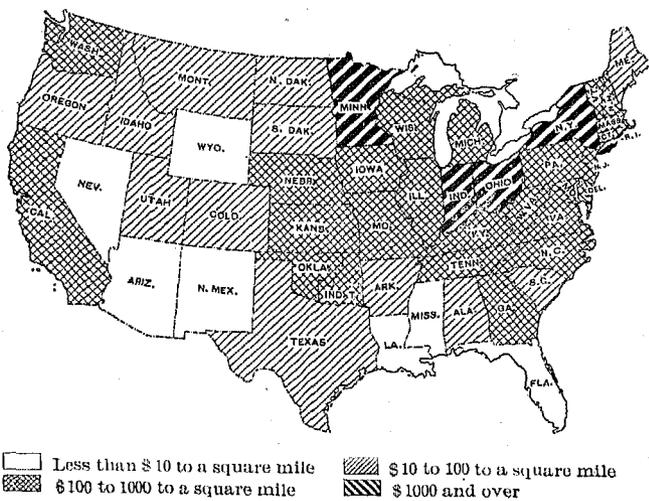
The exports in the fiscal year ending June 30, 1905, amounted to 8,831,056 barrels, or 8.4 per cent of the production. If the exports for a given year are composed largely of the products of that year, and if the

statistics for the two census years are accepted as representing normal conditions, or an average year, the quantity of rye and wheat flour retained for consumption increased by 14,181,770 barrels, or 17.2 per cent.

DIAGRAM 6.—FLOUR AND GRIST MILL PRODUCTS—VALUE BY STATES AND TERRITORIES: 1905.



MAP 3.—Flour and grist mill products—value per square mile: 1905.



*Bread and other bakery products.*—The statistics do not cover the making of bread or other bakery products in private families, hotels, restaurants, or boarding houses, but the small neighborhood bakeries, as well as the large factory establishments making bread, pies, cakes, pastry, crackers, pretzels, etc., come within the scope of the inquiry.

The present form of the classification originated in 1880. In 1850 it was "bakers;" in 1860, "bread and crackers;" and in 1870, "bread, crackers, and other bakery products."

Statistics for the manufacture of bread and biscuits were first returned, but in a very incomplete way, at the census of 1820 for Georgia, Maryland, Michigan, Missouri, Pennsylvania, Ohio, and Virginia. The figures are so incomplete as to be almost worthless. The classification for Georgia was "bread, navy and pilot;" for Maryland, "bread, pilot, navy, and crackers;" for Michigan, "bread, hard and soft;" for Missouri, "bread;" for Ohio, "bread, cakes, and cordials;" and for Pennsylvania and Virginia, "biscuits." The

value of products was reported as \$56,745, but none was given for Maryland or Michigan. The number of wage-earners was 65. Joshua Bent's and Artemus Kennedy's factories, both in Massachusetts, seem to have been overlooked, although one was founded in 1801 and the other in 1805,<sup>1</sup> and were probably in operation during the census year.

After the census of 1820 no statistics concerning bread and other bakery products appeared until 1850, when the value of products made by "bakers" reached \$13,294,229 and the number of wage-earners employed was 6,727.

The statistics for the censuses from 1850 to 1870 are given in Table LXXVII.

TABLE LXXVII.—Comparative summary—bread and other bakery products: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	3,550	1,930	2,027
Capital.....	\$10,025,966	\$3,909,189	\$3,390,824
Wage-earners, average number.....	14,126	6,514	6,727
Total wages.....	\$5,353,184	\$2,086,148	\$1,960,416
Cost of materials used.....	\$22,211,856	\$10,634,199	\$8,367,370
Value of products.....	\$30,907,704	\$16,980,012	\$13,294,229

The increase from 1850 to 1860 in value of products was \$3,685,783, or 27.7 per cent, but the number of establishments and of wage-earners decreased. From 1860 to 1870 the increase in value was \$19,927,692, or 117.4 per cent. Notwithstanding the inflated values of 1870 the growth of the industry was remarkable; the wage-earners increased by 7,612, or 116.9 per cent. At the census of 1880 compared with that of 1870 the increase shown for value of products was \$28,917,192, or 78.4 per cent; in 1900 compared with 1890 it was \$46,947,147, or 36.6 per cent.

In 1905 the value of "bread and other bakery products" was \$269,609,061, and the number of wage-earners, 81,284. The greatest increase in value of products is shown for the period 1900 to 1905, being \$94,240,379, or 53.7 per cent.

The quantity of bread baked for the trade is largely dependent upon the population of the neighborhoods in which the bakeries operate; with fancy crackers and cakes it is somewhat different. Yet, notwithstanding the inclusion in the classification of an industry the products of which are sent throughout the country and exported, the magnitude of the bread product governs the whole. New York, having the largest population, ranked first in value of products in 1905 as in 1900, Pennsylvania was second, and Illinois third, with Massachusetts following closely.

There have been many improvements in the methods followed in this industry. Some of the best equipped bakeries have laboratories in which samples of flour are tested for gluten and other qualities and for color. Experiments are made with various brands, and these are blended experimentally. The quantity of water to

be added to make the dough of a standard stiffness is carefully determined. The expansion of a loaf is also studied and tests of yeast are made. Where bakers do not have laboratories, they can consult chemists or other experts who make a specialty of bakers' problems.

Long ago the dough was mixed and kneaded by hand; this is still largely the method employed in households and small bakeries, but in the larger bakeries the work is done with machinery. The texture is afterwards improved by a dough brake, consisting of a series of rolls through which the dough is passed.

The division and forming into loaves are operations performed with the hand in the homes of the people; but in large bakeries automatic dough dividers and molding machines operated by power are used. The dividing mechanism is in some instances automatically operated by the dough when a certain quantity has gone into the pockets. Some machines will divide 40 large loaves, or from 80 to 100 smaller ones, in a minute, delivering each loaf to the molding machine, thus doing away with all handling except the placing of the loaves in the pans.

The mixing and blending of doughs to procure desired results in the color and texture of bread are done by machinery.

As with bread, so it is with cakes and pies. There are machines for cutting cakes, some with a capacity of nearly 8 dozen a minute. Doughnuts and crullers are also formed by machinery and cooked in patent kettles. There are machines for making pies, and fillings of all kinds can be bought ready prepared.

The mechanical perfection of cracker making is marked, the dough being kneaded, rolled out thin, and cut into the forms of squares and disks, all by power. Machinery in the cracker industry was unknown until about 1840, but since that time many finer machines have been introduced for the making of fancy goods. The reel oven came into extended use at the time of the Civil War, owing to the increased demand for hard bread for the Army and Navy. In some of the large plants to-day these ovens have a daily capacity of from 40 to 50 barrels per oven.

While in 1840 only 5 kinds of crackers were produced, now the varieties aggregate 500 or more. The fancy or sweetened cracker industry began about 1865,<sup>2</sup> as a result of English importations.

*Liquors, distilled, malt, and vinous.*—Next to flour and grist mill products the manufacture of liquors is the most important of the group of vegetable products. The gross value of the products of distilled, malt, and vinous liquors amounted to \$340,255,905 in 1900 and \$440,726,471 at the census of 1905, an increase of \$100,470,566, or 29.5 per cent.

The vast majority of the establishments included under the classification "liquors, distilled," were engaged in the manufacture of spirits other than fruit

<sup>1</sup>One Hundred Years of American Commerce, Vol. II, page 446.

<sup>2</sup>One Hundred Years of American Commerce, Vol. II, page 448.

brandies. As a rule the fruit brandy distilleries are small establishments operated only at certain seasons of the year, and this class was not included in the factory census.

In addition to alcohol, spirits, and high wines the value of products includes all the by-products of the distilleries, such as cattle feed, fusel oil, and slop. When the internal revenue tax was paid by the distiller, it was included in the value of the products reported to the Census, but when, the spirits being sold in bond, the purchaser became responsible for the tax, it was not covered in the report. While a combination of reports, some including and others excluding internal revenue tax, may result in a total which reflects conditions as shown by the account books of the distillers, it is impracticable to ascertain the proportion of the total value that is due to the imposition of the tax. It would probably be better to eliminate the tax in all cases.

The Bureau of Internal Revenue publishes annually statistics of the quantity of distilled liquors manufactured; therefore such data are omitted from the Census reports. From these revenue statistics it appears that the production of distilled spirits during the year ending June 30, 1904, amounted to 134,311,952 taxable gallons. The tax alone on this quantity at \$1.10 per gallon would amount to \$147,743,147.20, while the total value of all products for the distilleries as reported to the Census was \$131,269,886, or \$16,473,261.20 less than the tax.

It is the practice for the brewer to pay the internal revenue tax, and the value of products, \$298,358,732, shown for "liquors, malt," includes the tax for practically all establishments. In addition to lager beer it also includes weiss beer, porter, honey beer, malt extract, ale, and kindred fermented liquors as well as the by-products of the breweries.

*Malt.*—The manufacture of malt is frequently carried on in connection with brewing, and in such cases is absorbed in the production of malt liquors, or the malt itself is sold as a minor product. The manufacture of malt was first shown as a separate industry at the census of 1850 under the classification "maltsters." This classification and the present one of "malt" cover only the establishments where malt forms the only or chief product, according to value. The reports of the census of 1905 show that such establishments produced malt valued at \$30,288,984. As practically all of this production is sold to the breweries, it is duplicated in the value of products shown for "liquors, malt."

Table LXXVIII is a comparative summary of the industry as reported for the censuses of 1850, 1860, and 1870.

The three leading states in the malt industry in 1905 were Wisconsin, Illinois, and New York. Wisconsin had 29 establishments with products valued at \$8,740,103;

Illinois, 21 with products valued at \$8,539,870; and New York, 43 with products valued at \$7,037,043. These three states had an aggregate of 93 establishments, or 66 per cent of the total number of establishments in the industry, and the aggregate value of products amounted to \$24,317,016, or 80.3 per cent of the total value.

TABLE LXXVIII.—Comparative summary—malt: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	208	85	11
Capital.....	\$8,017,248	\$2,125,750	\$271,800
Wage-earners, average number.....	1,640	589	73
Total wages.....	\$700,624	\$189,800	\$18,276
Cost of materials used.....	\$9,002,094	\$2,365,209	\$363,660
Value of products.....	\$12,016,515	\$3,228,857	\$471,035

*Sugar and molasses, refining.*—The gross value of products reported for sugar and molasses refining is one of the largest in the group, amounting in 1905 to \$277,285,449, an increase since 1900 of \$37,574,438, or 15.7 per cent. The cost of raw materials was \$22,382,180, of which \$21,545,393 was reported for Louisiana. This is due to the fact that most of the establishments reporting from that state produced their sugar and molasses direct from the sugar cane, while the large refineries in New York, Pennsylvania, and other states were refining sugar which, though in a crude form, had passed through a process of manufacture. The value of products reported for New York was \$116,438,838, which is 42 per cent of the total.

The sugar and molasses industry, like others in this group, is allied closely to agriculture, and it is extremely difficult to distinguish clearly between the sugar mills properly belonging to a census of manufactures and those more closely allied to agriculture. Many of the mills obtain their raw material from the plantation on which they are located. The sugar and molasses from these mills are placed on the market under the same conditions as they are from mills in which the sugar is refined. The decrease in number of establishments shown for this industry is due to this difficulty and to the fact that many of the smaller mills were in rural sections and so scattered that the cost of sending agents to collect reports would have greatly exceeded the value of the statistics.

Sugar and molasses produced from the sugar cane compose the bulk of the products appearing under this classification. Beet sugar and molasses are excluded, but maple sugar and sirup are included. The number of establishments preparing sugar from the sap of the maple tree for general trade is inconsiderable, the production being confined for the most part to the farms where the sap is collected and boiled down during a brief season of the year. Statistics concerning the production of maple sugar and sirup on farms did not form a part of the census of 1905, and only those establishments that produced the product for the trade were reported.

The manufacture of sugar from the cane and the refining of imported cane sugar have long been industries of great importance in this country. The industrial census of 1810 reported refineries in Massachusetts, New York, Pennsylvania, Maryland, the territory of Orleans, and the District of Columbia (Alexandria). The total production of all the refineries was returned as 7,867,211 pounds, valued at \$1,415,724. The figures for the different states indicated that the refiners received from 17 to 20 cents a pound for their product. Pennsylvania had the greatest output, producing 3,364,590 pounds during the census year, and New York came next, with 2,474,742 pounds.

The returns for the census of 1820 were unsatisfactory for all industries. In general, the information was fragmentary and lacked uniformity. The statistics for the sugar industry indicated that refineries existed in several states, but the figures were so incomplete as to make it impossible to give even an approximate idea of the value of the output of the country.

At the census of 1840 an effort was made to broaden the scope of the industrial census, and returns concerning labor, capital, and cost of materials were secured in a more complete form. A serious defect, however, in the published figures was caused by the method of classification. The classes among which the industries were distributed were so comprehensive that the aggregates conveyed little significance, and comparisons with subsequent censuses have proved of little value. Thus the sugar refineries and chocolate and confectionery factories were combined, thereby rendering impossible comparisons with future censuses for the capital invested and the number of wage-earners employed in these industries. However, the number of refineries and value of their products were shown separately, and from these figures it appears that 42 sugar refineries in the country at that census, reported products valued at \$3,250,700. The returns indicated that Massachusetts, with only 2 refineries, had products valued at \$1,025,000 and stood first, while Pennsylvania with 20 refineries came next, with products valued at \$891,000, and Louisiana third, with 5 refineries producing \$770,000 worth of sugar and molasses. According to the census of 1850 the order was New York first, with 5 refineries producing sugar and molasses valued at \$5,020,000; Massachusetts was next, with 4 refineries and products valued at \$1,315,700; while Missouri with 3 and Pennsylvania with 5 refineries produced sugar and molasses valued at \$1,213,600 and \$1,158,000, respectively. The fact that apparently during the thirty years elapsing from 1810 to 1840, the value of sugar and molasses produced by New York decreased from \$420,706 to \$385,000, or 8 per cent, while during the ten years between 1840 and 1850 it increased from \$385,000 to \$5,020,000 casts some doubt upon the accuracy of the returns for 1840.

Table LXXIX is a summary which shows the figures relating to this industry published at the censuses of 1850, 1860, and 1870.

TABLE LXXIX.—Comparative summary—sugar and molasses, refining: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	59	39	23
Capital.....	\$20,545,220	\$9,087,600	\$2,669,000
Wage-earners, average number.....	4,597	3,484	1,656
Total wages.....	\$3,177,288	\$1,358,328	\$804,248
Cost of materials used.....	\$96,899,431	\$34,103,767	\$7,662,685
Value of products.....	\$108,941,911	\$42,143,234	\$9,898,800

The table indicates an extraordinary increase in the industry during the twenty years between 1850 and 1870. The number of refineries more than doubled, the number of wage-earners employed nearly trebled, the cost of materials increased more than twelvefold, and the value of the products more than elevenfold.

The industry continued to increase during the ten years following 1870 and the census of 1880 reported a product valued at \$155,484,915, or an increase of 42.7 per cent. However, the number of refineries decreased from 59 to 49, and the amount paid in wages from \$3,177,288 to \$2,875,032, which indicates a concentration movement and the introduction of labor saving machinery that lessened the cost of production.

Economic changes in the production of the world's sugar supply which had been slowly gathering force previous to 1880, culminated during the decade following and produced a crisis in the manufacture of sugar which was reflected by the figures for the census of 1890. Encouraged by a system of export bounties, the beet sugar producers of Europe, particularly of Germany, had so increased their production that in 1889-90 the commodity formed nearly 64 per cent of the world's production of sugar, whereas in 1879-80 it constituted but 43 per cent of the world's output.<sup>1</sup>

The system of export bounty adopted by the German Government enabled the manufacturers of that country to export beet sugar at a price little above the cost of production and at the same time to pay dividends on the capital invested.<sup>2</sup> Competition under such conditions with foreign producers and ruinous competition among themselves proved disastrous to the cane sugar refiners of the United States, and many large refineries ceased to operate, as many as 18 out of 40 northern refineries, according to one authority,<sup>3</sup> going under.

The altered conditions in price and production of the commodity account to a great degree for the decrease during the preceding decade which the figures for 1890 appear to indicate. From a value of \$155,484,915 in

<sup>1</sup> Treasury Department, Bureau of Statistics, Monthly Summary of Commerce and Finance, January, 1902, page 2589.

<sup>2</sup> D. A. Wells, Recent Economic Changes, page 130.

<sup>3</sup> Testimony of H. O. Havemeyer before Industrial Commission, Report of Industrial Commission, Vol. I.

1880 the product decreased to a value of \$123,118,259 in 1890, or 20.8 per cent. New York seemed to suffer most from the changes which took place during the ten years, the value of the production of the state falling from \$71,237,051 in 1880 to \$17,157,694 in 1890. Notwithstanding the depression which characterized the industry in the Northern states, the number of establishments in the country increased from 49 to 393. This increase was due to the large number of small mills operated in the middle West during the latter part of the decade.

From 1890 to 1900 the refining of sugar took on a new aspect in the United States, due to bounties and protective tariffs and to the concentration of the industry. Government aid, energetic business methods, and reduction in the expenses of manufacture contributed to make this decade a period of great prosperity to the sugar industry. The value of the products increased from \$123,118,259 in 1890 to \$239,711,011 in 1900, or 94.7 per cent.

The decade was also marked by a remarkable increase in the number of establishments—from 393 in 1890 to 657 in 1900. This increase was attributable to altered conditions in the production of sugar in Louisiana. Previous to 1890 the sugar planters were content to extract the sirup from the cane and to crystallize the sugar without attempting to refine the product. The raw sugar which resulted was shipped to other centers for refining. The planter discovered, however, that by turning out a better product he could get more for his sugar, and the larger plantations commenced to install expensive plants equipped with the most modern machinery. By means of centrifugal machines and vacuum pans the planter produced directly from the cane a high-grade sugar called "yellow clarified," which, though not a white granulated sugar, was sufficiently free from sirup to command a wide market, and in this way the planter became a manufacturer. The success of the movement is reflected in the figures for the census of 1900, when there were 384 establishments in Louisiana producing sugar, with products valued at \$47,891,691, against 38 in 1890, with products valued at \$12,603,913.

During the ten years from 1890 to 1900 the indus-

try as a whole made notable increases in the amount of capital invested, in the number of wage-earners employed, and in the amount paid as wages. The \$24,013,008 which was invested in the industry in 1890 grew to \$184,033,304 in 1900, while the number of wage-earners doubled, increasing from 7,043 to 14,129, and the amount paid to wage-earners trebled, rising from \$2,385,654 to \$6,917,829. With products valued at \$239,711,011 the industry stood ninth in 1900 among the manufacturing industries of the country.

The exports of raw or of refined sugars have never attained much importance and are steadily decreasing. In 1900 the total value of all sugars exported amounted to only \$1,015,397, and in 1905 the value had fallen off nearly one-third.

In marked contrast to the unimportant exports are the immense imports of the commodity, most of which constitutes materials for the refineries of the United States. From the standpoint of value, sugar in 1905 was the most important import, the total value amounting to \$97,645,449, or 8.7 per cent of the value of all merchandise imported into the United States during the fiscal year ending June 30, 1905. Of this total, cane sugar constituted about 94 per cent, of which Cuba alone contributed 70 per cent.

Sugar cane was first brought to Louisiana in 1751, but all attempts at manufacturing sugar in the colony failed until 1791, when a planter named Don Antonio Mendez successfully produced the commodity with the aid of a Cuban sugarmaker named Morin. Emboldened by this success Etienne de Boré in 1794 planted a sufficient acreage of cane to yield a crop of sugar for which he obtained \$12,000.<sup>1</sup> Since that date Louisiana has been the home of the sugar cane in this country, although some attempts to cultivate it have been made in Texas and Florida with varying degrees of success. However, domestic production has never been sufficient to supply the consumption in the United States.

Table LXXX shows how dependent upon imports the country is for its supply of sugar.

<sup>1</sup>The Universal Cyclopaedia, Vol. 11, page 194.

TABLE LXXX.—QUANTITY OF SUGAR MANUFACTURED FROM IMPORTED AND NATIVE MATERIALS AND CONSUMED IN THE UNITED STATES, SHOWING THE PER CENT WHICH NATIVE SUGAR FORMS OF THE TOTAL QUANTITY CONSUMED IN THE YEARS 1870, 1880, 1890, 1900, AND 1905.<sup>1</sup>

YEAR.	Total consumed (tons).	SUGAR MANUFACTURED FROM—							Per cent of sugar consumed produced from native materials.
		Imported—			Native—				
		Total (tons).	Sugar (tons).	Molasses (tons).	Total (tons).	Cane (tons).	Beet (tons).	All other materials <sup>2</sup> (tons).	
1870.....	607,834	544,634	544,634		63,200				10.4
1880.....	956,784	855,692	805,045	50,647	101,122	88,822	357	11,943	10.6
1890.....	1,476,377	1,310,574	1,257,292	53,282	165,803	136,503	2,800	26,500	11.2
1900.....	2,219,847	1,957,001	1,950,014	7,047	262,186	174,450	82,736	5,000	11.8
1905.....	2,632,216	2,067,972	2,056,092	11,880	504,244	334,522	220,722	9,000	21.4

<sup>1</sup> Statistical Abstract of the United States, 1905, page 505.

<sup>2</sup> Includes maple and sorghum sugar.

<sup>3</sup> Includes 376,497 tons Hawaiian, 124,928 tons Porto Rican, and 14,673 tons Philippine sugar.

The proportion of sugar consumed, which was produced entirely from domestic products, has steadily increased at each census since 1870. The United States does not yet, however, supply raw material sufficient for the manufacture of one-fourth of the domestic demand for sugar.

The manufacture of beet sugar has become a serious rival of the product of the native cane in this country, forming 39.1 per cent of the total domestic production of native sugar consumed in 1905. Cane sugar, however, forms the great bulk of the commodity consumed in the United States, since at least 90 per cent of the raw sugar imported and refined in this country is the product of the cane.

Statistics of imports show that in 1905 importations of cane sugar constituted over 93 per cent of the total quantity of sugars of all kinds imported, and practically all of it was refined in the United States before it reached the consumer. Thus, if the sugar manufactured from imported raw sugar and molasses be considered as nearly all produced from the cane, and the quantity consumed be added to the quantity of native cane sugar consumed, the total for 1905 will be found to constitute about 91 per cent of the total consumption of all sugars in the United States for that year.

Early methods of separating the sugar from the molasses and refining were crude and wasteful, and this continued to be true until about the middle of the last century. The result was that the refined article was little used and was classed as a luxury. In this country it is probable that the refined sugar consumed during the year 1839 did not exceed one-tenth of the quantity of brown, which was then bringing at wholesale 7½ to 8 cents per pound in New York, Philadelphia, and Boston, or about 10 cents less than the refined product.<sup>1</sup> However, the use of the vacuum pans—patented about 1819, but not generally introduced for many years afterwards—for concentrating the juice and crystallizing the sugar, and the invention of the centrifugal machine—probably first used about 1851<sup>2</sup>—for separating the crystals from the molasses, wrought great changes in the refining of sugar and cheapened the production of the commodity. By 1876 the margin between the cost of raw and refined sugar was only 3 cents.<sup>3</sup> Also, advances in knowledge of the chemistry of sugar refining aided greatly in bringing refined sugar within the reach of all.

To-day sugar is manufactured by expressing the juice from the cane by means of cylindrical rollers. For white sugar the juice is then bleached with the fumes of burning sulphur. Lime is added to the juice in order to neutralize the acidity, and in subsequent heating the impurities are removed by skimming the lime salts and coagulated albumen from the top of the mixture. The clarified juice is next evaporated in

multiple effect vacuum separators, through which the juice is pumped in continuous flow. The contents of the separators are heated by steam, and as the vapors arise they pass through the series of pans into a condenser from which they are pumped away. The juice now containing from 40 to 45 per cent of sugar is further condensed in a strike pan, and finally crystallized by injections of cool sirup into the heated mass. When crystallization has advanced as far as possible, the entire mass contained in the strike pans is transferred to the centrifugal machines, which are constructed with porous walls, so that the sirup is thrown out while the crystals are retained. The molasses thus obtained is put through the process three and sometimes four times, in order to obtain all the sugar possible.

To obtain the snow-white granulated sugar from the raw unrefined sugars, the latter are dissolved in water, filtered through a cloth, decolorized by filtering through boneblack, and finally granulated in a vacuum pan as described above.

*Confectionery.*—This classification includes all of the confections known to the confectionery trade, together with chewing gum, licorice, salted peanuts, popcorn balls or cakes, and starch and paste compositions used by confectioners. Undoubtedly numerous varieties of chocolate confections have been classified under "chocolate and cocoa products," and so lost to "confectionery," under which they rightfully belong. This results from the fact that many establishments manufacturing principally chocolate and cocoa also produce chocolate confections as minor products, and in default of any satisfactory method of segregating the values the entire product of these establishments has been classed under "chocolate and cocoa products."

The industrial census of 1840 was the first to accord the manufacture of candy a place among the industries of the country. From the returns it is evident that the confectionery output of the country even at this early date had attained proportions of some importance. The candy manufacture in the state of New York during that census year was valued at \$386,142, and in Pennsylvania the products were valued at \$227,050. During the following ten years machinery was introduced in the manufacture of confectionery and a great expansion of the industry followed.

Table LXXXI is a comparative summary of the confectionery industry for the censuses of 1850, 1860, and 1870.

TABLE LXXXI.—Comparative summary—confectionery: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	949	541	383
Capital.....	\$4,995,203	\$1,568,478	\$1,035,551
Wage-earners, average number.....	5,825	2,340	1,733
Total wages.....	\$2,001,826	\$688,423	\$458,904
Cost of materials used.....	\$8,703,560	\$2,990,186	\$1,691,824
Value of products.....	\$15,922,643	\$5,361,100	\$3,040,671

<sup>1</sup> North American Review, Vol. 48 (1839), page 427.

<sup>2</sup> De Bow's Review, Vol. 10, page 89.

<sup>3</sup> One Hundred Years of American Commerce, Vol. I, page 260.

As shown by Table 1, from 1880 to 1890 the industry more than doubled as a result of the fact that sugar, which is the foundation of practically all confections, had become more plentiful and vastly cheaper. There was an increase of over 100 per cent in every item with the exception of the cost of materials used, and this exception plainly reflects the low price of the principal material, sugar, which helped more than any other cause to raise this industry to a place among the important manufactures of the country.

The censuses of 1900 and 1905 have been placed on a common basis by the elimination of the small establishments engaged in retail trade in 1900, and now present comparable figures for the manufacture of confectionery in the factories of the country. At the census of 1905 compared with that of 1900 there was an increase in number of establishments of 386; in capital, of \$16,806,213, or 63.9 per cent; in wage-earners, of 9,373, or 34.9 per cent; in wages, of \$3,678,804, or 45.9 per cent; in cost of materials used, of \$13,456,134, or 38.1 per cent; and in value of products, of \$26,443,307, or 43.6 per cent.

In the United States candy making, as an art, did not obtain a firm footing until about the middle of the last century. As early as 1816, however, there were 20 confectioners manufacturing and selling candies in the city of Philadelphia,<sup>1</sup> and perhaps as many more in the city of New York, but they were merely local dealers, making by hand the sweetmeats sold over their own counters.

In 1845 Sebastian Chauveau, of Philadelphia, imported the first revolving steam pan used in this country for making candy, and in 1846 the first machine for making lozenges was invented and built by Oliver R. Chase, of Boston.<sup>1</sup> Since then the advance of the industry has been very rapid, although its growth up to thirty years ago was greatly retarded by the high price of sugar.

Sugar is naturally the principal ingredient consumed in the manufacture of sweets and confections, although a considerable quantity of molasses and maple sugar is used. Chocolate is perhaps next in importance as an ingredient. Over 70,000,000 pounds of cocoa bean, valued at over \$8,000,000, were imported during the last fiscal year, and a large percentage of this found its way into confections.

In the manufacture of confections large quantities of chocolate, cocoa butter, and cocoa itself are used by those factories using the cocoa bean, while smaller concerns use the already manufactured chocolate and cocoa. Large quantities of glucose are also used as a substitute or adulterant for sugar. Both glucose and grape sugar are now considered harmless when used alone or as adulterants.

Chicle, from which most chewing gum is made, was imported into this country to the extent of 5,060,166 pounds during the fiscal year ending June 30, 1905.

Glucose, essential oils, and flavoring extracts are used with chicle to form gum. Flour starch, glucose, sirup, and flavoring extracts are used with raw licorice to produce the licorice manufactured by confectioners. The starch and paste compositions included in confectionery are used as the molding material for shaping and stamping confections.

*Glucose.*—The thick sirup called "glucose" made from cornstarch and the solid product called "grape sugar" obtained from the same source are the most important products included under this classification. Some starch is generally sold by the glucose manufacturer, while corn oil and the solid residue of the corn after the oil and starch have been extracted, which is highly valued as stock feed, form by-products which help materially to swell the total value of the products for the industry.

The first mention of the industry in Census reports appeared at the census of 1870, when "beet and grape sugar" was shown with 2 establishments, 1 in Illinois and 1 in New York, having a combined product of but \$119,720. During the ten years following, the industry advanced rapidly and at the census of 1880 there were 7 establishments reported, with \$2,255,000 invested and products valued at \$4,551,212. At the census of 1890 the industry was shown with the same number of establishments as in the previous census, but the capital invested had more than doubled and there was an increase of 70.4 per cent in the value of products. From the Eleventh to the Twelfth Census the manufacture of glucose, from the standpoint of the value of products, rose from a position of comparative unimportance to one of considerable prominence among the industries of the country. Although there was an increase of only 1 in the number of establishments, the value of products nearly tripled, the amount of capital invested increased nearly sevenfold, and the number of wage-earners employed and the amount paid them in wages about doubled. The period from 1900 to 1905 was marked by continued increase in the value of products. During the latter census year 9 establishments were engaged in the manufacture of glucose and grape sugar, with \$17,045,313 capital and 2,876 wage-earners employed, to whom \$1,774,580 were paid in wages; these plants expended \$20,258,022 for materials, and their products were valued at \$24,566,932. Practically the whole industry is now located in the state of Illinois, and it illustrates the difficulties attending a clear presentation of statistics for a single product. Each of the factories reported at the census of 1905 used corn as their principal material, and the following statement shows the diversity of products and by-products obtained therefrom and the value of each:

Total.....	\$24,566,932
Glucose.....	12,207,197
Grape sugar.....	2,506,707
Cornstarch.....	4,176,141
Gluten feed.....	3,730,242
Corn oil.....	1,288,233
All other products.....	652,412

<sup>1</sup> One Hundred Years of American Commerce, Vol. II, page 625.

Thus it will be seen that while all of the 9 establishments represented are operated as glucose factories, and are classified properly as such according to their principal product, the actual value of glucose manufactured amounts to but 49.7 per cent of the total value of products. Even the total of \$4,176,141 shown for cornstarch in the above statement does not represent the value of starch manufactured by these establishments. In the manufacture of glucose, starch is first made from corn and afterward converted into glucose—two separate operations in the same factory. Therefore most of the starch manufactured by these establishments was immediately consumed as a partially manufactured material. The gluten feed and corn oil are by-products.

The manufacture of glucose and grape sugar commenced in the United States about 1868, and the consumption of glucose as a substitute for the more expensive cane sugar grew with great rapidity. At the present time glucose is consumed in immense quantities in the manufacture of candies, table sirups, in brewing, and in preserving, while in smaller quantities it is fed to bees and used for the manufacture of artificial honey, vinegar, wine, and mucilage. Grape sugar is sometimes mixed with cane sugar as an adulterant.

In the United States glucose is manufactured from cornstarch, while in Europe the potato is the customary raw material. The corn is hulled and then softened by soaking in water charged with a little sulphurous acid. After one or two days in the soaking tank the softened corn is ground on especially prepared stones which operate like the ordinary burr mill, but the grinding is carried only far enough to loosen the germ and not to crack it. The cracked mass is next thrashed and the excess of starch removed by passing through rubber rollers, it is then treated with starch milk of such a density that the lighter germs will float while the heavier hulls and kernels sink to the bottom. The germs are removed from the top of the solution and the hulls from the bottom by mechanical contrivances. The starch in the kernels and germs is removed by sieves and continuous washings, and is finally deposited on starch tables over which the washings are made to run. The starch settles in a hard white layer which, when drained, is ready for conversion.

Hydrochloric acid is used generally to accomplish conversion and the process is conducted in steam-heated, closed, copper "converters" under a pressure of 2 or 3 atmospheres. The starch is mixed with considerable water and run into the converters, which already contain some acidified hot water. In from ten to thirty minutes, according to the character of the required product, the conversion is accomplished and the liquor is led into neutralizers where its acidity is neutralized by the addition of soda. The neutralized liquor is next decolorized by passing through bone-

black filters; it is then drained into the vacuum pans and evaporated to the desired consistency.<sup>1</sup>

*Canning and preserving, fruits and vegetables.*—This industry, while of comparatively recent development, reported products to the value of \$78,142,022 at the census of 1905. California reported \$13,214,985, or 47.8 per cent of the total raw material, but the value of products for this state was \$23,809,988, or only 30.5 per cent of the total. The products in California consist principally of dried and canned fruits, which cost more in a raw state and require less labor and less expense for packages than vegetables. Thus, while the raw material in California formed 55.5 per cent of the value of the products, in Maryland where the industry is almost entirely devoted to canning vegetables, the raw materials formed only 30.9 per cent. The cost of "all other materials," consisting principally of cans, labels, and packages in Maryland, was \$4,872,229, or 39.1 per cent of the value of products, while in California this item of expense was \$3,393,995, or only 14.3 per cent.

The statistics for the manufacture of pickles, preserves, and sauces should be considered in connection with those for "canning and preserving, fruits and vegetables," as many of the larger establishments now manufacture both classes of products.

*Food preparations.*—The 766 establishments reported for "food preparations" were engaged in the manufacture of the great variety of cereal preparations which have become so popular during the past decade, and also in the manufacture of macaroni, spaghetti, and the like, potato chips, malted milk, and other prepared foods not elsewhere specified, and stock and poultry food. The value of the products for this class increased from \$39,836,882 in 1900 to \$61,180,416 in 1905, or 53.6 per cent.

#### MINERAL AND MISCELLANEOUS PRODUCTS.

*Mineral and soda waters.*—The manufacture of mineral and soda waters ranked first in this subgroup both in number of establishments and in value of products. The industry was represented in every state and territory and reported 3,469 establishments with products valued at \$30,251,150. Most of the materials used in this industry were purchased in a partially manufactured form, the amount reported for this item, including "all other materials" and "mill supplies," being \$9,295,115 and that for raw materials only \$167,678. The amount given for raw materials, however, represents only approximately the amount paid by manufacturers for this class of materials. Most of the establishments were comparatively small and could not segregate the materials, but reported the total cost.

The industry first appeared in the census of 1850, and the figures indicate that the manufacture of carbonated beverages had attained some importance not-

<sup>1</sup>The New International Encyclopaedia, Vol. VIII, page 450.

withstanding the high price of the principal materials which composed the products. Table LXXXII is a comparative statement of the industry from 1850 to 1870.

TABLE LXXXII.—Comparative summary—mineral and soda waters: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	387	123	64
Capital.....	\$3,462,360	\$585,860	\$228,650
Wage-earners, average number.....	2,383	727	589
Total wages.....	\$923,703	\$241,292	\$153,016
Cost of materials used.....	\$1,687,931	\$454,458	\$313,031
Value of products.....	\$4,222,278	\$1,415,420	\$760,489

*Manufactured ice.*—Although this industry may be said to be related to the group “food and kindred products,” because of the extent to which it is used in connection with the manufacture and preservation of food, it is not deemed sufficient to warrant the inclusion of the industry among the food products.

*Manufactured foodstuffs exported.*—The exports of foodstuffs partly or wholly prepared during the year ending June 30, 1904, were valued at \$308,835,694 and the total imports, dutiable and free of duty, at \$118,222,862. While no direct comparison should be made between these values and the total value of products as reported by the Census, the natural conclusion from their general relationship is that only a comparatively small proportion of the domestic production is sent abroad and a still smaller proportion of the domestic consumption is obtained from foreign countries.

TEXTILES.

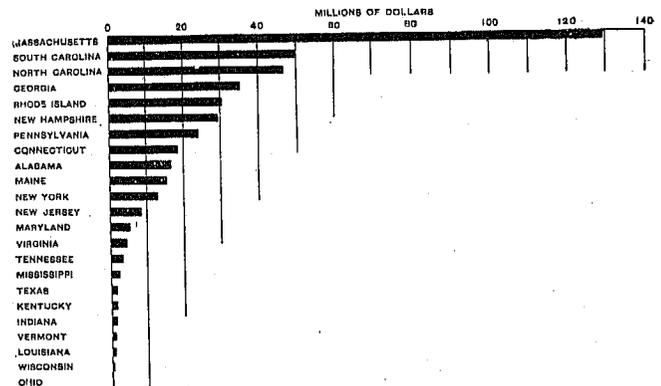
This group ranked third in gross value of products at the census of 1905, being outclassed by “food and kindred products” and “iron and steel and their products.” It contains many industries in which there are complicated processes of manufacture requiring large investments in machinery and the employment of a large number of operatives. It ranked first in the number of wage-earners. As compared with the totals for the census of 1900 the capital increased 30.1 per cent; the wage-earners, 13.1 per cent; the wages, 22.9 per cent; the cost of materials, 39.3 per cent; and the value of products, 31.9 per cent. The establishments reported for the group at the census of 1905 formed 7.9 per cent of the total for all industries; the wage-earners, 21.1 per cent; and the value of products, 14.5 per cent.

At this census the group is composed of 44 industries, which are shown separately in Table 3. Com-

parative totals from 1880 to 1905 are shown in Table 1 for 41 of the industries, 3 being shown in combination, “collars and cuffs” included with “furnishing goods, men’s,” “cotton small wares” with “cotton goods,” and “hats, felt,” with “hats and caps, other than wool.” At the census of 1900 the group contained 45 industries, 3 of which—“cotton cleaning and rehandling,” “cotton compressing,” and “cotton ginning”—were omitted entirely from the factory census of 1905, while 2 classifications—“collars and cuffs” and “corsets”—were added. The statistics for the manufacture of the articles comprised in the last named classification, however, were included with those for other classifications at prior censuses.

The industries embraced in the textile group depend upon animal or vegetable fibers for their raw material. They are characteristic of the factory method of manufacture and include those industries in which the factory system was first developed in the United States.

DIAGRAM 7.—Cotton goods—value of products by states: 1905.



MAP 4.—Cotton goods—value of products per square mile: 1905.

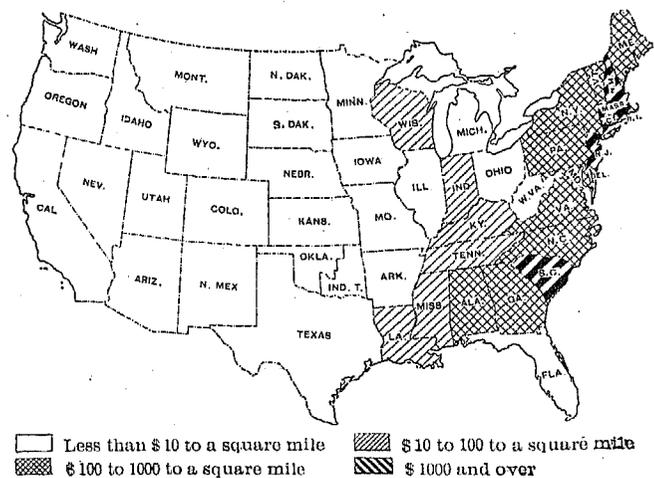
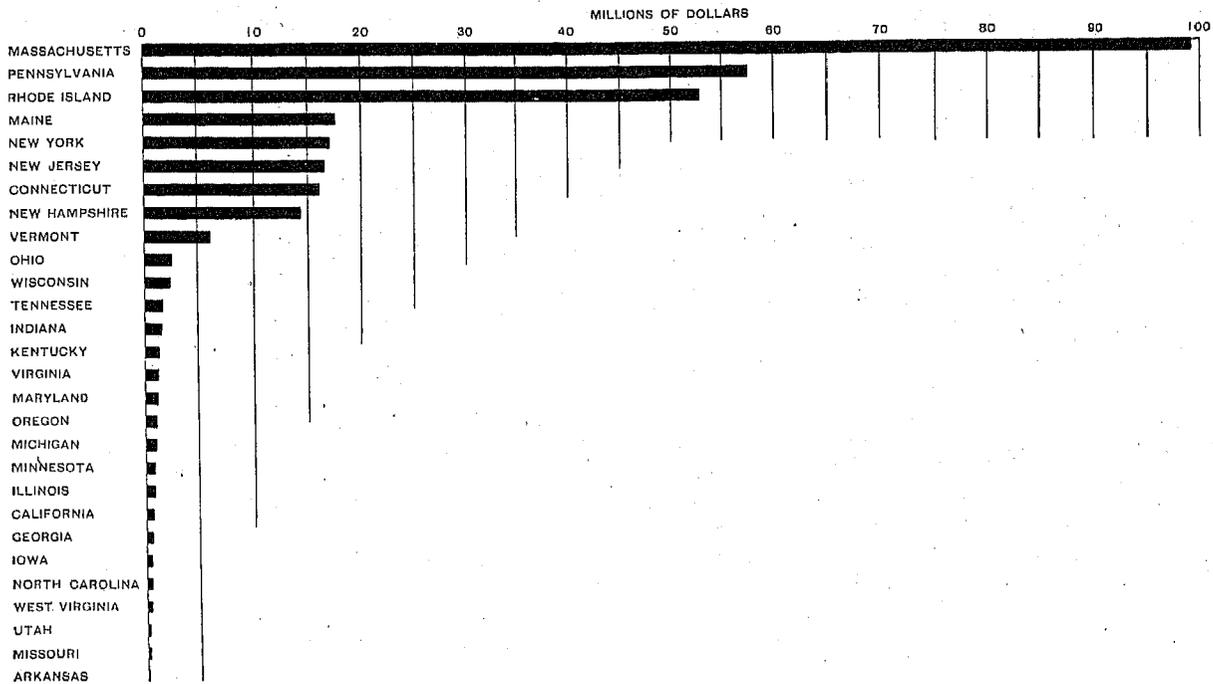


DIAGRAM 8.—WOOLEN GOODS, WORSTED GOODS, WOOL HATS, AND SHODDY—VALUE OF PRODUCTS BY STATES: 1905.

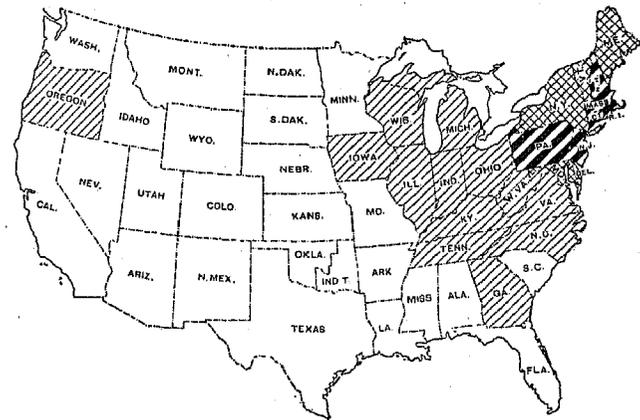


TEXTILE FABRICS.

The textile industries proper are the most important of the group, and they all show an increased production over the totals for 1900 except "wool hats," which has steadily diminished since 1880, due to the decreasing demand on account of the preference for the cheaper felt hat. The quantity of cotton consumed in the textile mills, including "cordage and twine" and excluding "felt hats" and "shoddy," increased from 1,923,531,948 pounds, valued at \$133,067,766 in 1900, to 1,981,760,046 pounds, valued at \$234,524,340, at the census of 1905. The quantity of wool increased from 412,323,430 pounds, valued at \$95,155,485, to 500,826,711 pounds, valued at \$125,902,637, and the quantity of raw silk from 9,760,770 pounds, valued at \$40,721,877, to 11,572,783 pounds, valued at \$45,318,416.

The leading textile industries proper are "cotton manufactures" (cotton goods and cotton small wares), with a production in 1905 valued at \$450,467,704; "wool manufactures" (carpets and rugs, felt goods, wool hats, woolen goods, and worsted goods), with a production valued at \$380,934,003; "hosiery and knit goods," with a production valued at \$136,558,139; and "silk and silk goods," with a production valued at \$133,288,072; making an aggregate value of products

MAP 5.—Wool manufactures—value of products per square mile: 1905.

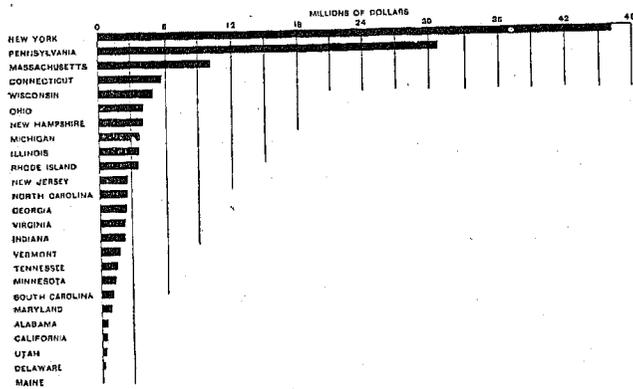


Legend for Map 5:  
 □ Less than \$10 to a square mile  
 ▨ \$10 to 100 to a square mile  
 ▩ \$100 to 1000 to a square mile  
 ▤ \$1000 and over

for these industries of \$1,101,247,918, or 51.3 per cent of the total value of all products for the group. "Hosiery and knit goods" shows the largest percentage of gain, 43, in value of products, in 1905 compared with 1900; "cotton manufactures" is second, with 32.8 per cent; "wool manufactures," third, with 28.3 per cent; and "silk and silk goods," fourth, with 24.3 per cent.

MANUFACTURES.

DIAGRAM 9.—Hosiery and knit goods—value of products by states: 1905.



In addition to the manufacture of textile fabrics, the group includes industries with products resulting principally from the remanufacture of these fabrics, such as "awnings, tents, and sails," "clothing" of every description, "bags, other than paper," "men's furnishing goods," "mats and matting," "nets and seines," and "upholstering materials." The indus-

MAP 6.—Hosiery and knit goods—value of products per square mile: 1905.

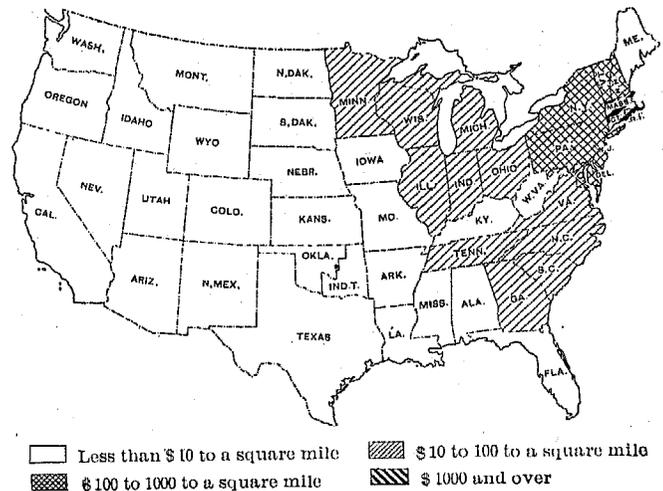
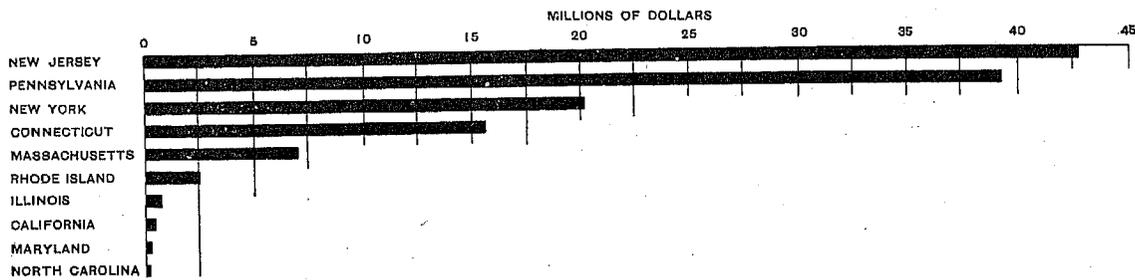
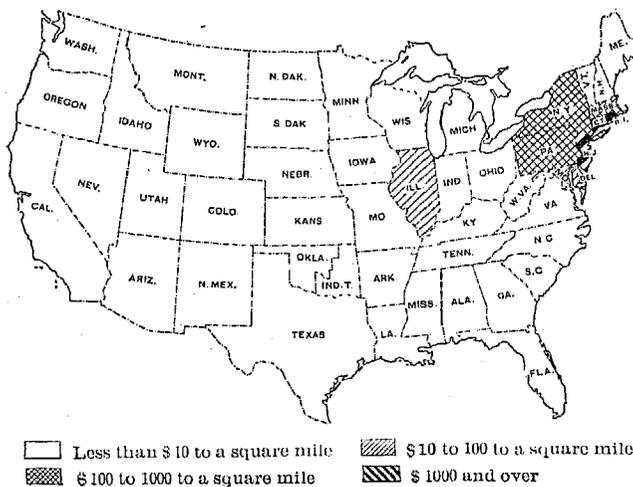


DIAGRAM 10.—SILK AND SILK GOODS—VALUE OF PRODUCTS BY STATES: 1905.



MAP 7.—Silk and silk goods—value of products per square mile: 1905.



tries in this category all show an increase in value of products at this census except "flags and banners" and "oakum."

The most important of these remanufactures are discussed in detail in the following pages.

CLOTHING AND KINDRED PRODUCTS.

The manufacture of clothing of all kinds includes not only articles of clothing made of cloth, but also the manufacture of boots and shoes of leather and rubber, leather gloves and mittens, corsets, fur goods, hats of cloth, fur, straw, and wool, millinery goods of every variety, and numerous other articles of wearing apparel, together with the products of industries called into existence entirely by the clothing industry. No statistical presentation of the manufacture of clothing in general, therefore, is complete without several industries not dependent upon the textile group for raw materials, and such industries are included in Table LXXXIII.

RELATIONSHIP OF INDUSTRIES.

cxliii

The industries in this group are distributed among three classes as follows: (1) Finished clothing from textile fibers, (2) finished clothing from leather and other materials, and (3) clothing accessories and miscellaneous materials. The statistics are for the census years 1900 and 1905.

TABLE LXXXIII.—COMPARATIVE SUMMARY—CLOTHING AND KINDRED PRODUCTS: 1905 AND 1900.

INDUSTRY.	Cen- sus.	Num- ber of estab- lish- ments.	Capital.	WAGE-EARNERS.		Miscellane- ous expenses.	Cost of materials used.	Value of products, in- cluding cus- tom work and repairing.
				Average number.	Wages.			
Aggregate.....	1905 1900	15,952 16,495	\$687,372,901 526,540,266	723,037 631,100	\$233,304,378 232,649,773	\$148,822,945 86,138,322	\$817,725,063 680,039,580	\$1,496,133,850 1,127,415,953
Finished clothing from textile fibers.....	1905 1900	11,051 11,596	439,873,825 332,825,093	470,611 403,818	182,660,016 142,893,362	112,778,345 67,106,388	486,558,191 364,360,217	926,746,746 697,067,926
Clothing, men's.....	1905 1900	4,504 5,729	153,177,500 120,547,851	137,190 120,927	57,225,506 45,496,728	57,695,240 37,492,601	185,793,436 145,218,798	355,796,571 276,717,357
Clothing, women's.....	1905 1900	3,351 2,701	73,947,823 48,431,544	115,705 83,739	51,180,193 32,536,101	24,349,282 11,733,605	130,719,990 84,704,592	247,601,560 159,330,539
Hosiery and knit goods.....	1905 1900	1,079 921	106,063,531 81,860,604	103,715 83,387	31,536,024 24,358,627	10,320,176 6,599,865	76,593,782 51,071,859	136,558,139 95,482,566
Shirts.....	1905 1900	641 690	23,379,774 19,642,658	36,499 36,622	11,233,392 10,894,327	6,451,006 4,771,601	25,639,402 22,950,564	50,971,105 47,121,530
Furnishing goods, men's <sup>1</sup> .....	1905 1900	547 457	28,043,584 20,575,961	27,185 30,322	8,760,108 9,730,066	6,424,881 2,511,838	26,564,500 23,069,929	49,031,582 44,340,482
Hats, felt.....	1905 1900	216 171	23,258,104 16,701,368	22,047 18,880	11,282,237 9,119,264	2,831,197 1,416,737	15,975,206 8,513,668	30,629,353 27,811,187
Hats and caps, other than felt, straw, and wool <sup>2</sup> .....	1905 1900	483 644	10,221,366 8,394,240	12,161 12,544	5,787,563 5,025,096	1,598,674 1,023,548	11,817,230 10,906,917	23,312,180 21,393,310
Corsets.....	1905 1900	109 138	9,589,402 7,289,936	10,975 12,297	3,600,462 3,644,593	2,104,522 987,180	6,135,237 6,357,189	14,862,081 14,451,198
Felt goods.....	1905 1900	39 36	9,667,136 7,125,276	3,254 2,688	1,356,754 1,024,835	612,766 356,164	5,754,026 3,801,028	8,948,594 6,461,691
Hats, wool.....	1905 1900	17 24	1,646,064 2,050,802	1,503 2,108	619,194 937,855	293,208 185,644	1,369,810 2,042,202	2,457,266 3,591,940
Hand knit goods.....	1905 1900	65 85	279,541 204,913	377 304	78,583 75,870	97,393 27,515	195,566 123,471	518,315 351,126
Finished clothing from leather and other materials.....	1905 1900	2,545 2,749	190,665,387 155,060,747	188,930 178,324	86,889,521 72,977,179	27,186,418 15,191,735	260,569,239 215,079,419	445,036,268 342,884,747
Boots and shoes.....	1905 1900	1,316 1,599	122,526,093 99,819,233	149,924 141,830	69,059,680 58,440,883	19,293,634 10,669,402	197,363,495 168,632,654	320,107,458 258,969,580
Boots and shoes, rubber.....	1905 1900	22 22	30,441,826 33,667,533	18,991 14,391	8,866,806 6,426,579	3,215,373 2,089,154	32,000,464 22,082,543	70,065,296 41,089,819
Fur goods.....	1905 1900	898 734	17,991,869 12,484,172	9,370 7,758	5,122,782 3,927,214	3,169,718 1,865,482	21,204,391 14,281,092	37,123,129 25,899,192
Gloves and mittens, leather.....	1905 1900	339 304	10,705,599 9,089,809	10,645 14,345	3,840,253 4,182,518	1,507,693 567,697	10,000,889 9,926,156	17,740,385 16,926,156
Clothing accessories and miscellaneous materials.....	1905 1900	2,356 2,150	56,833,689 38,654,426	63,496 48,958	23,754,841 16,779,217	8,858,182 3,840,199	70,567,633 50,599,944	124,350,836 87,463,280
Millinery and lace goods.....	1905 1900	860 591	17,849,821 10,764,813	27,500 16,871	10,307,241 5,817,855	4,588,553 1,545,167	26,258,916 15,654,295	50,777,768 29,469,406
Boot and shoe cut stock.....	1905 1900	290 342	9,850,007 7,003,080	5,936 6,155	2,364,209 2,230,691	904,950 490,548	21,586,872 17,800,282	27,675,815 23,242,892
Buttons.....	1905 1900	275 238	7,783,900 4,212,568	10,567 8,685	3,680,196 2,826,238	1,012,762 393,862	4,144,446 2,803,246	11,133,769 7,995,910
Boot and shoe findings.....	1905 1900	214 186	4,144,505 3,277,958	4,206 2,993	1,545,175 1,127,784	475,021 233,353	6,047,356 4,627,048	9,355,020 7,145,820
Cotton small wares.....	1905 1900	77 82	8,010,491 6,397,385	5,416 4,932	1,828,100 1,563,442	556,577 402,634	4,207,655 3,110,137	8,016,486 6,394,164
Hat and cap materials.....	1905 1900	65 70	4,264,651 1,744,419	2,414 1,371	848,751 434,148	343,780 103,565	4,216,906 2,797,756	6,440,108 3,849,116
Artificial leathers and flowers.....	1905 1900	213 224	2,567,648 3,632,789	4,343 5,331	1,396,817 1,561,403	470,200 404,751	2,014,380 2,763,337	5,246,822 6,293,235
Furs, dressed.....	1905 1900	85 92	1,296,141 798,030	1,105 835	754,988 478,190	206,363 49,291	1,641,950 519,699	3,215,701 1,400,455
Cloth, sponging and refinishing.....	1905 1900	55 46	401,326 288,894	795 534	503,935 268,191	191,382 93,295	38,852 17,490	1,052,939 566,000
Clothing, men's, buttonholes.....	1905 1900	141 149	262,091 246,539	903 944	380,468 332,187	46,383 36,234	94,857 93,178	700,158 680,502
Boot and shoe uppers.....	1905 1900	75 126	281,096 202,881	228 253	102,792 124,707	29,125 26,812	290,454 395,543	540,867 688,795
Straw goods.....	1905 1900	6 4	122,012 25,070	83 54	42,250 14,381	33,086 847	54,089 12,933	186,383 36,985

<sup>1</sup>Includes 44 establishments in 1905 reported as "collars and cuffs."

<sup>2</sup>Includes 68 establishments in 1905 reported as "hats, straw."

There is a considerable amount of clothing and clothing accessories included in the general statistics for which it is impossible to make a segregation to be included in Table LXXXIII. For instance, lodge uniforms are classed as "regalia and society banners and emblems;" garters, supporters, and elastic notions of all kinds are included in the "rubber and elastic goods" classification; athletic uniforms are included in the classification of "sporting goods;" pins and hooks and eyes are included in the classification of "needles, pins, and hooks and eyes."

Artificial palms, plants, fruits, and flowers are used to some extent for exterior and interior house decoration, and as these products could not always be segregated from those used for millinery purposes, the entire product of "artificial feathers and flowers" was necessarily included. Hides and skins are dressed to some extent for lap robes, rugs, etc., but the "furs, dressed" industry as a whole can safely be considered as furnishing material for the manufacture of "fur goods." The value of products for "straw goods" consists largely of the value of contract work for bleaching and dyeing straw hat materials, but small amounts for other miscellaneous straw goods are also included. The product of the whalebone cutting industry is largely tributary to the manufacture of clothing products, but as only 2 establishments were reported for 1905, they have been omitted from Table LXXXIII.

Weaving, spinning, knitting, and some other industries are still carried on to a limited extent in the household, but all such products have probably been omitted from recent censuses. At any rate such operations are not extensive and can not affect the comparisons. There were, however, large quantities of clothing made by the merchant and custom tailors, by dressmakers, and in the household, which, though entirely omitted from the census of 1905, assume in the aggregate such large proportions and are of such great importance that they must be considered in making any computation of the per capita values.

Since 1900 there has been a very satisfactory increase in practically all of the industries included in the group. The fact that the number of establishments did not increase as rapidly as the wage-earners and the value of products, indicates that the development has been due more to the expansion of existing plants than to the establishment of new enterprises.

"Artificial feathers and flowers," "boot and shoe uppers," and "wool hats" indicate a decreased production between the two census periods. The decrease in "boot and shoe uppers" and "wool hats" has been referred to under the discussion of "leather and its finished products" and "textiles." The decrease in "artificial feathers and flowers" was explained in the report on manufactures of the last census, as follows: "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.'"

FINISHED CLOTHING FROM TEXTILE FIBERS.

The manufacture of finished clothing from textile fibers has assumed great proportions. At the census of 1905 the total value of the output was \$926,746,746, an increase of 33 per cent over the value reported in 1900. A significant feature of the table is the decrease in the number of establishments, which dropped from 11,596 at the census of 1900 to 11,051 at the census of 1905. In view of the increase in the value of products and an increase of over a hundred million dollars in capital, it is evident that large establishments are flourishing at the expense of the small shops.

*Clothing, men's, and clothing, women's.*—The statistics for these classifications represent what is generally accepted as the factory clothing industry. The establishments in these industries which manufacture, under various conditions, ready made clothing, may be arranged in three groups according to the ownership of materials and the treatment of the expense for wages: (1) Those in which the material is owned by the manufacturer, under whose immediate supervision the manufacture is carried on. In such an establishment the value of products includes the cost of the material and the expense for wages. (2) Those in which the material is owned by the manufacturer who cuts the garments but has a portion or all of the sewing done by independent operators as contract or piece work. In the reports for such establishments the cost of the material is included in the value of the products, but the number of wage-earners employed by the independent establishments making the garments is not included, the cost of this work being reported in the amount "paid for contract work" under miscellaneous items of expense. (3) Those in which the contractor operates on material furnished by others. The value of products reported for such establishments is the amount received for work done during the year; and the cost of the material represents only the cost of thread, wax, buttons, and such miscellaneous articles as were not furnished by those for whom the work was done.

The combination of the reports for the second and third groups of establishments necessarily results in a duplication of the value of products, as the amount received for work done by establishments in the third class is reported by the establishments of the second class as an expense and enters as an item in the value of their products.

*Hosiery and knit goods.*—Next in importance to the manufacture of women's clothing was the production of hosiery and knit goods.

*Shirts; furnishing goods, men's; and collars and cuffs.*—The statistics for these three branches of industry are shown separately in Table 3. Some estab-

lishments manufacturing primarily the products of one class, show as minor products articles which; if they could be segregated, would belong in one of the other two classes.

Previous to the census of 1880 the only mention made of these products occurred at the census of 1860, when a classification representing the three industries combined showed 219 establishments having a capital of \$2,256,500, employing an average of 528 males and 15,068 females, who received \$1,634,992 in wages, consuming materials which cost \$3,920,607, and reporting products valued at \$7,218,790.

At the census of 1880 the statistics for "shirts" and "furnishing goods, men's," which were shown separately, indicate that the factory industry had attained considerable proportions prior to that date. It is probable that at the censuses of 1860 and 1870 they were included under the classification "clothing, men's." Since 1880 each census has recorded large increases in the manufacture of shirts. The census of 1890 showed an increase in the value of the products of 67 per cent over that of 1880, and in the following ten years an increase of 40 per cent was recorded. The census of 1905 showed a product valued at \$50,971,105, which represented an increase of 8.2 per cent over 1900. The decrease of 20.6 per cent in the number of establishments from 1890 to 1900 is accounted for by the fact that in 1890 establishments making custom shirts solely were included, while in 1900 and 1905 they were excluded.

The articles included in the classification "furnishing goods, men's," are neckties, suspenders, belts, handkerchiefs, fabric cloth gloves, mufflers, and gaiters and leggings made of cloth. This industry was first given a separate classification at the census of 1880, probably being reported with "clothing, men's," at prior censuses. The enumeration of 1905 was restricted to factories engaged in production for the trade only, and the statistics for 1900 were reduced to this basis, but the establishments engaged in custom work were included in prior censuses.

The manufacture of collars and cuffs as a distinct industry had reached such proportions at the census of 1905 as to warrant a separate classification. An interesting feature of this industry is its localization: Out of the 44 establishments reporting, 37 were in the state of New York, with products valued at \$12,188,181, or 96.8 per cent of the total.

*Hats.*—The establishments manufacturing hats are classified according to the character of the material used, and the industry appears in Table LXXXIII under "finished clothing from textile fibers" and also in the miscellaneous groups of the clothing under "clothing accessories, etc.," as "hat and cap materials."

The statistics for the entire industry at the present census are summarized in Table LXXXIV.

TABLE LXXXIV.—*Summary—hats and caps, and materials: 1905.*

	Number of establishments.	Capital.	WAGE-EARNERS.		Cost of materials used.	Value of products.
			Average number.	Wages.		
Total .....	781	\$30,300,185	33,125	\$18,537,745	\$33,370,152	\$68,838,907
Wool hats .....	17	1,646,064	1,503	619,194	1,360,810	2,457,266
Felt hats .....	210	23,258,104	22,047	11,282,237	15,975,206	36,629,363
Straw hats .....	68	6,030,216	5,567	2,433,974	5,509,507	10,356,690
All other hats and caps .....	415	4,185,150	6,594	3,353,589	6,307,603	12,955,490
Hat and cap materials .....	65	4,264,651	2,414	848,751	4,216,906	6,440,108

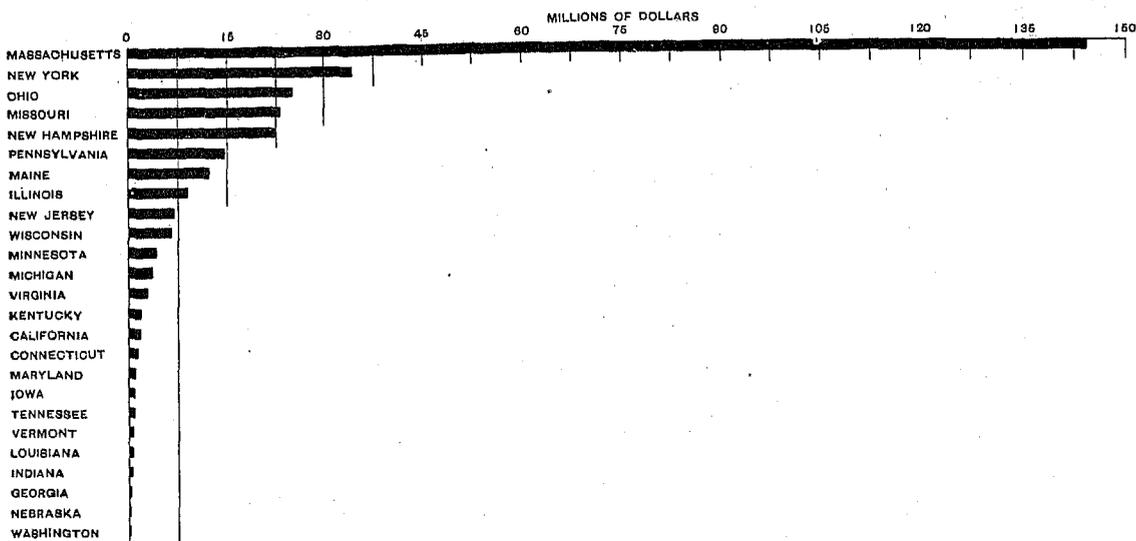
FINISHED CLOTHING FROM LEATHER AND OTHER MATERIALS.

This class includes the important industries "boots and shoes, leather," and "boots and shoes, rubber." Next to the manufacture of "clothing, men's," the manufacture of boots and shoes of leather is the most important industry shown in the table.

*Boots and shoes, leather.*—The different branches of this industry reported 1,895 establishments with a product of \$357,688,160 for the census of 1905 as compared with 2,253 establishments with a product of \$290,047,087 for the census of 1900. The decrease in the number of establishments is fully explained in the special report on "boots and shoes." The industry is specialized very much in the same way as the manufacture of men's and women's clothing—that is, the classes of cut stock, findings, and uppers represent the operations of establishments that make a specialty of manufacturing parts of shoes, such as vamps, tongues, laces, heels, pasted inner soles, wooden heels, and canvas box toes, covering metal shoe lace hooks, fitting uppers, etc. All of these products, which appear in the table under "clothing accessories, and miscellaneous materials," are included and duplicated in the total value of products reported for "boots and shoes."

MANUFACTURES.

DIAGRAM 11.—BOOTS AND SHOES—VALUE OF PRODUCTS BY STATES: 1905.



MAP 8.—Boots and shoes—value of products per square mile: 1905.

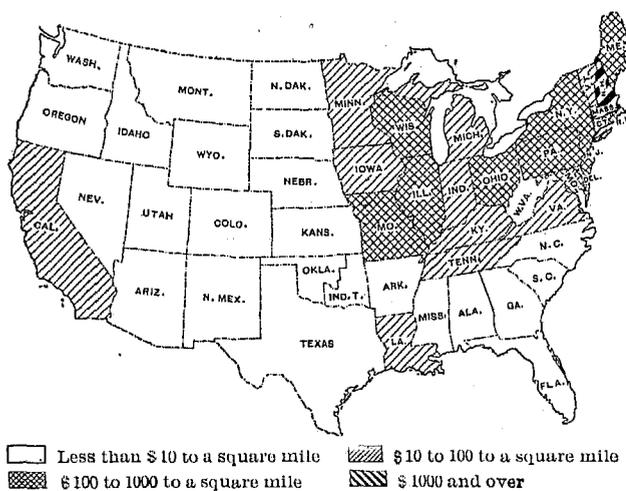
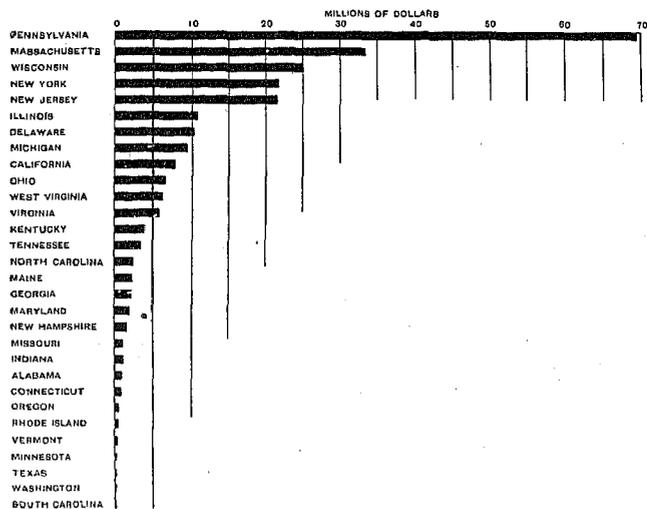


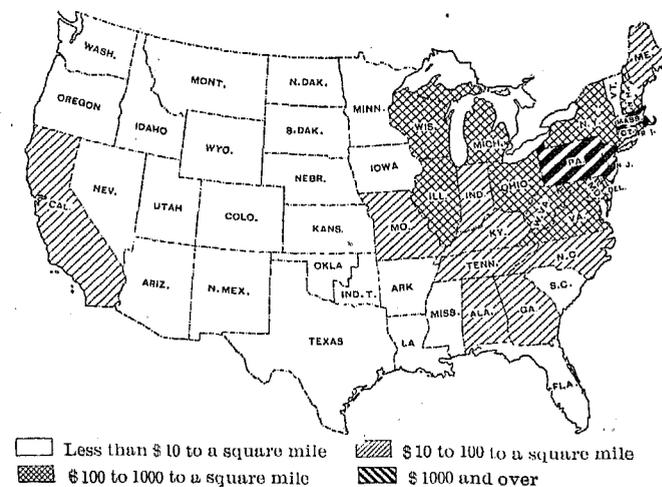
DIAGRAM 12.—Leather, tanned, curried, and finished—value of products by states: 1905.



It is interesting to note that the value of the finished leather product of the tanning and currying industry was \$236,765,803 for the census of 1905, while the leather reported as a material for the boot and shoe industry cost \$170,492,700. If these two amounts be accepted as representing the usual production and consumption during a period of twelve months, the figures indicate that about 72 per cent of the leather manufactured in the country was consumed in the boot and shoe industry.

*Boots and shoes, rubber.*—This industry reports the least number of establishments, but next to “boots and shoes, leather,” the greatest amount of capital and the largest value of products of any of this class. The excessive increase in value of products is due probably to the fact that at the census of 1905 some of the establishments prepared their reports on the basis of a list price, subject to the large discounts peculiar to the industry.

MAP 9.—Leather, tanned, curried, and finished—value of products per square mile: 1905.



*Gloves and mittens, leather.*—The census of 1905 is the first at which the statistics for the manufacture of leather gloves and mittens was given a separate classification. The value of the products for the industry amounted to \$17,740,385, but there is considerable duplication in this value, due to the practice of different manufacturers performing only certain processes and selling the partially completed products to others to be carried to a higher stage of completion. A large number of the wage-earners in the industry are pieceworkers and work at their homes or elsewhere than at the factory. Their wages are reported as amounts paid for contract work and included in miscellaneous expenses; therefore the 10,645 wage-earners and the \$3,840,253 paid as wages do not fully represent the magnitude of employment in the industry.

## CLOTHING ACCESSORIES AND MISCELLANEOUS MATERIALS.

The industries included under this heading are for the most part the result of specialization in the manufacture of clothing. Several of them contribute their entire product to the factories which produce finished articles of clothing. Thus the products of the industries "boots and shoes, cut stock," "boot and shoe findings," "boot and shoe uppers," "hat and cap materials," and "clothing, men's, buttonholes," are consumed entirely in the manufacture, respectively, of boots and shoes, of hats and caps, and of men's clothing.

*Millinery and lace goods.*—This is the largest industry of the miscellaneous group according to value of products. It includes the manufacture of ladies' belts, collars and neckwear of every description, embroidery, tucking, scarfs, hat and bonnet frames, ruffles, lace caps, the trimming of hats; the treatment and arrangement of feathers, the working of chenille dots on chiffon and the making of marabou chiffon, silk pompons, and millinery ornaments, children's bibs and headwear, and similar articles. The value of these products at the census of 1905 was \$50,777,768, or 18.6 per cent of the value of all the products of the "miscellaneous group." The materials consumed are composed largely of the finer products of the textile mills.

Many establishments classed as "millinery and lace goods" also manufacture some artificial flowers, and, as noted previously, the industry is allied closely to that of "artificial feathers and flowers," both classes of products being used largely for similar purposes. The statistics for "millinery and lace goods" do not include the trimming of hats, bonnets, etc., in millinery stores for individual customers.

*Cloth, sponging and refinishing.*—The operations of establishments engaged in shrinking, sponging, and refinishing cloth are here considered. The cloth treated is furnished by the establishment for which the work

is done, and therefore its value is not included either as materials or products. The total reported as value of products is the amount received for work done. The total, however, does not convey a correct idea of the extent of this work, as many of the manufacturers treat their own cloth.

*Buttonholes.*—The working of buttonholes is done to a limited extent in independent establishments, the materials being furnished. The statistics represent the operations of such independent establishments only. The amount added by the working of buttonholes by these independent establishments is included in the value of the products reported by the manufacturer for whom the work is done.

## QUANTITIES AND VALUES OF TEXTILE MATERIALS AND SELECTED ARTICLES OF CLOTHING.

In this as in other industries, the increase in the quantity of products is perhaps a better indication of the growth of the manufacture of clothing and of kindred products than the increase in the value. While it is impossible to show quantities of products for all of these manufactures, Table LXXXV presents some that are available for 1900 and 1905.

For the most part the value of the articles specified has increased at a greater rate than the quantity, silk broad goods and felt hats being the principal classes in which the reverse is true. The excess in the increase of value is due to the increase in prices and to changes in the character of products, as a larger proportion of the finer and more expensive classes of goods necessarily increases the total value. The impossibility of securing uniformity in the way of reporting the value of products—some manufacturers give the factory cost, others the value at the factory, and still others the actual amount received for the goods—should be considered in connection with the values for all branches of industry, but especially for the textile products, in which such radical changes in the quality of products are possible.

The totals for yarns show the greatest and those for hosiery and knit goods the least proportionate excess in value. A better idea of the increase for yarns, however, may be had by a comparison of the percentages for the different varieties, as the percentages for the totals for all yarns are fixed largely by the totals for cotton yarn. During the first half of the census year 1904 the price of raw cotton reached the highest point in ten years. Any fluctuation in the cost of raw material is reflected to a greater degree in the value of the partially manufactured products than in the value of the finished products, since in the former case the cost of labor is less in proportion to the value of production.

TABLE LXXXV.—TEXTILE MATERIALS AND SELECTED ARTICLES OF CLOTHING, BY KIND, QUANTITY, AND VALUE, WITH PER CENT OF INCREASE: 1905 AND 1900.

KIND.	QUANTITY.			VALUE.		
	1905	1900	Per cent of increase.	1905	1900	Per cent of increase.
Cotton goods.....	<i>Square yards.</i> 4,675,023,522	<i>Square yards.</i> 4,125,000,349	13.3	\$283,136,377	\$213,781,400	32.4
Plain cloths for printing.....	1,818,216,172	1,581,613,827	15.0	80,311,012	57,780,940	30.0
Brown or bleached sheetings.....	1,172,309,182	1,212,403,048	13.3	61,253,376	55,513,032	10.3
Twills and satteens.....	366,142,513	235,800,518	55.2	23,701,305	14,301,302	65.7
Napped fabrics.....	330,808,140	268,852,716	23.0	26,108,315	18,231,044	43.2
Fancy woven fabrics.....	306,254,685	237,841,603	28.8	28,486,342	21,066,310	35.2
Ginghams.....	302,316,132	278,392,708	8.6	22,471,867	16,179,200	38.9
Ticks, denims, and stripes.....	256,375,486	181,800,853	41.0	23,797,578	16,446,633	44.7
Duck.....	122,601,212	129,234,076	15.1	17,005,082	14,203,008	19.2
Wool goods.....	519,364,177	433,187,507	19.9	239,755,600	186,355,134	28.7
All wool woven goods.....	260,681,119	216,655,100	20.3	158,430,261	117,996,743	34.3
Goods woven on cotton warp with weft partly or wholly of wool, worsted, or hair.....	182,135,011	152,931,012	19.1	50,092,572	42,510,490	17.8
Union or cotton-mixed woven goods.....	63,197,407	57,394,570	10.2	26,288,407	23,111,696	13.7
Felt cloths, etc.....	12,289,901	5,819,167	111.2	4,026,483	1,994,114	101.9
Upholstery goods.....	1,000,739	447,568	137.0	608,937	742,121	22.5
Hosiery and knit goods.....	<i>Dozens.</i> 68,356,841	<i>Dozens.</i> 49,183,400	39.0	120,474,781	83,731,072	43.9
Woolen, merino, and cotton hose.....	25,999,813	16,642,677	56.2	26,152,043	16,206,674	61.4
Merino, all wool, and cotton shirts and drawers.....	19,707,096	15,818,893	24.6	56,338,450	45,167,540	24.8
Woolen, merino, and cotton half hose.....	18,144,185	13,253,848	36.9	17,438,914	11,043,764	57.9
Gloves and mittens.....	2,200,508	1,899,825	19.0	5,556,260	4,248,687	30.8
Merino, all wool, and cotton combination suits.....	1,433,610	974,127	47.2	6,643,745	3,575,591	85.8
Cardigan jackets, etc.....	811,629	594,000	36.6	8,345,360	3,498,837	138.5
Yarns, etc.....	<i>Pounds.</i> 477,260,371	<i>Pounds.</i> 418,497,739	14.0	154,483,509	114,612,491	34.8
Cotton yarn.....	369,679,680	338,253,895	9.3	80,936,359	56,165,212	44.1
Worsted yarn and tops.....	60,480,686	43,054,545	40.5	43,228,084	30,117,728	43.5
Woolen yarn.....	42,964,476	32,817,878	30.9	10,018,700	6,861,333	46.0
Silk, spun, machine twist, sewing, embroidery, and wash.....	2,109,884	1,903,034	10.9	11,109,656	10,301,027	7.8
Silk, organzine and tram.....	2,025,645	2,468,387	17.9	9,190,650	11,167,101	17.7
Silk broad goods.....	<i>Yards.</i> 136,447,107	<i>Yards.</i> 97,940,935	39.3	72,979,765	58,122,622	25.6
Plain and fancies.....	77,454,067	62,536,803	23.9	46,084,952	39,302,821	17.3
Piece dyed.....	26,937,937	15,890,385	132.5	13,076,099	6,210,673	120.2
Jacquards.....	10,479,211	9,209,695	13.8	7,156,711	6,639,322	7.8
Velvets.....	7,262,315	5,122,249	41.8	3,161,206	2,479,903	27.5
Plushes.....	2,547,367	3,848,684	33.8	1,340,815	2,480,068	45.9
Tapestry and upholstery.....	1,766,210	1,333,119	32.5	1,559,982	1,009,835	54.5
Boots, shoes, and slippers, leather.....	<i>Pairs.</i> 242,110,035	<i>Pairs.</i> 217,965,419	11.1	315,987,387	255,720,266	23.6
Hats, felt.....	<i>Dozens.</i> 2,612,175	<i>Dozens.</i> 1,926,366	35.6	34,319,634	25,671,211	33.7
Hats, wool.....	464,300	823,005	43.6	2,339,917	3,171,081	26.2

<sup>1</sup> Decrease.

Cotton fabrics show a much greater excess in the value increase than wool fabrics. This condition may be attributed largely to the stronger advance in cotton materials than in wool, although the price of wool was somewhat higher at this census than in 1900. It would be natural to expect any industry consuming large quantities of cotton yarn to show a large excess in the increase in value. This, however, is not the case with hosiery and knit goods, the increased cost of cotton material being offset by a change in the fineness of products, and also by greater economies of manufacture resulting from the use of improved methods and machinery.

The percentages of increase in the value of boots and shoes was 2.1 times the quantity increase, and this indicates higher prices resulting from increased cost of materials and manufacture.

The quantity of silk fabrics increased 39.3 per cent, or about 1.5 times the value increase. According to the Census returns the cost of raw silk declined 25.5

per cent per pound between the two census years. A change in the character of products is also apparent, tending toward cheaper grades of silk, as shown by a larger proportion of materials other than silk consumed by silk manufactures.

The slight decline in the average cost per pound of hatter's fur accounts in part for the lower value shown for "hats, felt."

A close comparison of a detailed statement of products for any industry, especially textiles, brings unsatisfactory results, because of the changes in character and the unavoidable differences in classification.

OTHER INDUSTRIES.

*Awnings, tents, and sails.*—Although the making of awnings, tents, and sails is one of the most ancient of industries or handicrafts, no notice seems to have been taken of it in census statistics prior to 1850. Table LXXXVI is a summary of the census statistics for this industry from 1850 to 1870.

TABLE LXXXVI.—Comparative summary—awnings, tents, and sails:  
1850 to 1870.

	1870	1860	1850
Number of establishments.....	224	150	180
Capital.....	\$715,765	\$342,275	\$271,380
Wage-earners, average number.....	1,127	737	868
Total wages.....	\$542,999	\$298,217	\$355,092
Cost of materials used.....	\$1,611,023	\$868,573	\$889,984
Value of products.....	\$2,880,715	\$1,442,046	\$1,675,703

This summary and the statistics given in Table 1 indicate, on the whole, a constant and consistent growth in the industry from 1850 to the present time. The decades 1850 to 1860 and 1870 to 1880 show decreases, which are undoubtedly the results of defective enumerations, and are not representative of actual conditions.

The small establishments that make window, porch, and store awnings and place the same for individual customers were omitted from the enumeration of 1905. The principal materials used in this industry are cotton duck and the iron and wood frames, braces, etc., for awnings and tents. The quantity and value of cotton duck manufactured in the United States according to the Census reports during the years ending May 31, 1890 and 1900, and the calendar year 1904 were 55,192,538, 129,234,076, and 122,601,212 square yards, respectively, valued at \$8,664,395, \$14,263,008, and \$17,005,982. The cost of all materials used in the manufacture of "awnings, tents, and sails," as reported to the Census at the same periods, was \$4,150,180 in 1890, \$5,227,503 in 1900, and \$6,669,721 in 1904. A large part of this cost was for cotton duck. It will be seen, therefore, that a large proportion of this product of cotton mills is utilized in the industry.

While it is true that in modern times the sewing machine has found some application in the trade, and, together with labor saving cutting appliances, has effected greater economy in the work, the industry is to-day, as always, a hand trade. Many of the establishments engaged in the manufacture of awnings, tents, and sails are large, employing many hands, but by far the largest proportion are comparatively small.

The simplicity and primitiveness of the industry as regards mechanical appliances is illustrated in the comparatively small number of patentable improvements recorded, and such patents as have been granted cover principally awning, tent, and canopy supports, frames, braces, etc.

*Flags and banners.*—The manufacture of "flags and banners" is closely allied to that of "awnings, tents, and sails," and in some instances to "regalia and society banners and emblems." Establishments often manufacture products common to the three industries, and this precludes a uniform classification from census to census, as the predominating product may be awnings and tents one year and flags and banners another. This difference in classification accounts largely for the

apparent decrease in flags and banners at this census. There was one large establishment which had gone out of business and one which reported a largely decreased production.

*Bags, other than paper.*—This classification is limited to establishments which manufacture bags from hemp, jute, cotton, or other fiber. Bags are made frequently by the establishments that manufacture the fabric, and in many instances they are made in connection with the manufacture of other products. In such cases they form only a minor portion of the product and are included in the classification to which the establishment is assigned according to its product of chief value. For example, the factories included in the classification of "cotton goods" manufactured bagging, cloth, and finished bags to the value of \$3,953,732 at the census of 1905, and establishments engaged in the manufacture of jute and jute goods reported the production of gunny bagging to the value of \$2,233,936. In the salt industry \$38,041 were expended for cloth for the manufacture of bags. There are flour mills and other factories in which bags are manufactured and consumed and their value does not appear separately in the Census statistics. The totals, therefore, do not exhibit the real extent of these manufactures. However, a comparison of the returns of the several censuses since 1860, when the industry was first classified separately, reveals a remarkable growth. Table LXXXVII gives the totals for 1860 and 1870. Statistics for subsequent censuses are given in Table 1.

TABLE LXXXVII.—Comparative summary—bags, other than paper:  
1870 and 1860.

	1870	1860
Number of establishments.....	39	19
Capital.....	\$1,200,500	\$82,000
Wage-earners, average number.....	1,097	112
Total wages.....	\$452,517	\$43,968
Cost of materials used.....	\$3,827,678	\$607,785
Value of products.....	\$8,261,679	\$749,578

In both 1880 and 1890 "bags, other than paper" included establishments reporting flax, hemp, and jute bagging. At the censuses of 1900 and 1905 all jute products were included under "jute and jute goods." This fact explains the decrease in the industry which the figures of 1900 apparently revealed. This change in classification makes the comparison of the censuses of 1880 and 1890 with those of 1900 and 1905 misleading. The growth of the industry has been constant until in 1905 products valued at \$37,399,087 were manufactured and 5,722 wage-earners were employed, to whom \$1,828,526 was paid in wages.

In the earlier history of the industry the majority of the bags manufactured were of the coarser materials. Cotton was not used to a great extent. Flax cotton, a fibrous material which was made by treating flax with caustic soda and sulphuric acid and which could be spun and woven on cotton mill machinery, had been

used for making the finer grades of grain bags. The importation of jute increased from 15,406 bales in 1860 to 62,850 in 1870,<sup>1</sup> the manufacture of bags being an important factor in the consumption of the material. Cotton cloth is now used largely in the manufacture of the finer grades of bags where fine texture and neatness are required, and jute, in the manufacture of the coarser grades, such as are used in shipping coffee, rice, corn, fertilizer, etc.

The use of machinery in the last twenty-five years has facilitated greatly the manufacture of bags, and the fact that all grades and sizes made from different materials may be produced in the same establishment has caused the value of products to increase in much greater proportion than the number of establishments.

One of the most important features of this industry is the increase in number of cotton bags used. Flour is now commonly sold in cotton bags of varying sizes, as also are table salt, granulated sugar, meal, and other articles of food.

*Oakum.*—The decrease in the value of the products of oakum is more apparent than real, as one establishment which reported oakum as the sole product in 1900, reported also a large paper and pulp product in 1905, and was assigned to the latter classification.

IRON AND STEEL AND THEIR PRODUCTS.

In 1905 this group ranked second in the gross value of products and in the average number of wage-earners, and first in the total amount paid annually in wages. It is composed of 37 industries, of which 33 are shown separately and 4 in combination in Table 1. The manu-

<sup>1</sup>The Universal Cyclopaedia, vol. 6, page 517.

facture of pig iron and of steel are the basic industries of the group. On these are founded all the other industries, such as those producing structural iron, machinery, tools, hardware, tin and terne plate, cutlery, wire, and the more delicate classes of products represented, for example, by electrical measuring instruments.

The aggregate value of all products of the iron and steel group of industries in 1905 was \$2,176,739,726, as against \$1,806,278,241 in 1900, an increase of \$370,461,485, or 20.5 per cent. As shown by the special report on iron and steel, the value of the products of the blast furnace industry in 1905 was \$231,822,707; of steel works and rolling mills, \$673,965,026; and of the remaining industries in the group, \$1,270,951,993.

MAP 10.—Iron and steel—value of products per square mile: 1905.

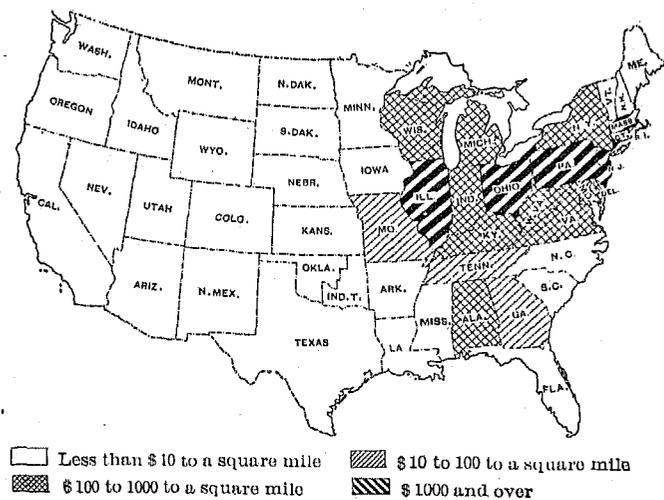
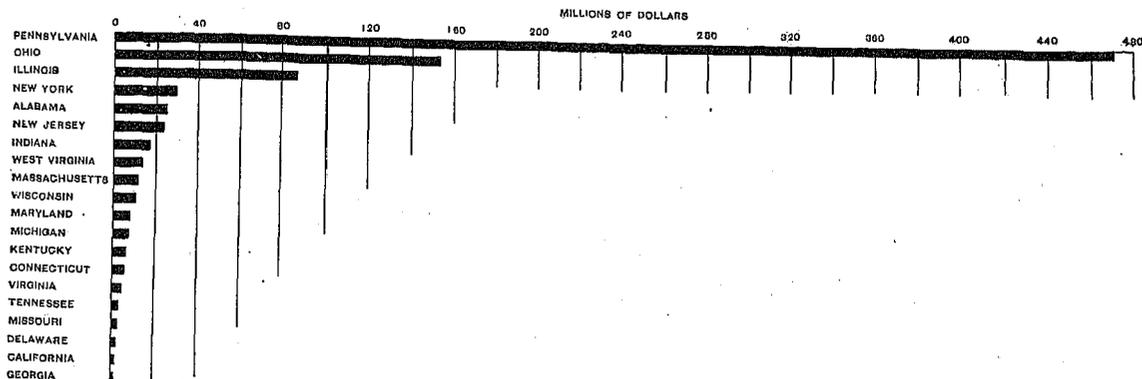


DIAGRAM 13.—IRON AND STEEL—VALUE OF PRODUCTS BY STATES: 1905.



*Iron and steel.*—The manufacture of pig iron is the foundation of all the industries in the group. Of the 30,582,857 tons of iron ore consumed in the iron and steel industry, 30,032,862 tons, or 98.2 per cent, were used in blast furnaces, and 549,995 tons, or 1.8 per cent, in steel works and rolling mills. Hence the value of the blast furnace products is substantially that of the basic product, which appears again and again as

material through successive stages of manufacture and remanufacture, in the various industries of this group and in many of the other industries.

The pig iron product at the census of 1900 amounted to 14,447,791 tons, and at the census of 1905, to 16,623,625 tons, an increase of 2,175,834 tons, or 15.1 per cent. During the decade from 1890 to 1900 the quantity increased 5,602,606 tons, or 63.3 per cent.

In rolling mill products there has been a considerable increase in the manufacture of boiler and other plates and sheets, wire rods, hoops, bands, cotton ties, skelp, and rolled blooms, slabs, billets, and tin plate bars. At the census of 1905 as compared with that of 1900 the quantity of steel rails manufactured decreased 56,752 tons, or 2.5 per cent, although the value increased \$11,734,071, or 25.2 per cent. In 1900 compared with 1890 the quantity of steel rails increased 396,595 tons, or 21.4 per cent, and the value decreased \$13,770,596, or 22.8 per cent.

In considering the statistics of the iron and steel industry for the years 1900 and 1905, it should be borne in mind that the first half of the year 1904 was a period of general business depression, which seriously affected the industry and is reflected in the returns for the census of 1905, which covered the calendar year 1904. On the other hand, the census of 1900 covered a year of business activity and expansion.

The combining of iron and steel with wood or other material in many lines of industry, as in the manufacture of agricultural implements, steam and sail vessels, carriages, wagons, and automobiles, makes it impossible to compile statistics that will fully portray the magnitude and importance of the iron and steel industry.

Iron and steel forms a considerable proportion of the products of a number of the industries assigned in Table 1 to some one of the 13 other groups. In fact, there is practically no industry to which iron and steel does not contribute, either as machinery, or as component parts of the products.

The extensive manufacture, as subsidiary products, by rolling mills of the higher grades of products, which were formerly almost altogether made as specialties by independent establishments that did not manufacture the basic material, makes it impossible to present complete statistics of capital, employees, wages, etc., incident to the manufacture of some of the most important iron and steel products.

The number of inquiries upon the iron and steel schedule were increased in 1890 to cover a number of products not enumerated previously. The inquiries were further extended in 1900, and still further at the census of 1905, so that at the last-named census most of the chief manufactures of rolling mills were specified.

The subsidiary products reported by rolling mill establishments and the classifications in which they appear as principal products when made by establishments other than rolling mills are as follows:

Subsidiary products reported by steel works and rolling mills.	How classified when made as a principal product by establishments other than steel works and rolling mills.
Agricultural implements.....	Agricultural implements.
Cast iron gas and water pipe; soil and plumbers', etc., pipe.	Foundry and machine shop products.
Copper rods.....	Brass and copper, rolled.
Copper wire.....	Wire.
Cut nails and cut spikes.....	Iron and steel, nails and spikes, cut and wrought, including wire nails, not made in rolling mills or steel works.
Gray iron and malleable castings.....	Foundry and machine shop products.
Horse and mule shoes.....	Horseshoes.
Iron and steel bolts, nuts, rivets, forged spikes, washers, etc.	Iron and steel, bolts, nuts, washers, and rivets, not made in rolling mills or steel works.
Iron and steel seamless drawn, clinched, brazed, etc., pipe or tubes.	Iron and steel pipe, wrought.
Iron and steel springs—car, carriage, furniture, and all other.	Springs, steel, car and carriage.
Iron and steel wire.....	Wire.
Iron and steel wire nails.....	Iron and steel, nails and spikes, cut and wrought, including wire nails, not made in rolling mills or steel works.
Iron and steel wrought pipe or tubes.....	Iron and steel pipe, wrought.
Machinery, etc.....	Foundry and machine shop products.
Ordnance.....	Ordnance and ordnance stores.
Other wire products.....	Wirework, including wire rope and cable.
Saws.....	Saws.
Screws.....	Screws, machine; screws, wood.
Shovels, spades, scoops, etc.....	Tools, not elsewhere specified.
Stamped ware.....	Stamped ware.

*Copper rods and copper wire.*—Rolling mills manufactured 1,406 short tons of copper rods, valued at \$463,057, and 25,966 short tons of copper wire, valued at \$7,252,917, as returned at the census of 1905. In addition, copper and brass wire, rods, etc., to the value of \$19,789,507 were made by establishments classified under "wire." This product was almost wholly copper wire. An unascertained quantity was made in establishments classified as "brass and copper, rolled."

*Cutlery and edge tools.*—This classification includes such articles as knives, razors, scissors, shears, axes, augers, gimlets, swords, meat choppers, turpentine hooks, pullers, scrapers, oyster knives, planes, etc.

At the census of 1810 products of this character were reported from 3 states. "Augers and bits" were manufactured in Maine to the value of \$2,000; Pennsylvania reported "cutlers" and "planes" with an aggregate value of \$132,360; and Virginia reported "swords" and "augers" valued at \$13,805. At the census of 1840 cutlery and edge tools were probably in-

cluded in the tabulation of "hardware, cutlery, etc." Table LXXXVIII shows the industry as reported at the censuses of 1850, 1860, and 1870.

TABLE LXXXVIII.—Comparative summary—cutlery and edge tools: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	184	250	401
Capital.....	\$4,127,547	\$3,594,549	\$2,321,805
Wage-earners, average number.....	4,428	4,963	4,275
Total wages.....	\$2,131,758	\$1,811,059	\$1,420,844
Cost of materials used.....	\$1,624,043	\$1,918,637	\$1,439,402
Value of products.....	\$5,622,801	\$5,341,647	\$3,813,241

The census of 1850 demonstrated the fact that the manufacture of "cutlery and edge tools" was even then quite an extensive industry. The census of 1860 showed separately the statistics for 51 establishments engaged in the manufacture of "cutlery;" 166 in the manufacture of "edge tools and axes;" and 33 in the manufacture of "carpenters' tools." These 3 classifications were combined and the total placed in comparison with the classification "cutlery and edge tools" at the censuses of 1850 and 1870. Except for a slight decrease in the wage-earners, wages, materials, and products during the decade ending in 1890, there has been a steady growth in the industry, as shown by the totals for each census to and including that of 1905.

*Files.*—A separate tabulation for files was shown for the first time at the census of 1870. The classification covers all varieties of files and rasps.

In 1870, 121 establishments were engaged in the manufacture, employing 1,581 wage-earners with products valued at \$1,649,394. The greatest number of establishments was returned at the census of 1880, when there were 179; only 62 were shown at the census of 1905. The greatest increase in the number of wage-earners occurred during the decade ending in 1880. In 1905 the wage-earners numbered 3,276, an increase of 116, or 3.7 per cent over 1900. The value of products has increased steadily, amounting to \$4,391,745 in 1905.

*Foundry and machine shop products.*—Next to the manufacture of iron and steel the products of the foundries and machine shops are the most important in the group. Their value exceeded that for every other industry, except blast furnaces, steel works and rolling mills, and "slaughtering and meat packing, wholesale." The industry gave employment to a larger number of wage-earners than any other except "lumber and timber products," for which, at the census of 1905, 404,626 were reported compared with 348,380 in foundry and machine shops.

The statistics for this industry probably represent a greater variety of products than that covered by any other classification. Some of the more important products are textile and other mill machinery, engines and boilers, hoisting and conveying machinery, and metal and wood working machinery of every description. The value of the products of metal working machinery

alone amounted to \$32,408,766 for the census of 1905. The great variety of products manufactured by the large machine shops makes it impossible to obtain a satisfactory segregation of the statistics for even the most important classes.

The following list gives some of the products reported by the foundries and machine shops at the census of 1905. The classification does not include the entire production of all of these products, as some of them are manufactured by establishments included in other industrial groups.

PARTIAL LIST OF PRODUCTS INCLUDED IN THE CLASSIFICATION, "FOUNDRY AND MACHINE SHOP PRODUCTS:" 1905.

- |  |                                  |
|--|----------------------------------|
| Advertising signs.                                 | Fan forges.                      |
| Air compressors.                                   | Feeding and watering appliances. |
| Air tanks.   | Fertilizer pulverizers.          |
| Anvils.  | Filters.                         |
| Automobile engines.                                | Fire engines.                    |
| Bake ovens.  | Fire escapes.                    |
| Bakers' machinery.                                 | Fire extinguishing apparatus.    |
| Ball bearings.                                     | Fire hydrants.                   |
| Bar fittings.                                      | Flue blowers.                    |
| Biscuit cutters.                                   | Folding machines.                |
| Blowers.   | Folding pails.                   |
| Boiler cleaners.                                   | Frames.                          |
| Boilers.   | Furnaces for steam boilers.      |
| Bookbinding machinery.                             | Furriers' machinery.             |
| Boot and shoe machinery.                           | Gas engines.                     |
| Boring machines.                                   | Gas holders.                     |
| Bottle washing machinery.                          | Gasoline motors.                 |
| Brake beams.                                       | Gear wheels.                     |
| Brewers' machinery.                                | Grain cleaning machinery.        |
| Brick machinery.                                   | Grain handling machinery.        |
| Butchers' machinery.                               | Grinders.                        |
| Canning machinery.                                 | Hair machines.                   |
| Car wheels.  | Hand drills.                     |
| Castings.  | Hat machinery.                   |
| Cement lined water pipes.                          | Hay carriers.                    |
| Chain belting.                                     | Heaters.                         |
| Check protectors.                                  | Hoisting engines and apparatus.  |
| Cigar machinery.                                   | Hydraulic presses.               |
| Clamps.  | Ice breakers.                    |
| Clay tempering machines.                           | Ice cream freezers.              |
| Cob crushers.                                      | Injectors.                       |
| Confectioners' machinery.                          | Ink machinery.                   |
| Coffee and spice, roasting and grinding machinery. | Insulating machinery.            |
| Conveying machines.                                | Iron beds.                       |
| Cooperage machinery.                               | Iron chairs.                     |
| Couplings.   | Iron flasks.                     |
| Cracker machines.                                  | Iron gates and ornaments.        |
| Cranes.  | Iron posts.                      |
| Cream separators.                                  | Iron and wire screens.           |
| Derricks.  | Jacketed kettles.                |
| Dies.  | Jack screws.                     |
| Dish washing machinery.                            | Jacquard attachments.            |
| Drying frames.                                     | Jewelers' machines.              |
| Dumb-waiters.                                      | Kettles.                         |
| Ejectors.  | Knife grinders.                  |
| Electric car trucks.                               | Knitting machinery.              |
| Elevator doors.                                    | Labeling machinery.              |
| Elevators.   | Laundry machinery.               |
| Envelope machines.                                 | Lawn mowers.                     |
| Etching machines.                                  | Lightning rods.                  |
| Evaporating machinery.                             | Looms and loom fixtures.         |
| Excavating machinery.                              | Loopers.                         |

- Lubricators.
- Machine knives.
- Machine wool combs.
- Mailing machinery.
- Manhole doors.
- Marine engines.
- Meal mills.
- Meat mixers.
- Merry-go-rounds.
- Metal beds.
- Metal furniture.
- Metallic packing napping machines.
- Metal saw tables.
- Metal working machinery.
- Milling machines.
- Molding cutters.
- Molding machinery.
- Music stands.
- Oilcloth machinery.
- Paint machinery.
- Paper bag machinery.
- Paper box machinery.
- Paper mill machinery.
- Parcel conveyors.
- Planes.
- Plated metal work.
- Pneumatic tools.
- Power transmission machinery.
- Presser dies.
- Propeller wheels.
- Pulleys of all kinds.
- Pumps.
- Punches.
- Radiators.
- Railroad switch appliances.
- Road machinery.
- Sausage stuffers.
- Scouring machines.
- Shafting.
- Shear knives.
- Sheet metal.
- Shoe racks.
- Shuttles.
- Slot machines.
- Smokestacks.
- Stamping machines.
- Staples.
- Stationary engines.
- Steam hammers.
- Steam rollers.
- Steel pans.
- Steel tires.
- Stencil machines.
- Stove trimmings.
- Street sweeping machines.
- Sugar machinery.
- Swages.
- Tackle blocks.
- Tanks.
- Tanning machinery.
- Textile machinery.
- Tile making machinery.
- Tobacco cutters.
- Toboggans.
- Tools.
- Traction engines.
- Trucks.
- Trunk racks.
- Turbines.
- Type casting and setting machines.
- Valves.
- Vending machines.
- Vises.
- Wall paper trimmers.
- Warping machines.
- Water meters.
- Weather vanes.
- White metal wrapping machines.
- Wire trays.
- Woodworking machinery.

Statistics for products similar to those included in this classification were first presented in the report on manufactures for the census of 1810. Some of the principal products enumerated at that census are given in the following list, which shows the limited character of the industry at that early date:

- Boring mills.
- Coffee mills.
- Hand cards.
- Hydraulic engines.
- Hydrostatic machines.
- Labor saving machinery.
- Looms for textile manufactures.
- Patent hat looms.
- Printing presses.
- Spinning wheels.
- Water turning machinery.
- Wheel irons.
- Wire cards.

The following is a partial list of the products reported at the census of 1870:

- Agricultural castings.
- Architectural castings.
- Belt hooks.
- Bleaching machines.
- Bobbins and spools.
- Boot and shoe machinery.
- Braiding machines.
- Caloric engines.
- Car wheels.
- Cider mills.
- Cooking ranges.
- Cotton gins and presses.
- Drying machines.
- Elevators.
- Flyers.
- Gristmills.
- Hand cards.
- Hollow ware.
- Hot air furnaces.
- Iron planes.
- Knitting machines.
- Lathes.
- Locomotive engines.
- Loom harnesses.
- Loom pickers.
- Looms.
- Machine castings.
- Malleable iron castings.
- Miscellaneous castings.
- Mules.
- Oil tanks.
- Paper engines.
- Pegging machines.
- Portable steam engines.
- Printing machines.
- Printing presses.
- Reeds.
- Ring travelers.
- Rivet machines.
- Rolls.
- Sawmills.
- Shuttles.
- Smut machines.
- Speeders.
- Spindles.
- Spinning frames.
- Spinning machines.
- Stationary engines.
- Steam fire engines.
- Steam gauges.
- Steam pumps.
- Stoves.
- Sugar mills.
- Tobacco machines and presses.
- Water wheels.
- Wood pulp machinery.
- Woodworking machinery.
- Wool pickers.

Many of these articles are manufactured in establishments where their production is a specialty, and it would be possible to make a separate compilation of the statistics. There are, however, comparatively few, if any, for which such a compilation would show the total production.

Under these conditions it is not strictly correct to speak of the classification "foundry and machine shop products" as the classification of a distinct industry. It is more properly a collection of industries. The statistics probably cover to a greater extent than any other classification the production of articles included in other classifications, such, for example, as agricultural implements; electrical machinery, apparatus, and supplies; hardware, etc. The heterogeneous character of the classification is acknowledged, and a partial segregation was made at the census of 1905 by the separation of the statistics for "locomotives" and "stoves and furnaces." The quantities and values of the different metal working machines and machine tools are also shown separately. It may be possible at future censuses to make a further segregation of the statistics.

It is probable that at the earlier censuses the statistics did not cover all of the products now included in the classification, but the figures for 1860 and 1870 are sufficiently harmonious to indicate the growth of the manufacture and are given in Table LXXXIX.

TABLE LXXXIX.—Comparative summary—foundry and machine shop products: 1870 and 1860.

	1870	1860
Number of establishments.....	5,551	2,795
Capital.....	\$168,762,558	\$60,209,034
Wage-earners, average number.....	134,819	67,201
Total wages.....	\$76,702,796	\$26,123,762
Cost of materials used.....	\$108,646,193	\$36,587,093
Value of products.....	\$238,302,464	\$88,019,299

The statistics for "foundry and machine shop products" presented in the above table are compiled from the classifications "iron, cast," and "machinery," as

reported in 1860 and 1870. The statistics for 1860, however, were revised in 1870 and presented in comparison with the two industries as reported at that census.

The decrease indicated by a comparison of the figures for 1870 in the above table with those for 1880 in Table 1 is due probably to the reclassification in 1880 of the products that were grouped as "miscellaneous and repairing" in 1870. This item aggregated \$80,444,614, and probably some establishments covered by it were assigned to other classes of industry at the census of 1880.

The statistics given in Table 1 for the censuses of 1890, 1900, and 1905 cover, so far as possible, the same class of products as those included in the classification at the census of 1880. The total for each census shows a constant increase, the largest actual increase being reported for the decade ending in 1900, when the value of products increased \$231,259,098, or 56 per cent.

*Hardware.*—Of the industries closely allied to "foundry and machine shop products," the manufacture of general hardware ranks first in value of products, which are of a wide range. Some of the articles included in the classification in 1905 are given in the following list:

Andirons.	Fancy furniture nails.
Automobile horns.	Fireplace goods.
Bicycle oilers.	Furniture casters.
Bicycle pumps.	Furniture trimmings.
Bird cage springs.	Hinges.
Bolts.	Ice skates.
Brass drapery chains.	Knobs.
Cabinet hardware.	Metal match safes.
Candle shades.	Molding hooks.
Car hardware.	Nail clippers.
Carriage drop forgings.	Office hardware.
Carriage mountings.	Organ hardware.
Casket hardware.	Padlocks.
Chain blocks.	Piano hardware.
Clips.	Picture hooks.
Coffee mills.	Rivets.
Copper spoons.	Roller skates.
Curtain brackets.	Sash weights.
Curtain rods.	Stationers' hardware.
Door locks.	Trunk trimmings.
Egg beaters.	Window springs.

A number of these products are similar to those made in machine shops, and some of the establishments included in the class of "foundry and machine shop products" make many of these articles as subsidiary products.

Hardware was first specified as a separate industry in the census of 1840, when it was shown under the classification "hardware, cutlery, etc.," and the value of products amounted to \$6,451,967. Since the census of 1850 the industry has been uniformly reported

as "hardware." The totals for 1850, 1860, and 1870 are given in Table xc.

TABLE XC.—Comparative summary—hardware: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	580	443	340
Capital.....	\$13,809,315	\$6,707,000	\$3,539,025
Wage-earners, average number.....	14,236	10,721	7,030
Total wages.....	\$6,845,640	\$3,443,664	\$1,073,004
Cost of materials used.....	\$9,188,064	\$4,402,958	\$3,015,688
Value of products.....	\$22,237,320	\$10,903,106	\$6,957,770

This summary and Table 1 show that there has been a constant increase in the industry. The value of products for 1905 was more than six times as great as that for 1850. The number of establishments decreased from 580 in 1870 to 350 in 1890 but since then has been gradually increasing. The 340 establishments reported at the census of 1850 were distributed throughout 16 states, but the industry was largely concentrated in Connecticut and New York. At the census of 1860 the 443 establishments were located in 19 states and the 580 returned at the census of 1870 were distributed in 20 states.

*Hardware, saddlery.*—The manufacture of snaps, check hooks, harness chains, and all metallic trimmings employed in the manufacture of harness and saddles are included under this classification.

The census of 1870 returned 155 establishments engaged in the manufacture of these products, with 2,566 wage-earners and products valued at \$3,227,123. In 1880 the establishments decreased to 64; the number of wage-earners increased 249, or 9.7 per cent; and the value of products increased to \$3,651,021, or 13.1 per cent. The fluctuation in the number of establishments reported in the different censuses is due undoubtedly to changes in classification, it being impossible in many cases to determine whether the establishments should be included in this industry or classed with "hardware" or some other of the metal industries. The statistics given in Table 1 are reasonably consistent and indicate a constant, though not a rapid, increase in the industry.

*Horseshoes.*—Horseshoes were made formerly by establishments devoted primarily to their production, but now are manufactured chiefly in rolling mills. From Table 1 it appears that the value of products of establishments other than rolling mills, engaged in the manufacture of horseshoes decreased from \$1,110,032 at the census of 1890 to \$798,981 at the census of 1905. But there were 68,594 tons of horseshoes, valued at \$5,483,137, reported by rolling mill establishments in 1905, making a total of \$6,282,118 as the value of such products, exclusive of those made in the small blacksmith shops. These products include shoes for mules and oxen.

*Iron and steel, nails and spikes.*—The manufacture of iron and steel nails and spikes by establishments not equipped for the manufacture of hot rolled iron and steel is shown as a separate industry in Tables 1, 3, and 5, and the statistics would indicate that there has been a constant decrease in this branch of the industry since 1890. This decrease is due to the fact that the bulk of these products are now made in rolling mills. The wire nail has, to a large extent, taken the place of the cut nail, and the major portion of the wire nail product is included in the rolling mill statistics.

Table xci presents the statistics for the manufacture of nails in rolling mills for 1900 and 1905.

TABLE XCI.—Comparative summary—manufacture of nails in rolling mills: 1905 and 1900.

	1905	1900
Total:		
Kegs of 100 pounds.....	10,373,061	6,261,453
Value.....	\$19,880,470	\$15,737,150
Cut nails—		
Kegs of 100 pounds.....	1,311,549	1,658,443
Value.....	\$2,394,108	\$3,292,063
Wire nails—		
Kegs of 100 pounds.....	9,061,512	4,603,010
Value.....	\$17,495,362	\$12,445,096

Table xcii summarizes the statistics for all classes of nails and accounts for the entire production irrespective of the character of the establishment where manufactured.

TABLE XCII.—Comparative summary—all classes of nails: 1905 and 1900.

	1905	1900
Total value.....	\$32,830,196	\$30,514,458
Iron and steel, nails and spikes, cut and wrought, including wire nails, not made in rolling mills or steel works.....	8,022,896	14,777,299
Wire nails made as a by-product of the wire industry.....	4,017,830	( <sup>1</sup> )
Nails made in rolling mills.....	19,880,470	15,737,150

<sup>1</sup> Not reported separately.

The above tables illustrate the necessity of considering all industries in which specific products occur in order to ascertain the extent of the manufacture. For example, the \$8,922,896 shown as the value of products for establishments in which nails were the product of chief value formed only 27.2 per cent of the value of all nails manufactured during the census year 1905.

*Iron and steel pipe, wrought.*—The production of iron and steel wrought pipe or tubes by rolling mill establishments at the census of 1905 amounted to 849,047 tons with an aggregate value of \$43,985,728. There was also manufactured a large amount of wrought pipe or tubes by establishments which purchased the skelp, and this appears in the classification "iron and steel pipe, wrought," the products of which aggregate \$17,400,912. Of this latter amount, \$15,542,530 represents the value of the products of 12 establishments purchasing skelp

and making wrought pipe or tubes, and the remaining \$1,858,382 was the value of seamless-drawn, clinched, brazed, riveted, etc., pipes or tubes made by 15 non-rolling mill establishments. The total value of all iron and steel wrought pipe or tubes (not including seamless-drawn, clinched, brazed, etc.), whether made in rolling mills or other establishments, was, therefore, \$59,528,258; and the total quantity, estimated on the basis of the average price per ton of the rolling mill products, approximately 1,149,000 tons.

If the statistics of the industry classified as "iron and steel pipe, wrought," alone were considered, it would appear that since 1890 there has been a steady decline, as the value of the production was \$37,906,801 in that year, \$21,292,043 in 1900, and \$17,400,912 in 1905.

In 1905, 8 rolling mills reported iron or steel seamless-drawn, clinched, brazed, etc., pipe or tubes aggregating 20,636 tons, valued at \$2,290,234. If this amount be added to the value of like products made by establishments other than rolling mills, it makes a total value of \$4,148,616:

*Iron castings.*—The bulk of the iron castings will be found under "foundry and machine shop products," but in 1905 there were reported by steel works and rolling mills 3,782 short tons of cast iron pipe and 42,862 short tons of gray iron and malleable castings with an aggregate value of \$2,569,792. The production of cast iron gas, water, soil, and plumbers', etc., pipe, and iron and malleable castings made by foundry establishments can not be segregated from the rest of the foundry and machine shop products.

*Locomotives.*—The statistics for the manufacture of "locomotives," which are included in the total for "foundry and machine shop products" in Table 1, are presented separately in Table xciii.

TABLE XCIII.—Comparative summary—locomotives: 1890 to 1905.

	1905	1900	1890
Number of establishments.....	15	28	19
Capital.....	\$38,421,048	\$40,813,793	\$24,516,674
Wage-earners, average number.....	24,806	19,039	15,678
Total wages.....	\$15,798,432	\$10,899,614	\$8,697,488
Cost of materials used.....	\$27,702,930	\$20,174,305	\$13,338,742
Value of products.....	\$59,552,092	\$35,209,048	\$24,922,756

The statistics in this table represent the establishments devoted exclusively to the manufacture of locomotives or those in which locomotives constituted the predominating product. They do not, however, include 148 locomotives reported at the census of 1905 as manufactured in the repair shops of steam railroad companies. The statistics for 1890 and 1900 are reproduced from a special report on the manufacture of locomotives at the census of 1900. As indicated by the number of wage-earners, value of products, and other items, the industry has increased rapidly since 1890.

In connection with the domestic production it is instructive to consider the number and value of locomotives exported.

TABLE XCIV.—Number and value of locomotives exported: 1870 to 1905.

YEAR.	Number.	Value.	YEAR.	Number.	Value.
1905.....	453	\$3,617,010	1900.....	525	\$5,592,403
1904.....	504	5,261,422	1890.....	161	1,280,606
1903.....	289	3,219,778	1880.....	00	466,313
1902.....	365	3,257,594	1870.....	25	341,794
1901.....	423	4,039,006			

The greatest increase in exports occurred in the decade from 1890 to 1900, when the number increased from 161 to 525, and the value from \$1,280,606 to \$5,592,403.

*Ordnance and ordnance stores.*—The manufacture of 1,594 tons of ordnance with an aggregate value of \$988,804 was reported by steel works and rolling mills, and products valued at \$557,903 by establishments classified as “ordnance and ordnance stores,” making a total of \$1,546,707. The manufacture of ordnance, however, is confined chiefly to governmental establishments.

*Saws.*—The statistics for the manufacture of saws represent hand and power saws of all varieties. Saws were among the earliest metal products of the United States. At the censuses of 1810 and 1820 they were reported from Pennsylvania, their value at the former being \$19,700, and at the latter, \$20,600. But in subsequent censuses up to and including 1850 no mention is made of saws, and it is supposed that the industry was represented by the classification “hardware, cutlery, etc.” The totals for the censuses of 1860 and 1870 are given in Table xcv.

TABLE XCV.—Comparative summary—saws: 1870 and 1860.

	1870	1860
Number of establishments.....	72	42
Capital invested.....	\$2,883,391	\$770,200
Wage-earners, average number.....	1,595	759
Total wages.....	\$995,609	\$281,392
Cost of materials used.....	\$1,332,891	\$583,123
Value of products.....	\$3,175,289	\$1,237,063

With the exception of a decrease in number of establishments between 1900 and 1905, there has been a constant increase in the industry since 1860.

*Springs, steel, car and carriage.*—In 1905 the iron and steel springs for cars, carriages, furniture, etc., made in 9 rolling mills amounted to 22,022 tons, valued at \$1,708,632. The value of products of the establishments not equipped for the manufacture of steel and hot rolled iron and steel was \$5,740,836. Therefore the total value of the iron and steel springs, not including those manufactured as subsidiary products in the foundry and machine shop industry was \$7,449,468.

*Stamped ware, machinery, and tools.*—The rolling mill establishments reported \$292,923 for stamped

ware, \$1,269,675 for machinery, and \$410,500 for shovels, spades, scoops, etc.; these amounts should be added to the value of products reported in the several industries entitled “stamped ware,” “foundry and machine shop products,” and “tools, not elsewhere specified,” respectively, to approximate the total production for each class of products.

*Steam fittings and heating apparatus.*—This classification includes all establishments engaged primarily in the manufacture of steam and hot water heating apparatus—steam gauges, steam valves, steam traps, and steam couplers—as well as pipe fittings, ventilating and car heating apparatus, lubricating devices, safety valves, oil cups, and other similar devices.

The principal materials used are pig and scrap iron, both malleable and cast, sheet copper, brass, tin, and iron and steel pipes and plates. Some of the establishments manufacturing steam fittings and heating apparatus also use hemp, canvas, rubber, and asbestos as materials and manufacture, as by-products, packing, packing rings, and piston packing; brass castings and other brass goods, which properly come within the domain of brassware, are also manufactured in some instances.

The industry was first mentioned at the census of 1860, when it was covered by the three classifications—“steam and gas fittings and valves,” “steam heaters and heating machines,” and “steam water gauges.” In 1870 the single classification “heating apparatus” covered the subject. Since then the present classification, “steam fittings and heating apparatus,” has obtained.

Table xcvi is a comparative summary, which presents the statistics for the industry as reported at the censuses of 1860 and 1870.

TABLE XCVI.—Comparative summary—steam fittings and heating apparatus: 1870 and 1860.

	1870	1860
Number of establishments.....	50	23
Capital.....	\$1,605,830	\$500,500
Wage-earners, average number.....	1,141	665
Total wages.....	\$853,516	\$200,232
Cost of materials used.....	\$1,424,345	\$367,262
Value of products.....	\$3,425,150	\$1,023,300

At the census of 1905 New York, Pennsylvania, and Massachusetts contained 89 establishments, or more than half of the number in the entire industry, and their products amounted to \$14,948,090, or 60 per cent of the total value of products.

Steam and hot water radiators and boilers are manufactured frequently by establishments of the class included in the Census reports under “foundry and machine shop products.” Therefore the two industries are closely allied, and the statistics for “steam fittings and heating apparatus” should not be accepted as representing the totals for all products of this class.

*Stoves and furnaces, not including gas and oil stoves.*—The statistics for these products are shown separately

in Tables 3 and 5, but for purposes of comparison are combined with "foundry and machine shop products" in Table 1.

In 1850 stoves and ranges were made in 13 states, in which a total of 230 establishments manufactured a product valued at \$6,124,748. At the census of 1860 there were 327 establishments located in 15 states, employing 8,366 wage-earners and with annual products valued at \$11,498,260. No comparative statistics are available for 1870, 1880, 1890, and 1900, the products for these censuses being merged either wholly or in part in other foundry and machine shop products. In 1905 the statistics for the industry were again reported separately, and show 415 establishments with products valued at \$54,409,108.

*Structural ironwork.*—The manufacture of structural iron is one of the important features in the development of the iron and steel industries.

Building operations have never been thoroughly covered in the Census reports, but they have heretofore been represented in part by the mechanical trades, such as masonry, carpentering, plumbing, etc. The exclusion of the mechanical trades from the census of 1905 eliminates statistics pertaining to the erection of buildings, the construction of docks and canals, the grading and construction of roads, excavating, etc., but the materials used in some of these operations, which are largely the products of factories, were reported. They consist principally of lumber, iron, steel, stone, glass, and clay products. The substitution of iron and steel for wood in the erection of buildings and bridges and in the construction of vessels and cars, etc., accounts in part for the rapid increase in this industry.

Builders' iron, structural shapes, beams, girders, etc., are manufactured to a considerable extent in rolling mills. Table xcvii shows the totals for this class of products as reported by steel works and rolling mills at the censuses of 1900 and 1905.

TABLE XCVII.—Comparative summary—manufacture of structural beams, girders, etc., by steel works and rolling mills: 1905 and 1900.

	1905	1900
Total:		
Tons.....	954,537	856,983
Value.....	\$32,730,901	\$29,361,522
Iron—		
Tons.....	4,475	27,091
Value.....	\$145,200	\$1,051,550
Bessemer steel—		
Tons.....	331,671	263,800
Value.....	\$11,089,170	\$8,381,717
Open-hearth steel—		
Tons.....	618,391	566,092
Value.....	\$21,496,531	\$19,928,249

Similar products are also manufactured to some extent by the establishments included in the classification "structural ironwork" shown in Table 1, but the majority of the products in this group consists of the cutting, punching, bending, and assembling of the structural shapes, and the manufacture of railings, fire-

proof doors, fire escapes, gratings, metal shingles, steel ceilings, roofing, etc.

*Tools, not elsewhere specified.*—This classification was first used at the census of 1880 and includes tools that can not be assigned to any of the specific classifications, such as "cutlery and edge tools," "saws," "files." It embraces the manufacture of shovels, spades, bakers' tools, crochet hooks, diamond glass cutters, drills, dentists' tools, garment workers' tools, knitting pins, polishing wheels, pipe wrenches and cutters, pressing irons, posthole diggers, stone tools, spirit levels, steel punches, etc.

These products are often found as subsidiary products of other industries. For example, agricultural implement manufacturers reported at the census of 1905 the manufacture of spades, shovels, scoops, picks, husking pins, post hole diggers, hammers, hay conveying forks, wrenches, etc. Prior to the census of 1880 these products were distributed among various classifications, according to their use or the material from which they were constructed.

The totals given in Table 1, with the exception of the number of establishments, indicate a rapid increase, but the products are of such a miscellaneous character that it is by no means certain that the same class has been uniformly included at the various censuses.

*Wire and wirework.*—The manufacture of "wire" and of "wirework, including wire rope and cable," are shown as distinct classes of industries in Table 3. The former represents the manufacture of wire from iron and steel rods, and brass, copper, lead, and tin bars, and also the remanufacture of wire into galvanized wire, barbed wire, fence wire, cables, insulated wire, and various other wires. Wirework, including wire rope and cable, includes the manufacture of woven wire and wire fencing, rat traps, bird cages, hat frames, guards and railings, mats and matting, screens, springs, and numerous other articles in which wire is the principal material. Some of the establishments in the latter class draw the wire and manufacture the finished articles, but as a rule the wire is obtained from the establishments included in the classification "wire."

In his report to Congress in 1791 on the manufactures of the country, Alexander Hamilton, then Secretary of the Treasury, referred to the fact that "copper and brass wires, particularly utensils for distillers, sugar refiners, and brewers," were among the manufactures of considerable importance. Although at the census of 1810 Massachusetts, New Jersey, and Pennsylvania each reported a wire-drawing establishment, there is no evidence that wire was drawn to any great extent in this country prior to the census of 1870. It was about this time that barbed wire was first manufactured.

A separate classification was first given to this industry at the census of 1850, when it was shown as "wire" and "wire and wireworkers." At the census

of 1860 it was reported as "wire," "wire cloth," "wire rope," and "wirework, sieves and bird cages, etc." At the census of 1870 it was shown as "insulated wire" and "wirework." The statistics for the three censuses are shown in Table xcviii.

TABLE XCVIII.—Comparative summary—wire and wirework, including wire rope and cable: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	175	91	83
Capital.....	\$4,200,700	\$902,263	\$537,725
Wage-earners, average number.....	4,270	1,328	676
Total wages.....	\$1,802,617	\$425,964	\$208,128
Cost of materials used.....	\$4,512,891	\$1,417,460	\$534,548
Value of products.....	\$8,017,025	\$2,612,161	\$1,033,249

The statistics show a substantial development of the combined industries. The greatest increase appears for the census of 1905 as compared with that of 1900, and is due primarily to the production of copper wire which was stimulated by the rapid growth of the electric industries.

To show the large proportions that the wire industry has assumed, it is necessary to consider not only

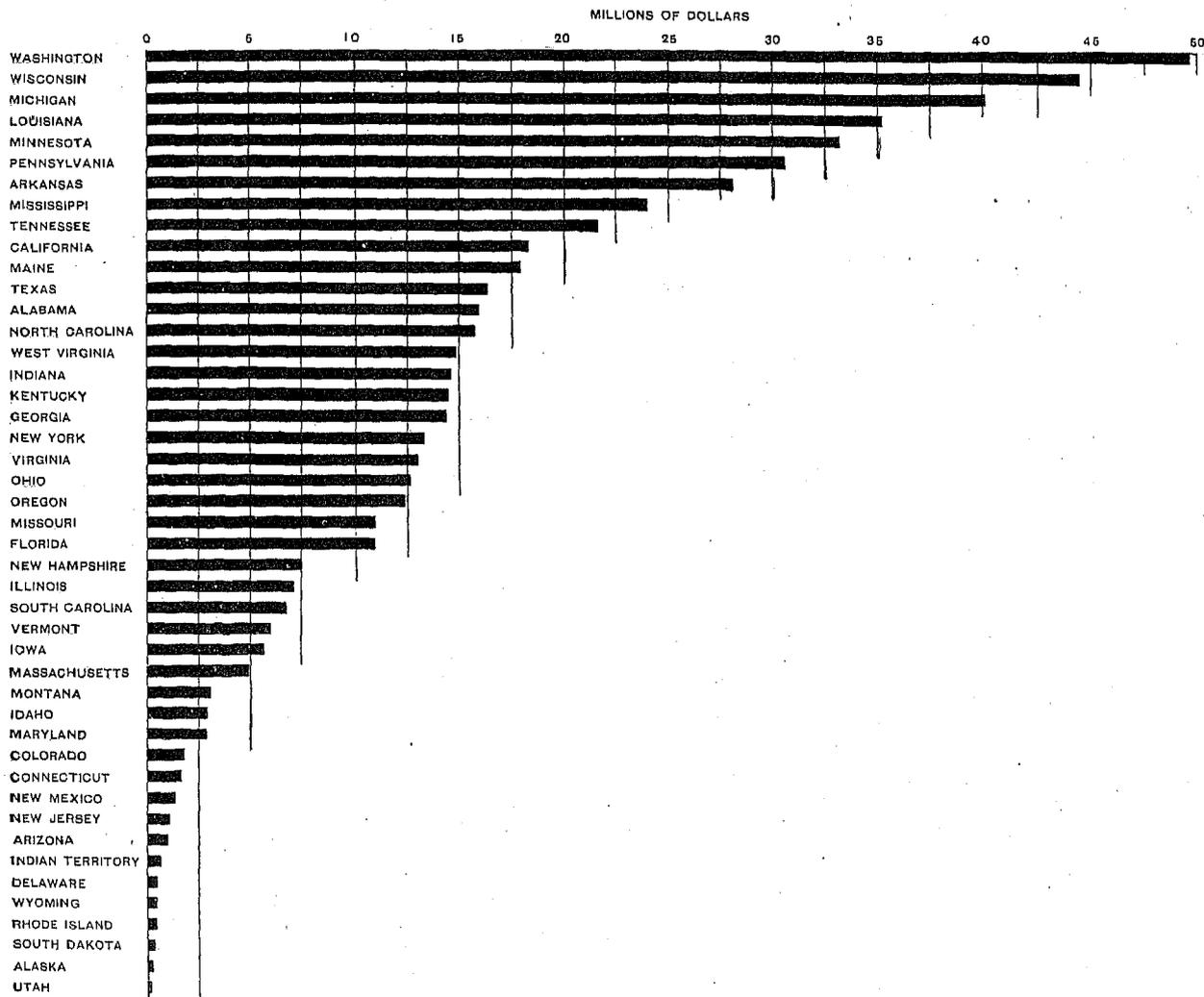
the products of rolling and other mills marketed in the form of wire, but that which is marketed in the more finished forms, barbed wire, field fencing, poultry netting, hay and bale ties, and wire nails as well.

In 1905 there were manufactured by rolling mills 1,416,494 short tons of wire produced as such or in the form of wire products, fencing, netting, wire nails, etc., with an aggregate value of \$67,551,443, as against a total of 809,745 short tons in 1900 with a value of \$47,728,784. In addition, wire-drawing mills not classified as steel works and rolling mills, made from purchased wire rods, iron and steel wire and wire products to the value of \$15,802,513 in 1905 and \$5,142,603 in 1900. The aggregate value of the wire production in 1905 was therefore \$83,353,956, as compared with \$52,871,387 in 1900, an increase of 57.7 per cent.

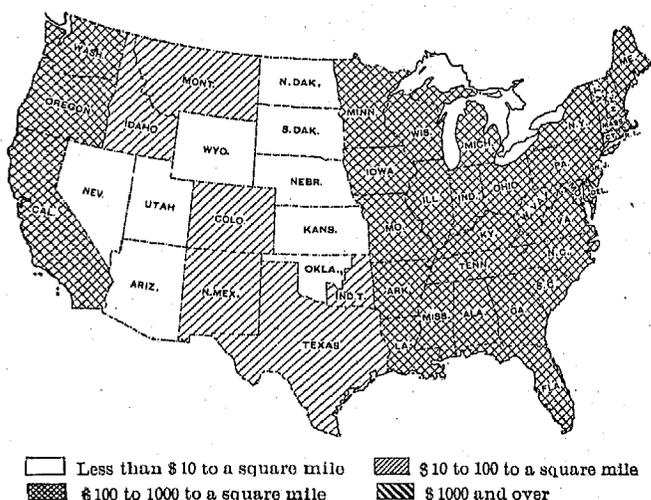
LUMBER AND ITS REMANUFACTURES.

The lumber mill with its adjunct, the logging or timber camp, forms the basic industry of this group, which includes 25 industries shown separately in Table 3.

DIAGRAM 14.—LUMBER AND TIMBER PRODUCTS—VALUE BY STATES AND TERRITORIES: 1905.



MAP 11.—Lumber and timber products—value per square mile: 1905.



At the census of 1905 the group ranked second in the number of establishments; fifth in capital, exclusive of capital invested in timber lands or standing timber, and fourth with this item included; third in number of wage-earners employed and in wages paid, but second in number of men wage-earners employed; sixth in total cost of materials used; and fourth in value of products.

In value of products the group increased from \$1,009,778,057 in 1900 to \$1,223,730,336 in 1905, a gain of \$213,952,279, or 21.2 per cent.

Some of the industries, which for various reasons have been assigned to other groups, find the bulk of their material in the products of the lumber industry and are therefore essentially lumber consuming industries. Prominent among this class are the manufactures of carriages and wagons, carriage and wagon materials, children's carriages and sleds, steam and street railway cars and general shop construction, shipbuilding, and wheelbarrows. The manufactures of agricultural implements, musical instruments, and automobiles are typical of another class of industries among whose materials lumber is an indispensable factor, although not a predominating one. Another class of industries in which lumber enters as a material, in a diminished though still important degree, includes the manufacture of brooms and brushes, flags and banners, phonographs and graphophones, pencils, toys and games, sporting goods, windmills, and professional and scientific instruments. In short, there are few industries in the realm of manufacture which in some form and at some stage do not draw upon the products of the lumber industry to contribute to their finished, marketable products, but by far the greater part of the product is utilized in the vast building industries not included in the census of 1905.

**Artificial limbs.**—While wood is not the only material of which these products are made, it forms the material of chief importance in the majority of them.

The first Census statistics concerning the industry appear in the reports of the census of 1850. The statistics for each subsequent census indicate a steady development and growth in the manufacture, with the exception of 1880, when the value of products showed a decrease from 1870.

Artificial substitutes for limbs were considerably used for a long time prior to 1860, as shown by the records of the United States Patent Office, but the manufacture hardly rose to the dignity of a factory industry. Indeed, at the present time, with the exception of a few of the large establishments, the manufacture is carried on in small shops employing few workmen.

The manufacture of artificial limbs received a strong impetus from the Civil War, and the later action of Congress by which all Federal soldiers afflicted with the loss of a limb were allowed an artificial substitute.

The statistics for the censuses of 1850, 1860, and 1870 are summarized in Table XCIX.

TABLE XCIX.—Comparative summary—artificial limbs: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	24	5	3
Capital.....	\$122,300	\$35,000	\$2,700
Wage-earners, average number.....	78	39	15
Total wages.....	\$36,079	\$23,544	\$5,880
Cost of materials used.....	\$59,894	\$10,050	\$1,400
Value of products.....	\$106,416	\$53,000	\$14,300

**Billiard tables and materials.**—Bagatelle tables, bowling balls and fixtures, as well as billiard tables, cues, chalk, and billiard balls are included under this classification. These products are similar to many included under the classification "furniture," and the statistics should be considered in connection with those for that industry. No reference to the industry is made in the published reports of any census prior to 1860. However, examination of the schedules for the census of 1850 shows that there were manufacturers of billiard tables in New York and Boston at that time.

If statistics were collected for the industry at the Seventh and prior censuses they were probably included under other classifications. The totals for the censuses of 1860 and 1870 are given in Table C.

TABLE C.—Comparative summary—billiard tables and materials: 1870 and 1860.

	1870	1860
Number of establishments.....	39	25
Capital.....	\$805,000	\$289,100
Wage-earners, average number.....	505	302
Total wages.....	\$283,758	\$140,556
Cost of materials used.....	\$650,864	\$343,868
Value of products.....	\$1,092,943	\$736,900

That the industry was well established some time before 1860 is indicated by the fact that its product was valued at more than two-thirds of a million dollars at that census. During the succeeding ten years, the manufacture of billiard tables, according to the figures

for 1870, more than doubled. The Eleventh Census reported products valued at \$2,823,278, as compared with \$1,648,182 for the Twelfth Census and \$2,222,922 for the census of 1905. The apparent decrease from 1890 to 1900 was due to a change in the classification of one of the largest establishments in the country. This establishment manufactured bar fixtures and office furniture, as well as billiard tables and supplies. In 1890 the total product was included under "billiard tables and supplies." In 1900 the same plant, while increasing its output of tables, reported a still greater value for bar fixtures and office furniture, and the report was classified as "furniture, factory product." Thus the plant's entire output of billiard tables was included in furniture. This change in classification, with others of a similar nature, though of less importance, accounts for the decrease, and the statistics should not be accepted as reflecting actual conditions. The production of billiard tables and materials has undoubtedly increased constantly.

*Boxes, wooden packing.*—This classification covers boxes and crates manufactured of wood, with the exception of cigar boxes, for which the statistics are shown separately. This is another industry that obtains its principal material directly from the lumber and planing mill. The principal products are the packing case of commerce, crates of all kinds, and box shooks.

Although packing boxes were undoubtedly manufactured on a wholesale scale before 1850, the census of that year is the first to show statistics for the industry as a separate classification. The totals for 1850, 1860, and 1870 are given in Table CI.

TABLE CI.—Comparative summary—boxes, wooden packing: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	696	390	246
Capital.....	\$4,028,642	\$1,283,910	\$386,236
Wage-earners, average number.....	5,303	2,035	990
Total wages.....	\$2,068,318	\$743,357	\$308,868
Cost of materials used.....	\$4,590,062	\$1,419,643	\$514,788
Value of products.....	\$8,964,903	\$2,939,917	\$1,099,936

The introduction of machinery has been an important factor in the development of the industry. The supplanting of the carpenter's saw, hammer and nails, rule, and hand plane, by mechanical gauges, saws driven by steampower which divide several boards at one cut, and machinery for assembling and nailing, has transformed the industry from a hand trade into a highly developed factory industry. Such mechanical aids have made possible the immense output of the modern factory and so cheapened the product as to greatly increase the consumption.

*Cooperage.*—The manufacture of all kinds of barrels, casks, kegs, wooden tanks, and similar products is found under this head. The principal material used is the product of the timber camp or the sawmill, although

an increasing number of cooperage works obtain their material directly from the forest.

Many of the large flour mills, salt works, turpentine distilleries, sugar refineries, petroleum refineries, and establishments engaged in other industries have their own cooperage works. The value of the cooperage of such establishments is included in the value of the products of which it is an adjunct, and as such is not included in the Census statistics for the industry. It is probable that the value of the cooperage consumed in the establishment where it is manufactured and used as a container, amounts to as much as that for which separate statistics are given.

Cooperage was reported as a manufacture at the censuses of 1810 and 1820, but the figures are incomplete and are not of much value except to show the location of the industry. The census of 1810 reports establishments in Massachusetts, Pennsylvania, and Virginia. Out of a total value of products of \$415,550, Pennsylvania was credited with \$345,887. At the census of 1820 the industry was found in the District of Columbia, Georgia, Michigan, Missouri, New York, Ohio, Pennsylvania, Tennessee, and Virginia. At the census of 1840 the figures were grouped, probably, with those for several other industries, under the term "all other manufactures."

Table CII presents the statistics as returned at the censuses of 1850, 1860, and 1870.

TABLE CII.—Comparative summary—cooperage: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	4,961	2,707	2,002
Capital.....	\$9,798,847	\$4,353,546	\$2,383,040
Wage-earners, average number.....	23,314	13,750	11,916
Total wages.....	\$7,819,813	\$4,284,704	\$3,201,204
Cost of materials used.....	\$12,831,796	\$4,105,203	\$2,044,582
Value of products.....	\$26,863,734	\$11,343,221	\$7,126,317

Machinery is now used extensively in all branches of the industry and has been a principal factor in its development.

*Furniture.*—Next to the products of the timber camps and lumber and planing mills the manufacture of furniture is the most important industry included in the group "lumber and its remanufactures." This classification includes not only household furniture, but also office, church, school, and lodge furniture; office, bank, and bar fixtures, and filing cases. Wood was the principal material consumed in the manufacture of these products. Therefore the classification does not include metal furniture, iron or brass beds, mattresses and spring beds, table accessories, mirrors, pianos, or lamps. While many of these articles can be classed as furniture, they are included in other groups with which they are more closely allied, because of the similarity of their principal material. The statistics for 1900 and 1905 do not include upholstering and furniture repair shops, or the incidental manufacturing and repair work done by furniture dealers. The manufac-

ture of refrigerators is a distinct industry and is shown as a separate classification.

At the census of 1810 the manufacture of "chairs" and "cabinetwork" was reported as existing in Pennsylvania, Massachusetts, Maryland, Virginia, and Vermont, the total product amounting to \$1,426,277. Pennsylvania was credited with about one-half of the product, of which the city of Philadelphia reported \$431,075. There was some furniture produced in Louisiana and Illinois, but no value was given.

At the census of 1820 the manufacture of "cabinet furniture," "chairs," and "bedsteads" was reported for 14 states, but the value of products was returned as only \$498,420.

The reports for the census of 1840 show the manufacture of furniture in 28 states and territories, the product amounting to \$7,555,405. New York ranked first with a product of \$1,971,776; Pennsylvania, second with \$1,155,692; Massachusetts, third with \$1,090,008; and Ohio, fourth with \$761,146. The remaining states produced less than half a million dollars each.

It is evident that the earlier censuses do not contain a full report of the industry, and they should not be used as a basis of comparison to show the increase.

At the census of 1850 the manufacture was classified as "cabinet ware," in 1860, as "furniture, cabinet, school, and other," and "spring beds," and in 1870, as "furniture not specified" and "chairs."

Table CIII presents the statistics for the industry as reported at these three censuses.

TABLE CIII.—Comparative summary—furniture: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	5,952	3,609	4,242
Capital.....	\$43,383,913	\$13,600,526	\$7,303,356
Wage-earners, average number.....	53,016	27,167	22,010
Total wages.....	\$21,424,319	\$8,932,906	\$6,638,568
Cost of materials used.....	\$25,649,580	\$8,290,651	\$6,089,546
Value of products.....	\$68,493,651	\$25,945,593	\$17,663,054

At the census of 1890 a classification was adopted to cover cabinetmaking, repairing, and upholstering. At previous censuses "upholstering" was considered separately, but cabinetmaking and repairing were included probably with "furniture." The most noticeable effect of the change was the reduction in number of establishments from 5,227 in 1880 to 1,919 in 1890, a decrease of 3,308. Of the 1,919 establishments, 340 manufactured chairs exclusively. Notwithstanding the elimination of custom work and repairing in 1890, the figures show a great gain over 1880.

In 1900 the classification was "furniture, factory product," the separate classification "chairs" being discontinued. The number of establishments continued to decrease, there being but 1,814, a decrease of 105 from 1890.

In 1905 the classification was "furniture," and the totals indicate a substantial increase since 1900.

From a production valued at \$1,426,277 to that of one valued at \$170,446,825 in not quite a century of growth is the record of the furniture industry in the United States as shown by the Census statistics; but these figures fall far short of showing the actual increase in the industry, since the present classification of "furniture" does not include the value of iron and brass beds and couches classified as "foundry and machine shop products," furniture made by hand in custom shops, furniture produced as a minor product of establishments engaged primarily in the manufacture of other products, and a number of products that have become so important as to receive separate classifications.

For a number of years practically all furniture was handmade and produced principally in small shops. About 1815 the increased consumption of a growing population necessitated a larger output of furniture, and in consequence steampower was introduced. This was the beginning of the factory system in the furniture industry.

Up to 1890 more furniture was manufactured in the Eastern—especially in New York, Pennsylvania, and Massachusetts—than in the Western states. Until the census of 1905 the North Atlantic led the geographic divisions; but at that census, notwithstanding New York was first in the United States, with a product of \$23,539,011, the total value produced by the states of the North Atlantic division was exceeded by the states of the North Central division, led by Illinois, with a product of \$15,287,605, and Michigan, with a product of \$10,767,038.

Prior to 1890 the prominent cities in the manufacture of furniture were New York, Philadelphia, Cincinnati, and Boston; then Chicago and Grand Rapids were added. The three leading cities at the census of 1905 were Chicago, New York, and Grand Rapids, with products valued at \$17,488,257, \$13,035,175, and \$9,409,097, respectively.

*Lumber and timber products.*—The lumber industry, which includes merchant lumber mills, logging camps both dependent and independent, and planing mills conducted in connection with lumber mills, under the classification "lumber and timber products," contributed 55 per cent of the total value of products of the group in 1900 and 47.4 per cent in 1905.

A duplication in the value of products of this industry in 1900, as explained on page xxix, not only resulted in a corresponding inflation in the total value of the products of the group, but it also accounts for the apparent decrease in the proportion that lumber and timber products formed of the total product of the group in 1905.

The lumber and timber industry is essentially different from others of similar magnitude and importance in that it is distributed widely, lumber products being manufactured on a commercial scale in every state and territory in 1900 and in all but one, North Dakota, in

1905. This characteristic of the industry results largely from the fact that owing to the unwieldy nature of its raw material, the point of manufacture is determined by its location.

The center of heaviest lumber production in the United States prior to 1880 was in its northeastern portion, Pennsylvania, New York, and Maine being the leading producers in this region. The value of the output of these three states in 1870 was \$28,930,985, \$21,238,228, and \$11,395,747, respectively, and their aggregate product, \$61,564,960, formed 29.3 per cent of the total production in the United States.

The growing scarcity of material in these states, however, brought about a movement of the industry westward, and by 1880 the supremacy in lumber manufacture had passed to the Lake states, the output of Michigan alone, \$52,449,928, constituted 22.5 per cent of the total value of the production of the United States.

In 1890 Michigan, Wisconsin, and Minnesota ranked first, second, and fourth, respectively, in lumber production, with products valued at \$83,121,969, \$60,966,444, and \$25,075,132, respectively, their aggregate forming 38.6 per cent of the total product of the industry. Pennsylvania ranked third at that census, with products valued at \$29,087,970. The Lake region still retained first rank in the industry at the census of 1900, though its prominence at that census was due chiefly to the heavy output of Wisconsin and Minnesota, the former having passed Michigan and the latter Pennsylvania since 1890. The products of Wisconsin, Michigan, and Minnesota in 1900 were valued at \$57,882,001, \$53,915,647, and \$42,689,932, respectively, and their aggregate formed 27.8 per cent of the total for the United States.

The development of the industry in the Southern and Pacific Coast states since 1880 has been rapid, and this, together with its wane in the Lake region, is moving the centers of greatest activity and heaviest production to these regions.

The seven leading states in the manufacture of lumber and timber products at the census of 1905 were Washington, Wisconsin, Michigan, Louisiana, Minnesota, Pennsylvania, and Arkansas, in the order named, and the value of their combined output constituted 45.3 per cent of the total production in the United States.

Owing to the complex nature of the lumber industry, embracing three distinct branches of manufacture, namely, logging, sawing, and planing, its range of products is wide and varied. The leading product, however, that on which the 24 other industries of the group depend in the main for material, is rough lumber, and the magnitude of the industry is indicated fairly by a detailed presentation of the quantity and value of this item. Table CIV shows the principal varieties of lumber sawed, by quantity and value, for 1900 and 1905. The quantities and values of rough lumber sawed as

custom work are included in this table, but only the amount received for this custom sawing is included in the general statistics for the industry.

TABLE CIV.—Sawed lumber—chief varieties, by quantity and value: 1905 and 1900.

[Quantities are in M feet board measure.]

	1905	1900
Total quantity.....	34,135,139	33,464,850
Total value.....	\$435,708,084	\$372,909,923
Yellow pine:		
Quantity.....	12,812,307	10,231,140
Value.....	\$120,366,749	\$87,801,750
White pine:		
Quantity.....	5,332,704	7,340,108
Value.....	\$78,580,577	\$03,499,233
Hemlock:		
Quantity.....	3,268,787	3,285,045
Value.....	\$38,938,154	\$32,739,631
Red fir:		
Quantity.....	2,928,409	1,725,098
Value.....	\$27,862,228	\$14,958,737
Oak:		
Quantity.....	2,902,855	3,848,363
Value.....	\$50,832,303	\$63,950,425
Spruce:		
Quantity.....	1,303,886	1,400,333
Value.....	\$18,289,327	\$15,008,647
Poplar:		
Quantity.....	853,554	1,042,380
Value.....	\$16,205,312	\$14,821,757
Cypress:		
Quantity.....	749,592	492,761
Value.....	\$13,115,339	\$6,571,741
Maple:		
Quantity.....	587,558	605,654
Value.....	\$3,780,727	\$7,163,746
All other:		
Quantity.....	3,395,487	3,475,098
Value.....	\$53,737,368	\$45,404,256

*Lumber, planing mill products, including sash, doors, and blinds.*—The statistics for this classification represent the mills which are not operated in connection with, or under the same ownership as, the establishments included in the classification "lumber and timber products." Therefore the two industries, which are shown separately in the general tables, represent in many cases the same class of products and should be considered as a continuous process of manufacture. There were 24,136 establishments reported for the two classifications and they gave employment to 502,300 wage-earners, or 68.2 per cent of the number reported for "lumber and its remanufactures," and their products were valued at \$827,464,646, or 67.6 per cent of the total for the group. Since, however, the cost of the materials used by the planing mills represents what has already been reported among the value of products of the lumber and timber branch of the industry, there is a considerable item of duplication in this great total.

*Wood distillation.*—This industry also requires large quantities of standing timber as material, 586,144 cords having been consumed in 1905. Because of the chemical character of its products, this industry has been included in the group "chemicals and allied products."

*Wood pulp.*—As a wood consumer the industry of wood pulp manufacture ranks next to the lumber industry. The growth of this industry during the last few years has been rapid. At the census of 1900, 1,986,310 cords of wood were consumed in the manufacture of

wood pulp, and this had grown to 3,050,717 cords at the census of 1905, an increase for the five years of 1,064,407 cords, or 53.6 per cent. The consumption of merchantable timber in the paper and wood pulp industry at the latter census was equivalent to approximately 3,000,000 M feet board measure of logs, or about one-ninth of the quantity consumed in the lumber industry. The total wood or timber consumption of these two industries, as reported at the census of 1905, was therefore more than 30,000,000 M feet board measure. The wood pulp manufacture is allied so closely to the paper industry that it has been included with the manufacture of paper, the joint classification being "paper and wood pulp," an industry in the group "paper and printing."

#### LEATHER AND ITS FINISHED PRODUCTS.

This group includes 10 industries which are shown separately in Table 3. The tannery furnishes the principal material consumed in 9 of these branches of industry. These 9 auxiliary industries represent finished leather products of every variety. The statistics for "boot and shoe cut stock," "findings," and "uppers" represent only the establishments in which these are the products of chief value. It is probable that an increasing proportion of parts and findings are being manufactured in the boot and shoe factories, where they are consumed and included with the finished products reported to the Census. An apparent decrease in either class would therefore be no indication that there has been an actual decline in the production.

The decrease since 1900 of 368 in the number of establishments for the combined industry is in keeping with the tendency indicated by the reports at prior censuses toward the absorption of the smaller establishments, especially in the tanning and currying industry and in the manufacture of boots and shoes.

The gross value of products for the group increased from \$569,619,254 at the census of 1900 to \$705,747,470 at the census of 1905, or 23.9 per cent. The gross value of products of the basic industry, tanning and currying, increased from \$204,038,127 to \$252,620,986, or 23.8 per cent. The number of hides and skins of all varieties treated increased from 120,266,008 in 1900 to 125,419,936 at the census of 1905.

Materials other than leather enter into some of the products of the group. This is true of the classification "saddlery and harness," for which products valued at \$42,054,842 were reported, but on the other hand the group does not include all of the industries in which leather enters as a material. For example, the classification "sporting goods" includes the manufacture of some leather shoes, and large quantities of leather are consumed in the manufacture of "carriage and wagon materials" and "trunks and valises."

At prior censuses the statistics for small custom shops were included in the returns for several of the

leather manufactures. The figures for the census of 1900 given in Table 1 have been reduced to a basis comparable with those of 1905, and therefore are not strictly comparable with those for previous censuses.

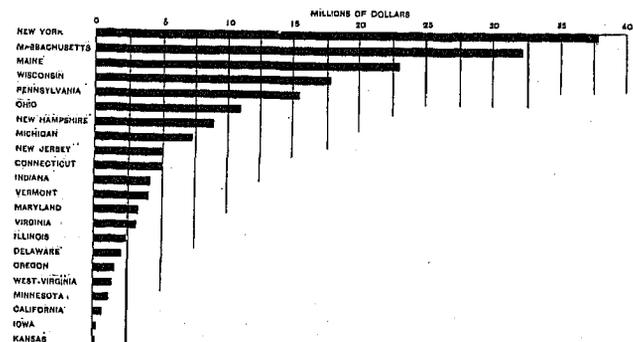
The manufacture of boots and shoes, measured by value of products, is by far the most important industry in this group. It is now one of the most highly specialized factory industries of the country. It first appeared in the Census reports as an industry distinct from the small custom shops at the census of 1870, when the gross value of its products amounted to \$146,704,055. The reports of each succeeding census indicate a constant increase, and the value of products, \$320,107,458, reported for the census of 1905 is almost double that of 1880 and forms 45.4 per cent of the entire total for "leather and its finished products."

The manufacture of boots and shoes, and the auxiliary industries, cut stock, findings, and uppers, and also the manufacture of leather gloves and mittens, are included in the group "clothing and kindred products," discussed on page cxlii. The statistics for these and for the other principal industries of the group are presented in special reports.

#### PAPER AND PRINTING.

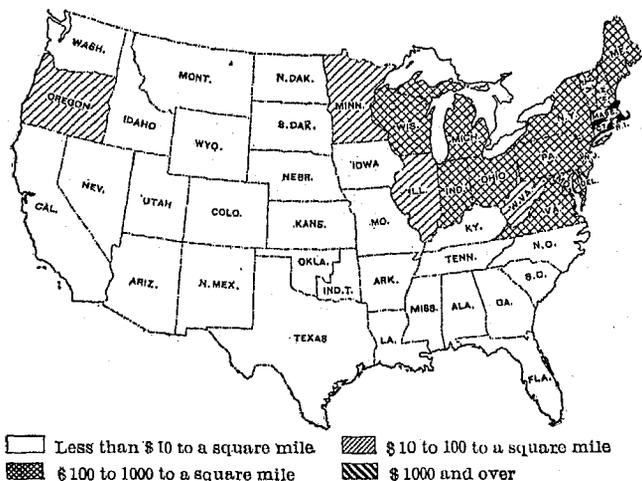
This group covers 21 industries, embracing the manufacture of paper and wood pulp and the allied industries, classified as "printing and publishing," "book-binding and blank book making," "fancy and paper boxes," "wall paper," etc., all of which are shown separately in Table 3. There were 30,787 establishments engaged in the industries included in the group; and the value of their products amounted to \$857,112,256, or 5.8 per cent of that for all industries reported at the census of 1905. As compared with 1900, the value of the product increased \$251,997,409, or 41.6 per cent.

DIAGRAM 15.—Paper and wood pulp—value of products by states: 1905.



The value of the products of paper manufacture amounted to \$10,187,177 in 1850, while at the census of 1905 the value of such products (including wood pulp, which was first shown at the census of 1870), had increased more than eighteenfold and amounted to \$188,715,189.

MAP 12.—Paper and wood pulp—value of products per square mile: 1905.



In addition to the 21 industries shown for the group in Table 3, the manufacture of printers' inks, engrav-

ers' materials, and type founding are allied so closely that they can with propriety be considered as forming a part of the group. In the group thus constituted there is one basic industry, the manufacture of paper, and 23 auxiliary industries. While these auxiliary industries are all related, either by the class of materials consumed or by the character and use of the products, they are naturally divisible into 3 groups: (1) Industries that carry the product of the paper mill through other processes of manufacture, changing to some extent its form, but producing articles that derive their chief value through a rearrangement of the material; (2) industries that derive their chief value from impressions on paper; and (3) industries that furnish materials, other than paper, for printing and writing processes.

*Paper industries.*—There are 9 classifications of industry covered by the first group and the statistics for each are summarized in Table cv.

TABLE CV.—SUMMARY—MANUFACTURE OF ARTICLES FROM PAPER: 1905.

INDUSTRY.	Number of establishments.	Capital.	WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products, including custom work and repairing.
			Average number.	Wages.			
Total.....	2,227	\$83,225,018	70,120	\$25,916,602	\$11,423,465	\$53,837,869	\$111,933,873
Bags, paper.....	62	11,441,383	2,473	930,171	484,027	6,594,976	10,086,863
Bookbinding and blank book making.....	908	16,904,883	17,713	7,886,945	2,824,481	9,139,937	25,223,650
Boxes, fancy and paper.....	796	22,660,766	32,082	10,207,827	3,114,408	16,685,826	36,866,589
Cardboard, not made in paper mills.....	4	1,651,210	586	234,490	108,587	926,964	1,594,303
Card cutting and designing.....	60	488,129	696	261,023	95,306	477,609	1,083,278
Envelopes.....	72	7,495,912	4,298	1,629,511	1,062,967	5,974,948	10,222,366
Labels and tags.....	67	2,117,654	1,348	609,439	204,528	957,028	2,462,497
Paper goods, not elsewhere specified.....	232	18,198,221	9,842	3,712,537	2,546,332	12,743,559	22,159,202
Paper patterns.....	26	2,236,860	1,082	444,659	892,769	337,022	2,265,125

The "cardboard, not made in paper mills," includes the heavy grade of cardboard and paper having a highly polished surface, used by textile manufacturers. "Card cutting and designing" includes the cutting and beveling of cards for the printing trade, and textile industries, also designs for carpets, upholstery, wall paper, etc. "Labels and tags" includes not only the cutting and manufacture of the tag but the printing, when done by the same establishment. The classifications for all of the other industries included in the group convey a reasonably definite idea of the character of the products.

*Boxes, fancy and paper.*—Measured by the gross value of products this manufacture is the most important industry included in the subgroup. The classification includes all boxes made from strawboard, cardboard, glazed paper, and other derivatives of paper and pulp. It also includes wooden boxes of fancy designs, covered with velvet, satin, etc. Statistics for the industry were first shown separately at the census of 1850, and the totals for that and the two subsequent censuses are given in Table cvi.

TABLE CVI.—Comparative summary—boxes, fancy and paper: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	249	110	82
Capital.....	\$1,192,325	\$333,196	\$136,240
Wage-earners, average number.....	4,632	1,601	718
Total wages.....	\$1,258,652	\$358,658	\$139,764
Cost of materials used.....	\$1,592,976	\$467,350	\$187,766
Value of products.....	\$4,029,669	\$1,162,777	\$434,104

The industry increased constantly during the twenty years covered by this table, but even a more rapid increase is indicated by the statistics for 1890, when the value of products increased to \$18,805,330 from \$7,665,553 in 1880.

The work in connection with the manufacture of paper boxes was done originally by hand, scissors being used to cut the patterns which were pasted together to form the boxes. The great demand for boxes of this character for use in packing and shipping manufactured products was met by the general introduction of machinery.

At the census of 1905 women formed 64 per cent of

the wage-earners in the industry; not only do they operate the machinery, but they also do the trimming and decorating of the boxes.

In the manufacture of cereal food products, confectionery, boots and shoes, and other industries, paper boxes are so essential to the packing and sale of the articles that they are frequently manufactured

by the establishments consuming them. Boxes thus manufactured and consumed are included in the value of the products of the establishment and therefore do not appear in the statistics for "boxes, fancy and paper."

*Printing industries.*—The statistics for the 6 printing industries are summarized in Table CVII.

TABLE CVII.—SUMMARY—PRINTING INDUSTRIES: 1905.

INDUSTRY.	Number of establishments.	Capital.	WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products, including custom work and repairing.
			Average number.	Wages.			
Total.....	26,042	\$426,984,102	205,594	\$121,874,760	\$108,795,295	\$139,785,465	\$541,237,217
Lithographing and engraving.....	248	25,537,781	12,614	8,198,676	3,348,560	8,349,823	25,245,266
Photolithographing and photoengraving.....	223	4,070,813	3,876	2,016,073	874,648	1,303,147	7,268,262
Printing and publishing, book and job.....	8,244	142,015,638	87,746	48,720,854	33,115,809	52,573,110	182,611,720
Printing and publishing, music.....	145	3,487,017	577	340,176	1,715,363	541,220	4,147,783
Printing and publishing, newspapers and periodicals.....	18,038	230,518,524	95,868	59,830,768	67,638,099	70,358,000	309,327,606
Wall paper.....	44	12,354,329	3,013	1,868,213	2,102,816	6,668,165	12,636,580

The value of products for this subgroup forms more than three-fourths of the value of products of Group 6, exclusive of paper and pulp mills. The paper consumed is an important item, but the chief importance of the printing industries is due to the values created by the preparation of manuscript and the various printing processes.

"Lithographing and engraving" appeared first in the Census reports as an industry at the census of 1850 and "photolithographing and photoengraving" at the census of 1890. The three classifications of printing and publishing—book and job, music, and newspapers and periodicals—really represent the printing industries; to them lithographing and engraving, and photolithographing and photoengraving are auxiliary. They comprise 26,427, or 98.1 per cent of the establishments and \$496,087,109, or 91.7 per cent of the total value of products for the subgroup. Small job printing shops as well as large publishing houses are included in this total.

The number of publications, newspapers, and maga-

zines of every variety increased from 18,226 at the census of 1900 to 21,400 at the census of 1905. The cost of paper used by establishments classified as "printing and publishing, newspapers and periodicals," increased from \$37,823,856 to \$58,966,258, or 55.9 per cent. The aggregate cost of paper used by these and by the music and the book and job printers at the census of 1905 was \$98,960,231, or 52.4 per cent of the value of the output of the paper and wood pulp mills.

The increase in the use of typesetting and typesetting machines has been one of the features in the recent development of the industry. There were 3,988 such machines reported at the census of 1900 as in use by establishments classified as "printing and publishing, newspapers and periodicals," and 6,793 at the census of 1905, an increase of 70.3 per cent. In addition there were reported at the census of 1905, 1,387 such machines in use in book and job printing establishments.

*Industries allied to printing.*—The statistics for the third group of industries are summarized in Table CVIII.

TABLE CVIII.—SUMMARY—INDUSTRIES ALLIED TO PRINTING: 1905.

INDUSTRY.	Number of establishments.	Capital.	WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products, including custom work and repairing.
			Average number.	Wages.			
Total.....	990	\$22,016,199	11,163	\$7,290,587	\$3,538,728	\$7,707,768	\$25,779,738
Engravers' materials.....	10	98,374	49	31,062	13,208	95,887	170,710
Engraving and diesinking.....	305	1,210,673	1,573	1,032,232	224,288	376,409	2,422,487
Engraving, steel.....	215	5,402,716	3,580	2,227,850	501,557	1,553,618	5,943,080
Engraving, wood.....	114	184,897	338	245,032	87,658	60,283	647,909
Ink, printing.....	60	4,609,774	711	474,987	1,209,387	2,612,558	5,774,264
Ink, writing.....	42	1,280,607	430	169,726	359,546	858,304	1,881,038
Printing materials.....	77	1,008,889	357	239,030	195,230	372,480	1,207,163
Stereotyping and electrotyping.....	146	3,297,546	2,679	1,985,067	577,809	1,032,053	5,005,338
Type founding.....	21	4,916,728	1,446	883,595	309,952	746,176	2,727,759

The statistics in Table CVIII represent the production of practically all the supplies required for printing except the typesetting machines, the printing presses,

and the paper. The manufacture of paper is shown separately under the classification "paper and wood pulp," but the presses and machinery are included in

the general classification "foundry and machine shop products," and can not be shown by themselves. In addition to the manufacture of materials and supplies required for printing, the totals include the limited amount of printing done by the establishments making steel plates or engraved blocks.

#### LIQUORS AND BEVERAGES.

The production of distilled, malt, and vinous liquors, and the manufacture of malt and of mineral and soda waters are covered by this group. Bottling, when carried on as a distinct industry, was excluded from the census of 1905, but when done by the establishment manufacturing the beverage it was included.

At the census of 1905 as compared with that of 1900 the number of establishments reported for the group had increased 641, or 11.2 per cent, and the value of the products, \$118,368,224, or 30.9 per cent. The products of this group can with propriety be included in the group of "foods, beverages, and condiments," and they are so considered in the discussion on pages cxxxiii and cxxxiv.

#### CHEMICALS AND ALLIED PRODUCTS.

This group includes industries the chief products of which are the results of—

(1) The manufacture of chemicals, such as the acids, bases, and salts, to be found in the classification of "chemicals" and sulphuric, nitric, and mixed acids which are the products of purely chemical factories; calcium lights; soap; and some explosives, as nitroglycerin.

(2) The extraction, distillation, or deposition of chemical substances represented by such industries as bone, ivory, and lamp black; dyestuffs and extracts; gas, illuminating and heating; glue; grease and tallow; oil, castor; oil, cottonseed and cake; oil, essential; oil, lard; oil, linseed; oil, not elsewhere specified; petroleum, refining; salt; starch; turpentine and rosin; and wood distillation.

(3) The mixing, compounding, or pulverization of chemical substances—as in the manufacture of axle grease, baking and yeast powders, blacking, bluing, candles, cleansing and polishing preparations, druggists' preparations, fertilizers, printing ink, writing ink, paints, patent medicines and compounds, perfumery and cosmetics, varnishes, some explosives, as gunpowder, and in drug grinding.

No chemicals produced in other industries are included in the totals, these being referred to as partial or subsidiary products wherever mentioned.

The group includes nearly all the chemical substances manufactured or compositions of matter. The principal exceptions are iron and steel, brass and other metals, and glass, which are of such importance as the

materials or products of great industries that they are treated in separate groups. Coke, a result of the distillation of coal, and an important material in the manufacture of pig iron, is also treated separately.

Table 1 includes 36 classes of industry accredited to the chemical group, 5 of which are shown in combination. Some of them have a closer relation to industries included in other groups because of the cognate use of the products. For example, "baking and yeast powders" could properly be assigned to the group "food and kindred products," and it is so treated on page cxxviii. "Ink, printing" is a printing material, and it is so considered in the discussion of "paper and printing," on page clxv. "Ink, writing" is also associated closely with that group, and the statistics are likewise there analyzed. The number of establishments reported for the entire group increased 868, or 9.9 per cent, and the value of products, \$296,532,721, or 40.3 per cent. The quantities and values for the great variety of products covered by the principal industries of the group are shown in detail in the special reports, to which reference should be made for technical information.

An illustration of the relation of the various industries in the group to each other and to industries in other groups is given in Table cix.

The table shows every classification contained in the chemical group, and in order to distinguish them from the secondary products, which are subordinated by indentation, the classifications are termed principal products. The principal products are those of chief value upon the reports of establishments included in the chemical group and control the classification of the schedules, while the secondary products are those produced in connection with the principal products under which they are listed and appear, therefore, as products of secondary value on the schedule. Under the heading "other classifications in which found" are listed industries in which the "principal product" will be found as a secondary product and those in which the "secondary product" will be found as a principal or again as a secondary product. Thus all the statistics concerning the manufacture of axle grease on the one hand include the value of harness oil and lubricating oils which are produced by the establishments manufacturing axle grease, and on the other, omit the value of axle grease produced as a secondary product in the blacking, varnish, and petroleum refining industries. The table therefore indicates how thoroughly intermingled is the manufacture of the products in the chemical group. Furthermore, the table shows plainly that statistics for any one class, or "principal product," can not be accepted as complete in any respect.

TABLE CIX.—CHEMICAL GROUP—KIND OF PRODUCTS, PRINCIPAL AND SECONDARY, ACCORDING TO CLASSIFICATION OF PRINCIPAL, AND THE OTHER CLASSIFICATIONS IN WHICH FOUND: 1905.

Principal product, with secondary products subordinated.	Other classifications in which found.	Principal product, with secondary products subordinated.	Other classifications in which found.
Axle grease.....	Blacking. Petroleum, refining. Varnishes. Oil, not elsewhere specified. Chemicals. Oil, hard. Oil, not elsewhere specified. Petroleum, refining.	Chemicals.....	Axle grease. Baking and yeast powders. Bone, ivory, and lamp black. Calcium lights. Candles. Coke. Druggists' preparations. Dyeing and finishing textiles. Dyestuffs and extracts. Explosives. Fertilizers. Flavoring extracts. Food preparations. Glass. Iron and steel. Mineral and soda waters. Oil, not elsewhere specified. Paints. Roofing materials. Silk and silk goods. Slaughtering and meat packing, wholesale. Smelting and refining, zinc. Soap. Sulphuric, nitric, and mixed acids. Varnishes. Wood distillation, not including turpentine and rosin.
Harness oil.....		Boiler compounds.....	(See Boiler compounds, under Blacking.)
Lime flour.....		Brushes.....	Brooms and brushes. Fancy articles, not elsewhere specified. Paints.
Lubricating oil.....		Caramel coloring.....	Flavoring extracts.
Baking and yeast powders...	Flavoring extracts. Liquors, malt. Bluing. Chemicals. Coke. Fertilizers. Flavoring extracts. Gas, illuminating and heating. Mucilage and paste. (See Bluing, principal product.) Chemicals. Flavoring extracts. Patent medicines and compounds. Perfumery and cosmetics.	Charcoal.....	Charcoal. Dyestuffs and extracts. Explosives. Fertilizers. Iron and steel, blast furnaces. Lumber and timber products. Turpentine and rosin. Varnishes. Wood distillation, not including turpentine and rosin.
Ammonia.....		Combs.....	Combs. Fancy articles, not elsewhere specified. Ivory and bone work.
Bluing.....		Dry mineral colors.....	Paints. Varnishes.
Flavoring extracts.....		Flavoring extracts.....	(See Flavoring extracts, under Baking and yeast powders.)
Insecticide.....		Niter cake.....	Fertilizers.
Phosphoric liquor.....		Paints.....	Sulphuric, nitric, and mixed acids. (See Paints, principal product.)
Phosphoric paste.....		Perfume concentrates.....	Perfumery and cosmetics.
Proprietary medicines...	(See Patent medicines and compounds, principal product.)	Phosphoric paste.....	(See Phosphoric paste, under Baking and yeast powders.)
Skin lotions.....	(See Perfumery and cosmetics, principal product.)	Pyrite cinder.....	Fertilizers.
Soda.....	Chemicals.	Pyroligneous acid.....	Dyestuffs and extracts. Wood distillation, not including turpentine and rosin.
Starch.....	(See Starch, principal product.)	Red oil.....	(See Red oil, under Candles.)
Sulphite of lime.....	Chemicals.	Tanning extracts.....	(See Dyestuffs and extracts, principal product.)
Washing fluid.....	(See Cleansing and polishing compounds, principal product.)	Cleansing and polishing preparations.....	Baking and yeast powders. Blacking. Bluing. Flavoring extracts. Mucilage and paste. Paints. Perfumery and cosmetics. Starch. (See Ammonia, under Baking and yeast powders.)
Blacking.....	Bluing. Cleansing and polishing preparations. (See Ammonia, under Baking and yeast powders.)	Enamel.....	Varnishes.
Ammonia.....		Platers' supplies.....	Electrical machinery, apparatus, and supplies. Smelting and refining, not from the ore.
Axle grease.....	(See Axle grease, principal product.)	Polish brushes.....	Brooms and brushes.
Bluing.....	(See Bluing, principal product.)	Shoe polish.....	(See Blacking, principal product.)
Boiler compounds.....	Chemicals. Patent medicines and compounds. Soap. Cleansing and polishing preparations. Bluing. Ink, writing. Mucilage and paste. Ink, writing. Mucilage and paste. Bluing. Cleansing and polishing preparations. Paints.	Drug grinding.....	Chemicals. Druggists' preparations. Oil, linseed. Paints. Patent medicines and compounds.
Brass polish.....		Caustic soda.....	Chemicals.
Ink.....		Chloride of lime.....	Chemicals.
Mucilage.....		Druggists' preparations.....	Chemicals. Drug grinding. Food preparations. Patent medicines and compounds. Perfumery and cosmetics.
Stove polish.....		Proprietary medicines...	(See Patent medicines and compounds, principal product.)
Bluing.....		Dyestuffs and extracts.....	Chemicals. Ink, writing. Silk and silk goods. Soap. Varnishes. Chemicals.
Ammonia.....		Bisulphite of soda.....	(See Oil, castor, principal product.)
Crude chemicals.....		Castor oil.....	(See Castor pomace, under Oil, castor.)
Ink.....	(See Ink, under Blacking.)	Castor pomace.....	(See Charcoal, under Chemicals.)
Shoe blacking.....	(See Blacking, principal product.)	Charcoal.....	(See Chemicals, principal product.)
Stove polish.....	(See Stove polish, under Blacking.)	Chemicals.....	
Bone, ivory, and lamp black.	Paints. (See Glue, principal product.) (See Ink, printing, principal product.) Slaughtering and meat packing, wholesale. Slaughtering and meat packing, wholesale. Chemicals. Coke. Gas, illuminating and heating.	Dextrins.....	Chemicals. Paints.
Glue.....			
Printers' ink.....			
Raw bone meal.....			
Steamed bone.....			
Sulphate of ammonia....			
Calcium lights.....	(Not found elsewhere.)		
Nitrogen.....	Chemicals.		
Nitrous oxide.....	Chemicals.		
Candles.....	Oil, not elsewhere specified. Petroleum, refining. Petroleum, refining. Petroleum, refining. Chemicals. Slaughtering and meat packing, wholesale. Soap. Petroleum, refining. Chemicals. Oil, cottonseed and cake. Chemicals. Dyestuffs and extracts. Paints. Slaughtering and meat packing, wholesale. Soap. Chemicals.		
Black oil.....			
Cable wax.....			
Glycerin.....			
Ironing wax.....			
Oleic acid.....			
Red oil.....			
Stearic acid.....			

TABLE CIX.—CHEMICAL GROUP—KIND OF PRODUCTS, PRINCIPAL AND SECONDARY, ACCORDING TO CLASSIFICATION OF PRINCIPAL, AND THE OTHER CLASSIFICATIONS IN WHICH FOUND: 1905—Continued.

Principal product, with secondary products subordinated.	Other classifications in which found.	Principal product, with secondary products subordinated.	Other classifications in which found.
Dyestuffs and extracts—Con.	Chemicals.	Glue—Continued.	
Gums	Drug grinding.	Desiccated fish	Canning and preserving, fish.
	Paints.	Fertilizers	Food preparations.
Lactic acid	Chemicals.	Gelatin	(See Fertilizers, principal product.)
Licorice mass	Drug grinding.		Food preparations.
Nitric acid	Chemicals.		Grease and tallow.
	Sulphuric, nitric, and mixed acids.		Slaughtering and meat packing, wholesale.
Pyroigneous acid	(See Pyroigneous acid, under Chemicals.)		(See Grease and tallow, principal product.)
Sizes	Glue.		(See Oil, under Fertilizers.)
	Paints.		Leather goods.
	Starch.		Leather, tanned, curried, and finished.
Soaps	(See Soap, principal product.)		Sand and emery paper and cloth.
Soda alum	Chemicals.		(See Tankage, under Fertilizers.)
Explosives	Ammunition.	Grease and tallow	Axle grease.
	Chemicals.		Food preparations.
Acids	Ammunition.		Glue.
	Chemicals.		Oil, not elsewhere specified.
	Fertilizers.		(See Bones, under Fertilizers.)
	Oil, not elsewhere specified.		Oil, not elsewhere specified.
	Paints.		Slaughtering and meat packing, wholesale.
	Sulphuric, nitric, and mixed acids.		(See Fertilizers, principal product.)
	Varnishes.		(See Fish scrap, under Fertilizers.)
Charcoal	(See Charcoal, under Chemicals.)		(See Gelatin, under Glue.)
Nitrate of ammonia	Chemicals.		(See Glue, principal product.)
Salt	(See Salt, principal product.)		(See Ground bone, under Fertilizers.)
Saltpeter	Chemicals.		(See Oil, under Fertilizers.)
	Druggists' preparations.		(See Soap, principal product.)
Fertilizers	Food preparations.		(See Tankage, under Fertilizers.)
	Glue.	Ink, printing	Bone, ivory, and lump black.
	Grease and tallow.		Paints.
	Ivory and bone work.		Varnishes.
	Oil, cottonseed and cake.		(See Paints, principal product.)
	Slaughtering and meat packing, wholesale.		(See Varnishes, principal product.)
	Sulphuric, nitric, and mixed acids.		
	(See Acids, under Explosives.)		
	(See Ammonia, under Baking and yeast powders.)		
Ammonia	Food preparations.		
	Grease and tallow.		
	Slaughtering and meat packing, wholesale.		
	(See Charcoal, under Chemicals.)		
	(See Chemicals, principal product.)		
	Oil, cottonseed and cake.		
	Chemicals.		
	Chemicals.		
	Druggists' preparations.		
	Food preparations.		
	Paints.		
	Sulphuric, nitric, and mixed acids.		
	Varnishes.		
	Oil, not elsewhere specified.		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	(See Glue, principal product.)		
	Grease and tallow.		
	Grease and tallow.		
	Slaughtering and meat packing, wholesale.		
	Soap.		
	(See Niter cake, under Chemicals.)		
	Chemicals.		
	Food preparations.		
	Glue.		
	Grease and tallow.		
	Muellage and paste.		
	Oil, cottonseed and cake.		
	Oil, lard.		
	Oil, not elsewhere specified.		
	Patent medicines and compounds.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		
	Slaughtering and meat packing, wholesale.		
	Chemicals.		
	Chemicals.		
	Chemicals.		
	(See Sulphuric, nitric, and mixed acids, principal product.)		
	Glue.		
	Grease and tallow.		
	Oil, not elsewhere specified.		

TABLE CIX.—CHEMICAL GROUP—KIND OF PRODUCTS, PRINCIPAL AND SECONDARY, ACCORDING TO CLASSIFICATION OF PRINCIPAL, AND THE OTHER CLASSIFICATIONS IN WHICH FOUND: 1905—Continued.

Principal product, with secondary products subordinated.	Other classifications in which found.	Principal product, with secondary products subordinated.	Other classifications in which found.
Oil, not elsewhere specified—Continued.		Patent medicines and compounds—Continued.	
Acids.....	(See Acids, under Explosives.)	Polishers.....	Blacking.
Belt dressing.....	Blacking.	Soap.....	Cleansing and polishing preparations.
Candles.....	Paints.	Spices.....	(See Soap, principal product.)
Cattle food.....	Patent medicines and compounds.	Tablets.....	Coffee and spice, roasting and grinding.
Chemicals.....	Oil, not elsewhere specified.		Chemicals.
Compounded wax.....	(See Cattle food, under Oil, cottonseed and cake.)		Druggists' preparations.
Disinfectants.....	(See Chemicals, principal product.)	Perfumery and cosmetics....	Flavoring extracts.
	Blacking.		Baking and yeast powders.
	Petroleum, refining.		Chemicals.
	Chemicals.		Druggists' preparations.
	Food preparations.		Flavoring extracts.
	Paints.		Patent medicines and compounds.
	Patent medicines and compounds.		Petroleum, refining.
	Perfumery and cosmetics.		Soap.
Fertilizer materials.....	(See Fertilizer materials, under Grease and tallow.)	Bluing.....	(See Bluing, principal product.)
Fish scrap.....	(See Fish scrap, under Fertilizers.)	Disinfectants.....	(See Disinfectants, under Oil, not elsewhere specified.)
Glue.....	(See Glue, principal product.)	Extracts.....	Druggists' preparations.
Greases.....	(See Grease and tallow, principal product.)		Flavoring extracts.
Lubricating compounds.....	(See Axle grease, principal product.)		Food preparations.
Ointments and liniments.....	Flavoring extracts.		Patent medicines and compounds.
	Patent medicines and compounds.	Flavoring extracts.....	(See Flavoring extracts, under Baking and yeast powders.)
	(See Stearin, under Oil, lard.)		Chemicals.
	(See Paints, principal product.)		Dairymen's, poulterers', and apiarists' supplies.
	Pickles, preserves, and sauces.		Druggists' preparations.
	(See Cleansing and polishing preparations, principal product.)		Patent medicines and compounds.
	(See Soap, principal product.)		Druggists' preparations.
	(See Cattle food, under Oil, cottonseed and cake.)		Patent medicines and compounds.
	(See Grease and tallow, principal product.)		Oil, essential.
	(See Tankage, under Fertilizers.)		Oil, lard.
Paints.....	Chemicals.		Oil, not elsewhere specified.
	Confectionery.		Petroleum, refining.
	Dyestuffs and extracts.	Soap.....	(See Soap, principal product.)
	Foundry and machine shop products.	Stock food.....	(See Cattle food, under Oil, cottonseed and cake.)
	Graphite and graphite refining.	Surgical powders.....	Druggists' preparations.
	Ink, printing.		
	Lead, bar, pipe, and sheet.	Petroleum, refining.....	Oil, not elsewhere specified.
	Lumber, planing mill products.	Asphaltum.....	(Not found elsewhere in manufactures.)
	Mucilage and paste.	Black oil.....	Candles.
	Oil, not elsewhere specified.	Candles.....	(See Candles, principal product.)
	Oilcloth, enameled.	Coke.....	(See Coke, under Gas, illuminating and heating.)
	Patent medicines and compounds.	Compounded oils.....	Oil, not elsewhere specified.
	Perfumery and cosmetics.	Lubricating greases.....	(See Axle grease, principal product.)
	Roofing materials.	Paraffin wax.....	Candles.
	Varnishes.	Petrolatum.....	Perfumery and cosmetics.
Art glass products.....	Glass.	Soap stock.....	(See Soap stock, under Oil, cottonseed and cake.)
	Glass, cutting, staining, and ornamenting.	Tree spray [insecticide]..	(See Insecticide, under Baking and yeast powders.)
Babbitt metal and solder.....	Babbitt metal and solder.		
	Brass.	Salt.....	Chemicals.
	Smelting and refining, not from the ore.		Explosives.
Bag blue.....	(See Bluing, principal product.)	Bromine.....	(Not found elsewhere.)
Belt dressing.....	(See Belt dressing, under Oil, not elsewhere specified.)	Calcium chloride.....	Chemicals.
		Ice.....	Ice, manufactured.
Bichromate of soda.....	Chemicals.		Liquors, malt.
Bleaching liquid.....	(See Bleaching agents, under Soap.)	Soap.....	Dyestuffs and extracts.
Brushes.....	(See Brushes, under Chemicals.)		Grease and tallow.
Cleaning oil.....	(See Cleansing and polishing preparations, principal product.)		Oil, cottonseed and cake.
			Oil, lard.
Coal tar distillery products.....	Chemicals.		Oil, not elsewhere specified.
Dextrins.....	Varnishes.		Patent medicines and compounds.
Disinfectants.....	(See Dextrins, under Dyestuffs and extracts.)		Perfumery and cosmetics.
	(See Disinfectants, under Oil, not elsewhere specified.)		Slaughtering and meat packing, wholesale.
		Bleaching agents.....	Chemicals.
Fine chemicals.....	(See Fine chemicals, under Fertilizers.)		Paints.
Gums.....	(See Gums, under Dyestuffs and extracts.)	Boiler compounds.....	(See Boiler compounds, under Blacking.)
Insecticides.....	(See Insecticide, under Baking and yeast powders.)	Glycerin.....	(See Glycerin, under Candles.)
		Hides.....	(See Hides, under Fertilizers.)
Lamp and carbon blacks.....	Bone, ivory, and lamp black.	Perfumeries.....	(See Perfumery and cosmetics, principal product.)
Lead pipe.....	Lead, bar, pipe, and sheet.	Red oil.....	(See Red oil, under Candles.)
Linseed oil.....	(See Oil, linseed, principal product.)	Sal soda.....	Chemicals.
Linseed oil cake.....	(See Linseed cake, under Oil, linseed.)	Salernus and soda.....	Baking and yeast powders.
Linseed oil meal.....	(See Linseed meal, under Oil, linseed.)		Chemicals.
Pharmaceuticals.....	(See Pharmaceuticals, nonsecret, under Patent medicines and compounds.)	Starch.....	Baking and yeast powders.
	(See Ink, printing, principal product.)		Flavoring extracts.
Printers' ink.....	(See Ink, printing, principal product.)		Food preparations.
Red oil.....	(See Red oil, under Candles.)	Bluing.....	Glucose.
Roofing materials.....	Roofing materials.	Cattle food.....	(See Bluing, principal product.)
Sheet lead.....	Lead, bar, pipe, and sheet.	Corn oil.....	(See Cattle food, under Oil, cottonseed and cake.)
Sizes.....	(See Sizes, under Dyestuffs and extracts.)	Gluten food [cattle food].....	Oil, not elsewhere specified.
Stova polish.....	(See Stova polish, under Blacking.)	Paste.....	(See Cattle food, under Oil, cottonseed and cake.)
Tar oil.....	Chemicals.	Size.....	(See Paste, under Ink, writing.)
	Varnishes.		(See Sizes, under Dyestuffs and extracts.)
	Wood distillation, not including turpentine and rosin.	Sulphuric, nitric, and mixed acids.....	Chemicals.
	(See Varnishes, principal product.)		Dyestuffs and extracts.
	Cleansing and polishing preparations.		Explosives.
	Varnishes.		Fertilizers.
Patent medicines and compounds.....	Baking and yeast powders.		Roofing materials.
	Druggists' preparations.		Smelting and refining, zinc.
	Flavoring extracts.	Alums.....	Chemicals.
	Perfumery and cosmetics.		Varnishes.
	(See Flavoring extracts, under Baking and yeast powders.)	Chloride of zinc.....	Chemicals.
Flavoring extracts.....	(See Flavoring extracts, under Baking and yeast powders.)	Fine chemicals.....	(See Fine chemicals, under Fertilizers.)
		Hydrofluoric acid.....	Chemicals.
Pharmaceuticals, nonsecret.....	Chemicals.	Muriatic acid.....	Chemicals.
	Druggists' preparations.		Mucilage and paste.
	Paints.		

TABLE CIX.—CHEMICAL GROUP—KIND OF PRODUCTS, PRINCIPAL AND SECONDARY, ACCORDING TO CLASSIFICATION OF PRINCIPAL, AND THE OTHER CLASSIFICATIONS IN WHICH FOUND: 1905—Continued.

Principal product, with secondary products subordinated.	Other classifications in which found.	Principal product, with secondary products subordinated.	Other classifications in which found.
Sulphuric, nitric, and mixed acids—Continued.		Varnishes—Continued.	
Niter cake.....	(See Niter cake, under Chemicals.)	Linseed meal.....	(See Linseed meal, under Oil, linseed.)
Salt cake.....	Chemicals.	Linseed oil.....	(See Oil, linseed, principal product.)
Sulphate of soda.....	Chemicals.	Lubricating grease.....	(See Axle grease, principal product.)
Superphosphates.....	(See Fertilizers, principal product.)	Metal polish.....	Cleansing and polishing preparations.
Thin crystals and salts.....	Chemicals.	Oil foots.....	(See Soap stock, under Oil, cottonseed and cake.)
Turpentine and rosin.....	Lumber and timber products. Wood distillation, not including turpentine and rosin.	Oil of tar.....	(See Tar oil, under Paints.)
Charcoal.....	(See Charcoal, under Chemicals.)	Paint remover.....	(See Cleansing and polishing preparations, principal product.)
Varnishes.....	Chemicals. Ink, printing. Mucilage and paste. Paints. Roofing materials.	Paints.....	(See Paints, principal product.)
Alums.....	(See Alums, under Sulphuric, nitric, and mixed acids.)	Sealing wax.....	(See Sealing wax, under Ink, writing.)
Axle grease.....	(See Axle grease, principal product.)	Sodas.....	Chemicals.
Bleached shellac.....	Chemicals.	Tanning materials.....	(See Dyestuffs and extracts, principal product.)
Charcoal.....	(See Charcoal, under Chemicals.)	Varnish remover.....	Cleansing and polishing preparations.
Coal tar distillery products.	(See Coal tar distillery products, under Paints.)	Wax polish.....	Paints.
Dextrin paste.....	(See Paste, under Ink, writing.)	Wood alcohol.....	Wood distillation, not including turpentine and rosin.
Dry colors for printing.....	(See Ink, printing, principal product.)	Wood preservative.....	Wood distillation, not including turpentine and rosin. Wood preserving.
Dyestuffs, artificial.....	(See Dyestuffs and extracts, principal product.)	Wood distillation, not including turpentine and rosin.	Charcoal. Chemicals. Dyestuffs and extracts. Iron and steel, blast furnaces. Turpentine and rosin.
Dyestuffs, natural.....	(See Dyestuffs and extracts, principal product.)	Charcoal.....	(See Charcoal, under Chemicals.)
Fine chemicals.....	(See Fine chemicals, under Fertilizers.)	Disinfectants.....	(See Disinfectants, under Oil, not elsewhere specified.)
Furniture polish.....	(See Cleansing and polishing preparations, principal product.)	Oil of tar.....	(See Tar oil, under Paints.)
		Spirits of turpentine.....	Turpentine and rosin.
		Wood preservative.....	(See Wood preservative, under Varnishes.)

From the table it will be seen that axle grease is also made, but as a subsidiary product, by establishments manufacturing blacking as their product of chief value, by refineries of petroleum, and by varnish factories. Harness oil, made as a subsidiary product by axle grease establishments, is also returned by establishments classified under "oil, not elsewhere specified." Lime flour, or powdered calcium oxide, another subsidiary product, is also made by chemical factories; and lubricating oil as a chief product by establishments classified under "oil, lard," "oil, not elsewhere specified," and "petroleum, refining."

Again, baking and yeast powders are made as a subsidiary product by establishments classified under "flavoring extracts," and "liquors, malt." A subsidiary product of regularly classified baking and yeast powder factories is ammonia, which is also to be found under "bluing," "chemicals," "coke," "fertilizers," "flavoring extracts," "gas, illuminating and heating," and "mucilage and paste." The bluing made as a subsidiary product can be found under "baking and yeast powders," "blacking," "chemicals," "cleansing and polishing preparations," "flavoring extracts," "ink, writing," "paints," "perfumery and cosmetics," "mucilage and paste," and "starch."

Among the notable features of the table are the number of classifications—26—in which appear some of the chemicals classified as principal products under "chemicals," and the large number of subsidiary products shown under "paints" and "varnishes."

Uses.—A separation of the various industries placed in the chemical group according to the uses made of the products involves the transfer of two—"baking and

yeast powders" and "salt"—to "food and kindred products," and of two others—"ink, printing" and "ink, writing"—to "paper and printing." The other industries, except those classified as chemicals and as explosives, have been arranged in subgroups ranked by value of products as follows: (1) Illuminants and lubricants; (2) fertilizers and fertilizer materials; (3) paints and dyes; (4) drugs, medicines, and lotions; and (5) cleansers, polishers, and sizes.

Two industries are treated separately—"chemicals," the real center and base of the group, the returns being those of chemical factories, the products of which are so numerous and the uses to which they are put so varied, that it is impossible to classify them satisfactorily under any subgroup; and "explosives," which are used for purposes different from those of any of the other products shown among "chemicals and allied products," and are debarred, therefore, from all of the subdivisions.

Table cx gives the number of establishments, average number of wage-earners, and value of products for each of the subgroups, with the percentages they form of the totals for the entire chemical group.

Illuminants and lubricants lead except in number of establishments; in this item they are exceeded by drugs, medicines, and lotions, and paints and dyes. Fertilizers and fertilizer materials are second in value of products, but give place to paints and dyes both in number of wage-earners and in number of establishments. Paints and dyes are third in value of products, but second both in number of wage-earners and number of establishments.

TABLE CX.—Chemical group—number of establishments, average number of wage-earners, and value of products for each subgroup, by uses, with per cent each forms of total: 1905.

SUBGROUP.	ESTABLISHMENTS.		WAGE-EARNERS.		PRODUCTS.	
	Number.	Per cent of total.	Average number.	Per cent of total.	Value.	Per cent of total.
Total.....	9,480	100.0	210,165	100.0	\$1,031,905,263	100.0
Illuminants and lubricants.....	1,667	17.2	53,245	25.3	346,792,253	33.6
Fertilizers and fertilizer materials.....	1,147	11.9	32,188	15.3	162,093,120	15.7
Paints and dyes.....	2,220	22.9	51,543	24.5	161,708,098	15.7
Drugs, medicines, and lotions.....	2,860	29.5	21,028	10.3	124,688,723	12.1
Cleaners, polishers, and sizes.....	975	10.1	17,690	8.4	95,722,461	9.3
Chemicals (treated separately).....	275	2.8	19,806	9.4	75,222,249	7.3
Explosives (treated separately).....	124	1.3	5,800	2.9	29,602,384	2.8
The 4 transferred industries not considered here by uses.....	412	4.3	8,256	3.9	36,135,475	3.5

ILLUMINANTS AND LUBRICANTS.

The number of establishments, average number of wage-earners, and value of products for illuminants and lubricants are shown in Table CXI.

TABLE CXI.—Illuminants and lubricants: 1905.

INDUSTRY.	Number of establishments.	Wage-earners, average number.	Value of products.
Total.....	1,667	53,245	\$346,792,253
Axle grease.....	25	119	879,483
Calcium lights.....	22	41	135,246
Candles.....	17	816	3,889,362
Gas, illuminating and heating.....	1,019	30,566	125,144,045
Grease and tallow.....	300	3,628	18,814,533
Oil, lard.....	5	44	796,111
Oil, not elsewhere specified.....	181	1,261	22,127,253
Petroleum, refining.....	98	16,770	175,005,320

Of the industries in this subgroup, "petroleum, refining" is easily first in value of products, with 50.5 per cent, although in establishments and wage-earners (5.9 and 31.5 per cent, respectively) its rank is lower. The manufacture of gas is second in value of products, with 36.1 per cent; but first in number of establishments, with 61.1 per cent; and first also in wage-earners, with 57.4 per cent.

In the subgroup are included lubricants and fuels, as well as illuminants, for the reason that in the two leading industries just mentioned there are products, not separable, extensively used for both heating and lighting, while in one of the two, lubricating oils are also largely produced. If the establishments wholly or largely devoted to the production of illuminants be segregated from the subgroup, the list will include calcium lights, candles, gas, illuminating and heating, and petroleum, refining. These totals combined are: Number of establishments, 1,156; average number of wage-earners, 48,193; and value of products, \$304,174,873. The percentages these are of the totals for the subgroup are 69.3, 90.5, and 87.7, respectively.

*Axle grease.*—Manufacturing establishments the principal product of which is "axle grease" are included in this classification. This grease is used for carriage and car axles.

The classification "axle grease" appeared first in Census reports at the census of 1880. It may have been included in "grease" and "grease and tallow" before that time. In 1880 there were 16 establishments having 72 wage-earners and \$365,048 in value of products. The statistics at the census of 1905 were for 25 establishments, employing 119 wage-earners, and reporting products valued at \$879,483, an increase since 1880 of 65.3 per cent in wage-earners and 140.9 per cent in value of products.

In considering these statistics the distinction between the classifications "axle grease" and "grease and tallow" should be understood. The former includes only axle grease, a composition of matter, while the latter includes the animal fats made into grease and tallow, soap fat, oil, etc.

The figures fall far short of showing the entire manufacture in the United States of grease used for lubricating axles, either carriage or car. In petroleum refining large quantities of grease used for all kinds of lubrication are manufactured, and these mineral products are compounded frequently with other materials by the refining establishments.

There was a slight decrease in the industry "axle grease" from 1890 to 1900, but from 1900 to 1905, as shown in Table 1, the value of products increased.

*Calcium lights.*—Establishments making oxygen and hydrogen gas compressed in tanks specifically for the production of lime lights are included in this classification.

The first appearance of the classification in Census statistics was at the census of 1870, where 2 establishments were shown, with a capital of \$56,000. The average number of wage-earners was 11 and the wages \$6,800. The cost of materials used was \$4,100 and the value of products, \$16,000. At the census of 1905 the number of establishments had increased to 22; the average number of wage-earners, to 41; and the value of products, to \$135,246. Some of the products are returned as "electric calcium effects." The principal products are found in no other classifications.

The calcium light, also known as lime light, is produced by an oxyhydrogen blowpipe flame thrown upon a pencil of lime, which thereby becomes vividly incandescent and has an intense brilliancy. It is employed largely in producing stage effects and in throwing stereopticon views upon the canvas. Zirconia, an oxide of zirconium, is sometimes employed instead of lime.

*Candles.*—The classification includes establishments making, as their chief products, candles, whether of wax or of other material, irrespective of the special purposes for which they are employed. Candles are also made by establishments engaged in manufacturing

"oil, not elsewhere specified," and in "petroleum, refining."

It is impossible to give separate figures for candles for previous censuses, as this industry was combined with soap until the census of 1905. The totals for this census include 17 establishments, with 816 wage-earners, and products amounting to \$3,889,362.

In the manufacture of ordinary candles pure stearic acid, a fatty acid of tallow, is generally used, sometimes mixed with a little wax or paraffin. Molding machines are employed, except for wax candles in the manufacture of which melted wax is poured over the wicks and rolled.

*Gas, illuminating and heating.*—This classification includes plants manufacturing, as their chief product, gas for illuminating and fuel purposes, whatever the materials used, and whether owned by municipal or other corporations, firms, or individuals. Natural gas, being a direct product of nature, is not included. The statistics for natural gas were shown in the census of mines and quarries for 1902. Gas is also found under "coke," as a subsidiary product.

*Grease and tallow.*—The reports of such establishments as rendered grease and tallow as their chief product, for further use in the industrial arts, are included here. Some of the chief products under this head are:

Albany grease.	Rough tallow for soap, grease, and candles.
Fat.	
Railroad grease.	

The classifications in 1860 were "grease" and "hides and tallow." The combined classification in 1860 is compared with the 1870 statistics in Table CXII.

TABLE CXII.—Comparative summary—grease and tallow: 1870 and 1860.

	1870	1860
Number of establishments.....	62	18
Capital.....	\$841,980	\$200,100
Wage-earners, average number.....	442	99
Total wages.....	\$184,787	\$40,320
Cost of materials used.....	\$5,114,808	\$972,186
Value of products.....	\$6,035,845	\$1,267,533

The value of products increased nearly fourfold during the decade shown. At the census of 1905 the number of establishments reported was 300; the average number of wage-earners was 3,628, an increase of 77.8 per cent over 1900; and the value of products was \$18,814,533, an increase of 57.4 per cent.

*Oil, lard.*—Nothing but lard oil, as the chief product of the establishments reporting, is classified under this head.

"Oil, lard," appeared first as a separate industry in 1850. In 1870 it disappeared, being absorbed probably in "oil, animal," which may have embraced both "oil, lard," and "oil, neat's-foot." Table CXIII gives the statistics from 1850 to 1870, the comparison being with the combined classification for the latter census.

TABLE CXIII.—Comparative summary—oil, lard: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	58	29	41
Capital.....	\$2,072,532	\$512,950	\$302,950
Wage-earners, average number.....	543	161	103
Total wages.....	\$298,975	\$51,112	\$58,956
Cost of materials used.....	\$7,582,576	\$2,131,141	\$1,271,002
Value of products.....	\$9,728,067	\$2,552,510	\$1,017,069

The decrease in the lard oil industry between 1900 and 1905, as shown in Table 1, is due to the discontinuance of one establishment in New York city, for which, in 1900, a large value of products was reported, and to a change in the classification of an establishment in New Jersey. The value of products for this, however, was so very materially reduced that had the factory remained under "oil, lard," the great decrease in the industry would nevertheless have been apparent.

Lard oil is an animal olein which is extracted by open kettle rendering, by acid rendering, or by steam rendering. When rendered in open kettles the fatty tissue, chopped, is heated over water until the oil or fat is tried out. The broken tissue is skimmed off. The oil and water stratify upon cooling and are separated readily. In acid rendering the fatty tissue is boiled with water and sulphuric acid, thus dividing the tissue and liberating the oil. When lard oil is rendered by steam, the tissue is destroyed with steam under pressure in autoclaves.

*Oil, not elsewhere specified.*—Under this classification are a great variety of oils. Among them are:

Cocoonut oil.	Neat's-foot oil.
Cod liver oil.	Olive oil.
Corn oil.	Rosin oil.
Fish oil.	Sperm oil.
Hoof oil.	Whale oil.

Some of the uses to which the oils under this head are put are shown by the following named products:

Bicycle oil.	Harness oil.
Boot and shoe treeing oil.	Lubricants.
Chronometer oil.	Machinery oil.
Clock oil.	Medicinal oil.
Curriers' oil.	Recovered oil for soap manufacture.
Cylinder oils.	Sewing machine oils.
Engine oils.	Signal oils.
Floor oil.	Valve oils.
Food oil.	Watch oil.
Fuel oil.	

"Oil, not elsewhere specified," did not make its appearance as a classification until the census of 1900, but the industries included in it were mentioned in 1810 as "oil, whale," and "oil, spermaceti," the returns in each case being from Massachusetts. In 1820 "oil" was returned from New Hampshire. The next appearance was in 1850, when statistics for "oil, miscellaneous," and "oil, whale," were shown, the industries included in these two classifications being such as are now included in "oil, not elsewhere specified." In 1860 the corresponding classifications were "oil, fish, whale, and other," "oil, neat's-foot," and "oil,

resin." In 1870 they were "oil, vegetable, not elsewhere specified," "oil, lubricating," and "oil, fish." The statistics from 1850 to 1870 are shown in Table CXIV.

TABLE CXIV.—Comparative summary—oil, not elsewhere specified: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	120	66	60
Capital.....	\$1,855,731	\$2,538,201	\$2,826,200
Wage-earners, average number.....	1,607	429	602
Total wages.....	\$342,233	\$174,032	\$211,596
Cost of materials used.....	\$3,304,320	\$5,449,354	\$6,536,979
Value of products.....	\$4,853,163	\$6,633,633	\$7,905,654

The decreases shown during these decades were due largely to the gradual lessening of the whale oil industry.

In 1880 the classifications were "oil, lubricating," "oil, illuminating, not including petroleum refining," "oil, resin," and "oil, neat's-foot." The classifications in 1890 were the same as in 1880, except for "oil, neat's-foot," which, as stated in a note to the general table published at that census, was included elsewhere.

*Petroleum, refining.*—All the products of petroleum refineries reported are included in this classification. Of these the distillates are:

Filtered cylinder oils.	Neutral filtered oils.
Fuel oils.	Paraffin oils.
Illuminating oils.	Reduced oils.
Naphtha and gasoline.	

The subsidiary products include asphaltum, black oil, coke, black naphtha, lubricating greases, paraffin wax, residuum, and sludge acid. The products of petroleum refining are used as a base for, or as a part of, a large number of articles. Among them, as returned under this classification also as subsidiary products are candles, petrolatum (or vaseline), soap stock, and tree spray (or insecticide).

FERTILIZERS AND FERTILIZER MATERIALS.

Subgroup 2 contains the statistics of fertilizers and fertilizer materials. Cottonseed cake is used as a fertilizer and as cattle food, while the oil is utilized for various purposes, some of them justifying its classification as a food product. Of the sulphuric, nitric, and mixed acids classification, sulphuric acid is used largely in the manufacture of fertilizers. This use governs the classification and places it in this subgroup. Table cxv gives the statistics of the industries grouped as fertilizers and fertilizer materials.

TABLE CXV.—Fertilizers and fertilizer materials: 1905.

INDUSTRY.	Number of establishments.	Wage-earners, average number.	Value of products.
Total.....	1,147	32,188	\$162,093,120
Fertilizers.....	400	14,201	56,632,853
Oil, cottonseed and cake.....	715	16,540	96,407,621
Sulphuric, nitric, and mixed acids.....	32	2,447	9,052,646

The leading industry in this group is "oil, cottonseed and cake," the value of these products constituting 59.5 per cent of the total.

*Fertilizers.*—All establishments making fertilizers as their chief product are included in this classification. The kinds of fertilizers made are:

Superphosphates from minerals, bones, etc.	Concentrated phosphate.
Ammoniated fertilizers.	Complete fertilizers.
	Other fertilizers.

Among other products returned are:

Epsom salts.	Pyrite cinder.
Chemicals, not otherwise specified.	Soda products.
Fish scrap.	Sulphuric acid.
Oil.	Other acids.

*Oil, cottonseed and cake.*—Cottonseed-oil mills, whether making crude oil or refining it, or both making and refining it as their principal business, are under this head. The products reported are:

Cattle feed, mixed.	Linters.
Crude oil.	Meal and cake.
Fertilizers manufactured.	Refined oil.
Hulls.	

In addition, some of the reports include olein, soap, and soap stock. Some cottonseed oil is refined by establishments the principal product of which is fertilizers.

*Sulphuric, nitric, and mixed acids.*—All establishments making as their chief product either one or more of these products are here included. Such acids are also found, as subsidiary products, under the classifications "chemicals," "dyestuffs and extracts," "explosives," "fertilizers," "roofing materials," and "smelting and refining, zinc." Other products, besides sulphuric, nitric, and mixed acids, are:

Alums.	Muriatic acid.
Chloride of zinc.	Niter cake.
Fine chemicals.	Salt cake.
Hydrofluoric acid.	Superphosphates.

PAINTS AND DYES.

The third subgroup is paints and dyes. Table cxvi gives the statistics for the industries thus grouped.

TABLE CXVI.—Paints and dyes: 1905.

INDUSTRY.	Number of establishments.	Wage-earners, average number.	Value of products.
Total.....	2,220	51,543	\$161,708,098
Bone, ivory, and lamp black.....	25	200	647,717
Dyestuffs and extracts.....	98	2,707	19,893,118
Oil, linseed.....	30	1,349	27,577,152
Paints.....	449	9,731	67,277,910
Turpentine and rosin.....	1,287	33,352	23,937,024
Varnishes.....	190	1,852	23,561,099
Wood distillation, not including turpentine and rosin.....	141	2,272	7,813,483

In value of products "paints" stand far in the lead, with 41.6 per cent of the total, and "oil, linseed," is

second in value of products, with 17.1 per cent of the total.

*Bone, ivory, and lamp black.*—The principal products under this classification are:

Boneblack.	Mineral black (to color fertilizers).
Ivory black.	Pulp black.
Gas carbon black.	
Lampblack.	

There are carbon blacks, as a subsidiary product, under "paints." Among subsidiary products under the main classification are glue, printers' ink, raw bone meal, steamed bone, and sulphate of ammonia.

*Dyestuffs and extracts.*—In this classification are establishments manufacturing dyestuffs, natural and artificial, and extracts for tanning purposes, as their chief product. These principal products include, besides dyestuffs:

Chrome tannage solution.	Mordants.
Ground bark.	Oak and chestnut extract.
Ground and chipped wood.	Palmetto extract.
Ground sumac.	Red liquor.
Hemlock extract.	Sumac extract.
Iron liquor.	Tannic acid.
Logwood extract.	Turkey red oil.

Among subsidiary products are gums and dextrans, castor oil, castor pomace, charcoal, chemicals (such as muriatic acid, etc.), nitric acid, and sizes. Dyestuffs and extracts are also found under "chemicals" and "ink, writing."

*Oil, linseed.*—Linseed oil is the principal product obtained from flaxseed, but the totals representing this classification also include the products of meal and cake, or the solid matter of the seed after the oil is extracted. Linseed oil will also be found under "chemicals," "ink, printing," "oilcloth and linoleum, floor," "paints," and "varnishes," as a subsidiary product.

While the manufacture of "flaxseed" oil is one of the pioneer industries of the United States, the records in the censuses prior to 1850 are not suitable for comparison with the growth of the industry since that time. However, the first census of manufactures, taken in 1810, demonstrates the fact that even then its manufacture had reached considerable proportions. At that census the industry was reported from 16 states and territories, representing a total of 374 establishments with an annual value of products of \$819,225. Pennsylvania led with 171 establishments and products valued at \$518,421.

At the census of 1820 the industry was returned from 12 states. In 1840 the statistics of the industry were included probably with those of "oil mills."

Table cxvii shows the statistics as returned at the censuses of 1850, 1860, and 1870.

TABLE CXVII.—Comparative summary—oil, linseed: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	77	94	163
Capital.....	\$3,862,956	\$2,592,550	\$806,650
Wage-earners, average number.....	945	814	479
Total wages.....	\$458,387	\$284,604	\$143,664
Cost of materials used.....	\$7,216,414	\$5,044,267	\$1,477,645
Value of products.....	\$8,881,962	\$5,981,843	\$1,948,934

*Paints.*—Under this classification are establishments producing pigments, paints, fillers, etc., as their product of chief value. Among the pigments are:

Barytes.	White lead, dry and in oil.
Dry colors.	Oxides of lead.
Fine colors.	Lampblack and other carbon blacks.
Pulp colors, sold moist.	

Among the paints are:

Paints in oil, in paste.	Paints in oil, already mixed for use.
Water paints.	

The fillers reported embrace liquid, paste, and dry fillers, putty, and whiting. Paints are also found as a subsidiary product in other classifications, among them "chemicals," "confectionery," "dyestuffs and extracts," "graphite and graphite refining," "ink, printing," "lumber, planing mill products," "oilcloth, enameled," "roofing materials," "soap," and "varnishes." Among subsidiary products under the paint classification itself are art glass products, bichromate of soda, brushes, cleaning oil, coal tar distillery products, dextrans, disinfectants, fine chemicals, insecticides, and linseed oil.

*Turpentine and rosin.*—The chief product of establishments included under this head is the spirits of turpentine, the result of distillation of the resin of the long-leaf pine, the residuum being disposed of as rosin. Much spirits of turpentine is the result of the distillation of long-leaf pine stumpage, and is included as a subsidiary product under "wood distillation, not including turpentine and rosin." A considerable subsidiary product in the industry is charcoal.

*Varnishes.*—Here are included all kinds of varnishes and japans made as a principal product by the establishments reporting. The varieties are:

Baking japans and lacquers.	Drying japans and dryers.
Benzine varnishes.	Oleo-resinous varnishes.
Damar varnishes.	Spirit (not turpentine) varnishes.

Varnishes are also found as a subsidiary product under "chemicals," "ink, printing," "mucilage and paste," "paints," and "roofing materials." Among subsidiary products of the classification itself are:

Alums.	Coal tar distillery products.
Axle grease.	Dextrin paste.
Bleached shellac.	Dyestuffs, artificial and natural.
Charcoal.	Wood alcohol.

*Wood distillation, not including turpentine and rosin.*—This embraces establishments distilling wood. The leading products among the principal products are refined and crude wood alcohol. Other products reported are:

Acetate of soda.	Gray acetate of lime.
Acetone.	Pyroligneous acid.
Brown acetate of lime.	Pyrolignite of iron.
Dye liquors.	Wood ashes.
Formaldehyde.	Wood creosote.

Subsidiary products under "wood distillation" include charcoal, disinfectants, oil of tar, paints, spirits of turpentine, and wood preservative.

DRUGS, MEDICINES, AND LOTIONS.

The number of establishments, average number of wage-earners, and value of products in the fourth subgroup are shown in Table cxviii.

TABLE CXVIII.—*Drugs, medicines, and lotions: 1905.*

INDUSTRY.	Number of establishments.	Wage-earners, average number.	Value of products.
Total.....	2,800	21,628	\$124,688,723
Drug grinding.....	27	981	5,145,522
Druggists' preparations.....	240	7,410	31,782,250
Oil, essential.....	52	132	1,464,662
Oil, castor.....	4	43	642,665
Patent medicines and compounds.....	2,245	10,980	74,520,765
Perfumery and cosmetics.....	292	2,082	11,132,850

In all particulars the leading industry in this subgroup is "patent medicines and compounds," which has 78.5 per cent of the establishments, 50.8 per cent of the average number of wage-earners, and 59.8 per cent of the value of products.

*Oil, essential.*—The products under this classification include the following oils:

Black birch.	Spearmint, crude and refined.
Cedar.	Spruce.
Erigeron (fleabane).	Pennyroyal.
Fireweed.	Tansy.
Juniper.	Wintergreen.
Peppermint, crude and refined.	Wormwood.
Sassafras.	

In addition there are peppermint camphor, witch hazel extract, and mint hay, concrete oleoresin of orange and of lemon, orange juice, and perfumes. Essential oil is also found under "flavoring extracts."

*Oil, castor.*—Castor oil is not only found as the chief product under this classification, but as a subsidiary product under "chemicals" and "dyestuffs and extracts."

In 1810 castor oil valued at \$600 was reported from the state of Maryland, and in 1820 there was a classification of "oil, flaxseed, castor, etc.," establishments being reported from Ohio. The industry was not classified in 1840. The statistics from 1850 to 1870 are given in Table cxix.

TABLE CXIX.—*Comparative summary—oil, castor: 1850 to 1870.*

	1870	1860	1850
Number of establishments.....	6	8	23
Capital.....	\$479,800	\$137,400	\$152,820
Wage-earners, average number.....	94	97	147
Total wages.....	\$46,950	\$41,196	\$43,824
Cost of materials used.....	\$537,250	\$239,840	\$447,065
Value of products.....	\$757,700	\$320,370	\$593,050

The statistics for 1905 include 4 establishments, with 43 wage-earners and products valued at \$642,665. The increase in value since 1850, therefore, has been slight, while in the number of establishments and number of wage-earners there were marked decreases. The course of the industry as shown by the statistics has been rather inconstant, but the increase since 1900 in value of products is 62.5 per cent.

Castor oil consists largely of the esters ricinolein and isoricinolein, dihydroxystearin, and a small quantity of stearin, and does not contain normally any free acids. It is expressed from the seeds of the *ricinus communis*, of which it constitutes nearly half the weight, and in modern practice this expression is supplemented by treatment of the pomace with light hydrocarbon solvents to recover the last traces of oil.

*Perfumery and cosmetics.*—Under this classification there are, among other articles, the following:

Barbers' perfumery.	Massage creams.
Barbers' supplies, liquid and paste.	Perfume concentrates.
Bay rum.	Perfumed waters.
Breath perfumes.	Perfumery.
Cold cream.	Petrolatum.
Cologne water.	Pomades.
Complexion preparations.	Rouges.
Dental preparations.	Sachets.
Dentifrices.	Stage make-ups.
Face creams.	Talcum powders.
Hair lotions.	Toilet preparations.
Lavender.	Toilet waters.

Perfumery and cosmetics were also reported as minor products of establishments classified under "druggists' preparations," "patent medicines and compounds," and several other classifications, but it is impracticable to segregate them and add to the total here shown in order to reach the grand total for the United States.

No classification of "perfumery and cosmetics," or the equivalent thereof, appears in Census statistics until 1850. It then included fancy soaps, which inclusion was continued for 1860 and 1870. The statistics of the industry from 1850 to 1870 are shown in Table cxx.

TABLE CXX.—*Comparative summary—perfumery and cosmetics: 1850 to 1870.*

	1870	1860	1850
Number of establishments.....	64	33	39
Capital.....	\$1,172,900	\$597,000	\$197,550
Wage-earners, average number.....	727	535	188
Total wages.....	\$200,415	\$146,076	\$43,730
Cost of materials used.....	\$592,219	\$460,194	\$163,826
Value of products.....	\$2,023,582	\$1,222,400	\$355,350

In the manufacture of perfumed waters, which are alcoholic solutions of mixed essential oils, the alcohol used is that form of it known as cologne spirits which has been deodorized thoroughly and freed from fusel oil. The essential oils are either dissolved separately in the alcohol or added to the solvent. Distillation is not employed, the development of the perfume being accomplished by permitting the solution to stand for some time. Cologne waters are of this order of manufacture. Odoriferous extracts are made by charging fats and oils with the perfume of flowers, which is extracted with cold alcohol, or with glycerin, soft paraffin, or vaseline. This is the enfleurage or maceration process. Preparation of pomades is also effected by this process, the basis being fatty oils, usually oil of almonds, oil of bean, or olive oil.

*Patent medicines and compounds; druggists' preparations; and drug grinding.*—The development of these industries at an early date and their growth in the last half century, as shown by the various census reports, make them prominent among the manufacturing industries of the country. Each industry has a separate tabulation at this census, but as the products are more or less related they will be treated together.

The classification "druggists' preparations" includes drugs and standard compounds prepared especially for the use of pharmacists in filling prescriptions, making other compounds, etc. Such preparations are of standard strength and purity and the formulas are well known to the medical fraternity; whereas the preparations known as patent medicines are compounded from secret formulas, or are goods sold under a trade-mark name. In 1890 a classification "pharmaceutical preparations" appeared in the chemical group, and the classification "druggists' preparations" was also first used, but the former was merged in the latter classification in the censuses of 1900 and 1905. This change in classification accounts for the very large increase in the value of products for "druggists' preparations" from 1890 to 1900. The unusual decrease in the number of establishments returned for this industry from 1890 to 1900 was accounted for by the fact that the census of 1890 included in its report on manufactures all retail drug stores that made preparations on a small scale and sold them at retail prices, while the censuses of 1900 and 1905 excluded them. It is apparent, therefore, that in this industry no comparison between 1890 and 1900 is possible. However, in 1900 and 1905 the classification was similar and the results comparable.

Among the articles reported by establishments included in the classification of "druggists' preparations" are:

Acetate of copper.  
Antitoxins.  
Baby food.  
Bitters.  
Carbonate of copper.

Charcoal preparations.  
Citrate of magnesia.  
Citric acid.  
Complexion powders.  
Cough sirups.

Dentifrice.  
Drugs.  
Effervescent salts.  
Elixirs.  
Embalming fluids.  
Face lotions.  
Filled gelatin capsules.  
Flaxseed meal.  
Fluid extracts.  
Granulated salts.  
Headache powders.  
Medicated solutions.  
Nebulizers.  
Ointments.  
Oleate of mercury.  
Pancreatin.  
Pepsin.

Perfumes.  
Pharmaceuticals.  
Pills.  
Salves.  
Sirups.  
Soft elastic capsules.  
Special medicinal preparations.  
Sugar of milk.  
Sulphuret of potash.  
Suppositories.  
Tablets.  
Tartaric acid.  
Tinctures.  
Toilet articles.  
Toilet preparations.  
Vaccine virus.  
Vanilla essence.

"Drug grinding" includes establishments which by powdering or pulverizing reduce drugs to forms convenient for the use of manufacturers of druggists' preparations and patent medicines, and for the filling of prescriptions for sale to the general public. Drug grinding is carried on to a large extent in connection with the manufacture of pharmaceutical and other preparations, so that the Census figures are far from representing the true magnitude of the industry.

The first reports for drug grinding as a separate industry occurred at the census of 1860, when 3 establishments with a capital of \$45,500, and employing 16 wage-earners, who received \$5,544 in wages, produced an output valued at \$107,500. In the censuses of 1870 and 1880 the industry was included evidently with chemicals. However, the censuses of 1890, 1900, and 1905 segregated the industry and during the fifteen years it has grown rapidly until now the annual products are valued at over \$5,000,000.

The establishments included in the classification of "drug grinding" report the following among other products:

Barks.  
Botanical drugs.  
Flaxseed meal.  
Flowers.  
Ground charcoal.  
Gums.

Herbs.  
Licorice paste.  
Peels.  
Powdered licorice root.  
Roots.  
Seeds.

The census of 1810 shows that "drugs" were manufactured in three states, namely, Louisiana, New Jersey, and Pennsylvania, the last state reporting a product of \$126,950. In 1820 medicines were manufactured in Connecticut, Maryland, and Vermont. The census of 1840 combined the products of "medicinal drugs, paints, and dyes," which amounted to \$4,151,899, over one-half of the total amount being credited to Pennsylvania. At the census of 1850 a separate classification was made for "patent medicines and compounds." This classification included the many secret remedies prepared and placed on the market for sale. The statistics as reported at each census from 1850 to 1870, inclusive, are given in Table cxxi.

TABLE CXXI.—Comparative summary—patent medicines and compounds: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	319	173	143
Capital.....	\$6,667,684	\$1,977,385	\$1,427,375
Wage-earners, average number.....	2,436	1,059	827
Total wages.....	\$1,017,795	\$372,127	\$276,488
Cost of materials used.....	\$7,319,752	\$1,492,248	\$1,657,886
Value of products.....	\$16,257,720	\$3,465,594	\$3,508,405

Among the articles reported by establishments classed as "patent medicines and compounds" are the following:

Antiseptic shaving liquid.	Hive sirups.
Asthma cure.	Hoof paste.
Attar compound.	Horse liniment and powders.
Belt dressing.	Insect exterminators.
Bitters.	Kid plasters.
Boiler compounds.	Kidney pills.
Breath perfumes.	Liquid lotions.
Catarrh specifics.	Massage creams.
Cathartic pills.	Medicated shampoo
Compounds for reclaiming tobacco.	Mentholatum.
Constitution tablets.	Mexican soap.
Consumption cure.	Nervine tabules.
Corn cure.	Nonalcoholic remedy.
Cough balsam.	Ointments.
Cough cure.	Pain cure.
Cough disks.	Pepsin.
Cream of sage and sulphur.	Petroleum jelly.
Dandruff cure.	Pharmaceutical specialties.
Dental specialties.	Pills.
Disinfectants.	Pine tar gum.
Dyspepsia tablets.	Poultry food and remedies.
Elixirs.	Preservative and filler for belting.
Embalming fluids.	Rat meal.
Emulsion of cod liver oil.	Rheumatic remedies.
Eye salve.	Shampoo liquid.
Flavoring extracts.	Sirups.
Fluid extracts.	Stomach bitters.
Fly paper.	Toilet articles.
Foot powders.	Tonic for hair.
French hair grower.	Tooth powder.
Gall cure.	Veterinary medicines and supplies.
Germicide.	Worm compounds.
Hair food.	
Hair restorer.	

CLEANSERS, POLISHERS, AND SIZES.

The fifth subgroup embraces all industries of the chemical group used for cleansing, polishing, and sizing purposes. The statistics of these are shown in Table CXXII.

TABLE CXXII.—Cleansers, polishers, and sizes: 1905.

INDUSTRY.	Number of establishments.	Wage-earners, average number.	Value of products.
Total.....	975	17,699	\$95,722,461
Blacking.....	138	1,218	5,941,042
Bluing.....	56	206	678,737
Cleansing and polishing preparations.....	150	504	2,710,393
Glue.....	58	2,804	10,034,685
Soap.....	436	11,044	68,274,700
Starch.....	131	1,803	8,082,904

Soap.—This classification includes 44.7 per cent of the establishments, 62.4 per cent of the wage-earners, and 71.3 per cent of the value of products of the group. It covers all establishments reporting soap of whatever kind as a chief product. The schedule called for hard soaps as follows:

Foots.	Toilet (including medicated,
Olein.	shaving, and other special
Powdered.	soaps).
Tallow.	All other.

Soft soap, special soap articles, and glycerin are also included. A very large quantity of soap is made by establishments engaged in slaughtering and meat packing, wholesale. Other classifications under which it appears are "dyestuffs and extracts," "grease and tallow," "oil, cottonseed and cake," "oil, lard," "oil, not elsewhere specified," "patent medicines and compounds," and "perfumery and cosmetics." Subsidiary products under the main classification include bleaching agents, boiler compounds, glycerin, hides, perfumeries, red oil, and sal soda.

Starch.—All kinds of starch, whatever their use, for food, laundry, or mill purposes, are included under this head, when reported as a chief product. The kinds, according to the material used, are:

Corn.	Root.
Potato.	Wheat.

The subsidiary products include bluing, cattle food, corn oil, gluten food (cattle food), paste, and size. Starch, as a subsidiary product, is found under "baking and yeast powders," "flavoring extracts," "food preparations," and "glucose"—the last classification containing a very large quantity.

Glue.—Glue is a partly purified gelatin used in certain of the arts for its adhesive qualities, and in sizing preparations for glazing textiles and paper, for which purpose its consumption has increased greatly. Hide glue is made, as its name indicates, from hides which are boiled after being cleaned with lime, caustic soda, and sulphuric acid; bone glue, from bones, treated with hydrochloric acid; fish glue, from the skin, scales, and muscular tissue of the larger fish. The waste or residuum is used for fertilizer.

All kinds of glue—hide, bone, fish, liquid, or other—are here classified. Some of them are also found, as subsidiary products, under "bone, ivory, and lamp black," "fertilizers," "grease and tallow," "leather, tanned, curried, and finished," "mucilage and paste," "oil, not elsewhere specified," and "slaughtering and meat packing, wholesale." Subsidiary products of the glue industry include curled hair, desiccated fish, fertilizers, gelatin, grease, oil, prepared rawhide trimmings, sandpaper, and tankage.

Glue appeared as a classification at the census of 1810, Maryland and Pennsylvania being represented. It did not appear again until 1850. The statistics from that year to 1870 are shown in Table CXXIII.

TABLE CXXIII.—Comparative summary—glue: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	70	62	47
Capital.....	\$1,054,800	\$1,052,900	\$510,050
Wage-earners, average number.....	800	575	391
Total wages.....	\$309,673	\$305,904	\$99,432
Cost of materials used.....	\$882,981	\$537,270	\$371,016
Value of products.....	\$1,709,605	\$1,185,625	\$662,405

The statistics of the industry for 1905 show 58 establishments, 2,864 wage-earners, and products valued at \$10,034,685. The industry has increased fifteenfold in value of products since 1850. The period of greatest increase was for the semidecade ending with the census of 1905, when it was 86.2 per cent.

*Cleansing and polishing preparations.*—Cleansing and polishing preparations first appeared as a separate classification at the census of 1870, when 21 establishments with a capital of \$370,800 were reported. There were 98 wage-earners, having wages of \$37,087; the cost of materials used was \$214,696 and the value of products, \$323,015.

In 1905 the number of establishments was 156; the average number of wage-earners, 564, an increase over 1900 of 11 per cent; and the value of products, \$2,710,393, an increase of 23.6 per cent.

This classification includes the following and similar compounds:

Cleansing compounds.	Paste.
Copper polishes.	Polishing materials.
Felt polish.	Silver polishes.
Floor dressing.	Stove polish.
Furniture polish.	Wall paper cleaner.
Liquid polishes.	Washing powder.
Oil polish.	

Some of these preparations are also found, as subsidiary products, under "baking and yeast powders," "blacking," "bluing," "flavoring extracts," "mucilage and paste," "paints," "soap," and "varnishes." The subsidiary products under the classification are enamel, platers' supplies, polish brushes, and shoe polish.

*Bluing.*—Bluing is a soluble compound used in laundry work to neutralize the yellowish tinge of white clothes. All bluing was formerly a composition of indigo, but more recently artificial coloring matter, such as Prussian blue and the coal tar colors, has come into use.

The first census to show the classification of "bluing" was that of 1860. The statistics for that year and 1870 are given in Table CXXIV.

TABLE CXXIV.—Comparative summary—bluing: 1870 and 1860.

	1870	1860
Number of establishments.....	11	1
Capital.....	\$62,500	\$500
Wage-earners, average number.....	54	1
Total wages.....	\$17,975	\$288
Cost of materials used.....	\$37,422	\$1,706
Value of products.....	\$92,100	\$3,000

Among varieties here enumerated which appear under "bluing" are:

Diamond blue.	Washing fluid.
Laundry wash blue.	

Bluing is also found, as a subsidiary product, under several classifications, including "baking and yeast powders," "blacking," "flavoring extracts," and "perfumery and cosmetics."

*Blacking.*—Blacking involves the use of a pigment, usually ivory black, boneblack, or lampblack, mixed with a combination of oil, vinegar, beer, molasses, water, and hydrochloric or sulphuric acid. Harness blacking usually contains glue, gelatin, gum arabic, or some resinous compounds. Sulphuric acid added to ivory black and sugar produces sulphate of lime and soluble acid phosphate of lime, making a paste which is the foundation of many blackings.

The classification "blacking" did not appear in Census statistics until 1860. The statistics for that year and for 1870 are given in Table CXXV.

TABLE CXXV.—Comparative summary—blacking: 1870 and 1860.

	1870	1860
Number of establishments.....	32	18
Capital.....	\$266,750	\$183,050
Wage-earners, average number.....	305	185
Total wages.....	\$107,460	\$42,520
Cost of materials used.....	\$428,710	\$105,378
Value of products.....	\$817,708	\$420,940

This classification includes establishments producing blacking of various kinds as their chief product.

Among the varieties are:

Dressings and blackings for leather.	Liquid dressings.
Harness dressing.	Shoe blacking.
Harness grease.	Shoe dressings.
Harness wax.	Shoe paste.
Leather dressing.	Shoe polishes.
Leather stains and blackings.	Shoe wax.
	Shoemakers' waxes.

The stove polishes shown may be classed as subsidiary products. Some of the principal products are found also, as subsidiary products, under "bluing" and "cleansing and polishing preparations."

CHEMICALS.

The purely chemical manufactures can not be grouped with any of the other classifications in the chemical group. They are used in a great variety of ways in many industries and particularly in compounding many compositions of matter. The chemical manufactures schedule called for the quantity and value of the following products:

Acids.	Cyanides.
Alums.	Epsom salts.
Bleaching materials.	Fine chemicals.
Blue vitriol.	Glycerin.
Chemical substances produced by electricity.	Phosphate of soda.
Coal tar products.	Plastics.
Compressed or liquefied gases.	Potashes.
Coppers.	Sodas.
Cream of tartar.	Tin salts

There are at least 26 classifications in which some kind of chemical found in the chemical manufacture proper is included as a subsidiary product.

EXPLOSIVES.

No other classification in the chemical group includes articles the uses of which are similar to those of explosives. The schedule used in collecting the sta-

tistics called for the quantity and value of the following products:

Blasting powder.	Gunpowder.
Dynamite.	Nitroglycerin.
Fulminating mercury.	Smokeless powder.
Gun cotton or pyroxylin.	

Subsidiary products reported are acids and saltpeter. Explosives were reported as subsidiary products under "ammunition" and "chemicals."

CLAY, GLASS, AND STONE PRODUCTS.

The manufactures of brick and tile, of pottery, terra cotta, and fire clay, and of glass are the principal products of this group, which includes 19 industries. The group contains 10,775 establishments with products amounting to \$391,230,422, or 2.6 per cent of the total of all industries in the United States.

While all of the industries of the group are related through a general similarity in the materials consumed, a further and perhaps a more natural grouping brings together those whose raw material of chief value was clay, or stone, or sand.

*Clay products.*—Table CXXVI summarizes the statistics for the 5 industries in most of which clay was the chief material.

TABLE CXXVI.—CLAY PRODUCTS: 1905.

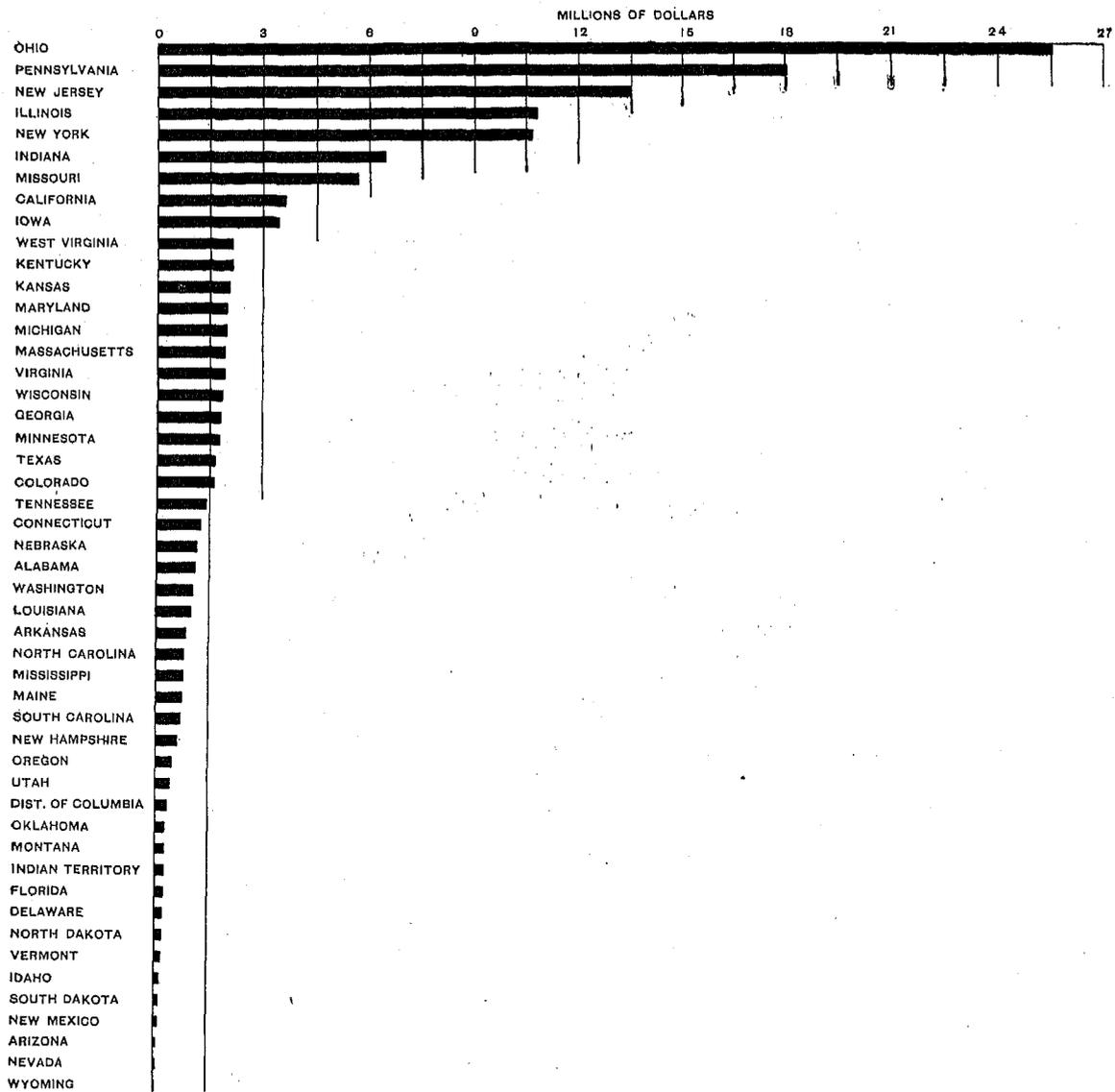
INDUSTRY.	Number of establishments.	Capital.	WAGE-EARNERS.		Cost of materials used.	Value of products.
			Average number.	Wages.		
Total.....	5,801	\$243,008,067	122,338	\$55,851,988	\$35,276,883	\$142,535,057
Brick and tile.....	4,634	119,956,959	66,021	28,646,005	16,316,409	71,152,062
China decorating.....	28	260,655	225	99,137	107,647	325,679
Kaolin and ground earths.....	131	10,195,793	2,157	898,700	1,898,901	4,438,794
Pottery, terra cotta, and fire clay products.....	873	110,026,018	52,428	25,177,665	16,591,462	64,200,732
Statuary and art goods.....	135	1,668,642	1,507	1,030,481	392,374	2,416,730

The products of the brickyards and pottery works form 95 per cent of the total products for this subgroup of industries. These two industries are allied closely, as bricks and other products included under "brick and tile" are manufactured frequently in the establishments classed as "pottery, terra cotta, and fire

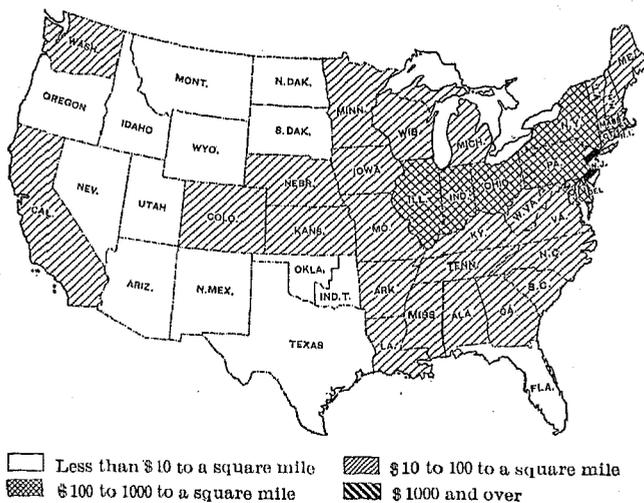
clay products." The next largest product was reported for "kaolin and ground earths." This classification includes, in addition to kaolin, the grinding of such products as feldspar, silix, dry paints, silica sand, whiting, corundum, barytes, and manganite.

MANUFACTURES.

DIAGRAM 16.—CLAY PRODUCTS (BRICK AND TILE, POTTERY AND TERRA COTTA)—VALUE BY STATES AND TERRITORIES: 1905.



MAP 13.—Clay products—value per square mile: 1905.



The manufacture of "statuary and art goods" is a distinctive branch of the industry, and it is probable that considerable material other than clay is used in the manufacture. China decorating of the class included in this classification consists largely of hand-work and adds considerable value to the products of the china and porcelain factories.

*Stone products.*—Table CXXVII summarizes the statistics for the industries in which stone is used largely as a material.

The 5 classifications covering the production of grindstones, hones, whetstones, mantels, monuments, tombstones, and other marble and stone work, largely adjuncts of the quarry industries, form 58 per cent of the products of the subgroup and represent practically all products, included in the census of manufactures, in which the value of the marble or stone is enhanced by cutting, carving, or dressing. These industries depend upon the quarry for raw material, and a large

proportion of the products are manufactured at the quarries in connection with the regular quarry work. In such cases the statistics for the operations of the entire establishment are included in the census of manufactures, as the stone working industries and quarrying are so intimately connected that it is impossible

to make a satisfactory segregation of the data for the two branches. Quarries were included in the census of mines, and for information concerning them reference should be made to the Census Report on Mines and Quarries, which covered the calendar year ending December 31, 1902.

TABLE CXXVII.—STONE PRODUCTS: 1905.

INDUSTRY.	Number of establishments.	Capital.	WAGE-EARNERS.		Cost of materials used.	Value of products.
			Average number.	Wages.		
Total.....	4,003	\$210,224,770	88,030	\$40,597,761	\$52,269,245	\$148,344,270
Artificial stone.....	477	3,315,910	2,506	1,402,858	1,430,238	4,128,221
Cement.....	120	85,758,954	17,478	8,814,077	12,215,113	29,873,122
Crucibles.....	11	1,577,051	280	193,219	761,851	1,342,716
Emery wheels.....	34	2,248,744	801	451,016	705,220	2,002,120
Grindstones.....	25	1,930,706	725	289,400	321,894	871,022
Gypsum wall plaster.....	176	13,203,772	3,758	1,890,350	4,725,919	10,104,185
Hones and whetstones.....	17	423,501	220	94,428	103,334	307,789
Lime.....	526	22,590,020	11,152	4,597,113	5,437,150	14,751,170
Mantels, slate, marble, and marbleized.....	4	141,354	87	55,403	65,735	223,706
Marble and stone work.....	1,105	63,210,814	38,399	23,029,807	17,717,374	58,931,621
Monuments and tombstones.....	1,439	15,817,344	12,624	3,213,030	8,753,417	25,688,607

<sup>1</sup>Includes 2 establishments manufacturing millstones distributed as follows: Maryland, 1; New York, 1.

The other industries included in the table depend almost entirely upon the quarry for their raw material, but grind, crush, and otherwise treat the products so as to adapt them to other uses.

The assignment of "crucibles" to this group is questionable, as plumbago is one of the principal materials used in their manufacture.

*Sand products.*—Sand is the principal material of the

basic industry of the three remaining industries of the group, and the statistics for all are summarized in Table CXXVIII.

The manufacture of glass is the basic industry of this subgroup; the other industries represent the remanufacture of glass by subjecting it to further processes, and there is present in the value of products for the group therefore a large duplication.

TABLE CXXVIII.—SAND PRODUCTS: 1905.

INDUSTRY.	Number of establishments.	Capital.	WAGE-EARNERS.		Cost of materials used.	Value of products.
			Average number.	Wages.		
Total.....	971	\$100,613,345	74,907	\$43,022,154	\$35,578,264	\$100,351,086
Glass.....	399	89,380,151	63,969	37,288,148	26,145,522	79,907,998
Glass, cutting, staining, and ornamenting.....	453	7,365,225	8,379	4,359,199	4,845,393	13,137,653
Mirrors.....	119	3,868,469	2,649	1,374,807	4,587,349	7,605,435

METALS AND METAL PRODUCTS, OTHER THAN IRON AND STEEL.

This group embraces 34 industries, including the smelting and refining of copper, lead, and zinc; the reduction and refining of gold and silver (not from the ore); the rolling of brass and copper; and the remanufacture of these metals into highly finished products, such as watches, clocks, jewelry, silverware, brassware, and needles and pins. Copper is consumed largely in establishments engaged in the manufacture of electrical apparatus and supplies, but so many other kinds of materials are consumed in the production of electrical supplies that the industry has been included in the group of "miscellaneous industries."

At the census of 1905 compared with that of 1900 the gross value of products for the group as shown in Table LXXIV increased from \$710,525,157 to

\$922,262,456, or 29.8 per cent. Although the products of some of the industries consist of alloys such as babbitt metal, solder, and brass, the vast majority of them are finished highly and are of the most delicate character, involving the more complicated processes of manufacture.

*Jewelry.*—Jewelry and the allied industries, silver-smithing and silverware and plated ware, are credited at the census of 1905 with 36,941 wage-earners and products valued at \$86,065,270.

The classification "jewelry" includes establishments manufacturing, as chief products, metallic ornaments for personal adornment, whether of base or precious metals and with or without gems, real or imitation, such as bracelets, brooches, comb mountings, earrings, ear screws, neck and watch chains, pendants, rings, scarf pins, etc. It includes, also, diamond setting for the

trade and the manufacture of opera glass holders, sleeve buttons, cane and umbrella ornaments, collar buttons, studs, gold and silver purses, fobs, mountings for pipes and whips, thimbles, match boxes, pen and pencil cases, medals, badges, and jewelers' findings, such as rolled gold plate and gold filled wire. Some of these articles are found as minor products in establishments classified under "silversmithing and silverware," while plated jewelry is among the minor products of establishments manufacturing plated ware.

Providence, R. I., Attleboro and North Attleboro, Mass., Newark, N. J., Philadelphia, Pa., and New York, N. Y., have long been the centers of the manufacture of jewelry.

The reports for the census of 1860 are the first that can be accepted as representative of the industry, and the totals for that census and the census of 1870 are given in Table CXXIX.

TABLE CXXIX.—Comparative summary—jewelry: 1870 and 1860.

	1870	1860
Number of establishments.....	081	403
Capital.....	\$11,787,956	\$5,190,723
Wage-earners, average number.....	10,001	5,947
Wages.....	\$4,433,235	\$2,605,056
Cost of materials used.....	\$9,187,364	\$5,102,500
Value of products.....	\$22,104,032	\$10,415,811

In 1860 there were in addition 8 establishments making "hair jewelry" having products valued at \$45,600, and employing 42 wage-earner

*Silversmithing and silverware, and plated ware.*—These industries are allied closely, but statistics for them are shown separately in Table 3. In "silversmithing and silverware" are included articles of silver, slightly alloyed, such as tableware of all kinds, hollow and flat, articles for the dresser, made entirely of or mounted with silver, and a multitude of novelties made of the metal and often gold plated. "Plated ware" consists of articles similar to those enumerated under "silversmithing and silverware," but made of a base metal overlaid with more or less of the precious metals.

The distinction drawn between products classed under "jewelry" and those classed under "silversmithing and silverware" and "plated ware" appears to be one of utility. With few exceptions "jewelry" includes articles intended primarily for the adornment of the person, their utility being of secondary or no importance, whereas "silversmithing and silverware" and "plated ware" embrace articles for the most part of general utility.

Frequently silverware and plated ware are made at the same factory and in such cases the assignment of the report to either class depends upon the product of chief value.

The statistics for the two classifications under consideration were shown separately in 1860 as "manufactures of silver" and "silver plated and britannia ware" and in 1870 they appeared as "silverware" and

"plated ware." In Table CXXX the figures for the industries are combined for each of these censuses.

TABLE CXXX.—Comparative summary—silverware and plated ware: 1870 and 1860.

	1870	1860
Number of establishments.....	258	234
Capital.....	\$5,868,675	\$3,249,590
Wage-earners, average number.....	5,050	3,843
Total wages.....	\$2,802,282	\$1,488,896
Cost of materials used.....	\$4,994,409	\$4,005,590
Value of products.....	\$10,486,507	\$7,248,114

The great increase in the silver plated ware industry began about 1846 with the application of electro-silver plating, patented in England in 1836. Previously, plated silverware was made by attaching a thin strip of silver to the base by means of solder. The new plated ware found a ready and very profitable sale. Goods of many varieties, styles, and qualities were produced by means of improvements in methods, machines, and dies for stamping and preparing the blanks, and the manufacture increased rapidly. Britannia ware, made of an alloy susceptible of a high polish, answered the general demand for spoons, drinking cups, teapots, etc.

Although lapidary work is essential to the production of jewelry containing precious stones, the cutting and polishing of the stones is a distinct industry and one that is not otherwise related to the group "metals and metal products, other than iron and steel;" it is therefore classed with the "miscellaneous" group.

*Babbitt metal and solder.*—This classification embraces all fusible alloys which are used for joining metals, antifriction alloys in common use for lining bushings for bearings, and type metal of various kinds. These alloys are composed of the white metals, and, in the case of babbitt metal, also of copper. For this reason they are conveniently manufactured in and often appear as the product of the same plant; and therefore, notwithstanding the dissimilar uses to which they are applied, are classed together by the Census Bureau.

Babbitt metal, which was invented by Isaac Babbitt, of Boston, Mass., in 1839, is a white antifriction alloy of copper, tin, and antimony, in proportions varying according to the use for which the alloy is intended. The value of the invention was recognized by Congress, which voted \$20,000 to the inventor.

"Solder" is an inclusive term, which may embrace any fusible alloy to be used for joining metals. Tin and lead, in proportions varying according to the purpose for which it is to be applied, compose the alloy. There are numerous solders for special metals, such as gold, silver, and platinum. A gold solder must have an affinity for the metals which it is to join, and melt at a considerably lower temperature.

In the Report on Manufactures for the census of 1860 appears the classification "metal, prepared and white," which may have included solder, and possibly babbitt

metal. There appears to have been no attempt to show these alloys separately prior to 1860. The classification in its present form first appeared in the Census reports of 1870, when products valued at \$309,900 were reported.

The growth of the industry since 1880, as shown by Table 1, has been extraordinary and is due largely to the immense increase in the consumption of solder and type metal in the canning, and the printing and publishing industries, and to the common use of antifric-tion alloys as linings for shells or bushings for bearings.

The cost of materials is the principal item of expense in the manufacture of these metals. It has formed more than three-fourths of the gross value of products reported at each census since 1870. The processes are comparatively simple and add but little to the cost of the material.

At the census of 1905 three states—New York, Illinois, and Missouri—produced 68.7 per cent of these alloys, New York leading with a product valued at \$4,965,979, Illinois following with \$2,500,418, and Missouri ranking third with \$1,531,604.

*Bells.*—Included under this heading are all hollow, cup-shaped metallic spheres which, by means of a striker or clapper, are made to give forth a more or less musical sound. The classification includes all varieties, ranging in size from the small tinkling bell used for ornamental purposes to the sonorous church bell weighing several tons. It is probable that some establishments included in the classification of "hardware" manufacture the smaller varieties of bells; therefore the classification does not represent the entire production.

From the reports for the census of 1810 it appears that the industry existed at that time in Massachusetts and Pennsylvania. In Massachusetts iron foundries were reported as casting bells, with products valued at \$8,555, while Philadelphia had 10 "foundries" engaged in the manufacture, with products valued at \$63,000. In subsequent censuses up to 1860, this classification was not shown separately. In 1860, 9 establishments appeared, with products valued at \$224,500, which had increased to \$1,023,010 ten years later. From 1870 to the present census only slight increases in the manufacture of bells have been recorded by Census figures. In fact, it would appear that at the Eleventh Census the production was valued at a quarter of a million dollars less than that of the Tenth Census. It is impossible to state whether this decrease was actual or due to a difference in classification, but since the Twelfth Census showed an increase of nearly \$200,000 over the census of 1880, it would appear that the latter cause is the more probable explanation.

The metal used principally in the manufacture of bells is an alloy of copper and tin, which is called bell metal. There is some controversy as to the proper proportions of these metals for the production of the

finest bells, but the method now commonly accepted is to mix four, or sometimes three, parts of copper with one part of tin. Steel has come into use in comparatively recent years, but bells cast from this metal have not proven equal to those cast from bell metal.

The casting of the bell is a process of founding. It consists of constructing a core of brickwork covered evenly with clay to conform exactly with the interior dimensions of the bell. On this core is laid a model of the future bell, constructed of hair and earth, which is covered with a third and heavy shell. This shell is then lifted and the model broken away from the core, so that upon replacing the shell the metal may be run into the space formerly occupied by the model.

The use of small call bells in houses and hotels is nearly universal in this country, and the old mechanical contrivances for ringing them have been supplanted by the push button, magnet, and storage battery. In these small bells lead, arsenic, antimony, or zinc may be added to the copper and tin, and oftentimes brass and German silver are utilized.

*Brass and copper manufactures.*—The industries represented by the classifications "brass," "brass and copper, rolled," "brass castings and brass finishing," "brassware," and "bronze castings," which are shown separately in Table 3, are allied closely to each other, not only because of the similarity in the materials used, but also because the same class of products is manufactured frequently by establishments in the different industries. Brass is an alloy of copper and zinc, with sometimes small additions of lead and tin, and bronze is an alloy of copper and tin, with sometimes a little zinc and lead. Not infrequently the major product of one of these industries is the minor product of another, and in many cases the products are incapable of segregation. The major product controls the classification, and hence an establishment manufacturing both brass and bronze castings may appear in the industry classified as "brass castings and brass finishing" at one census and in the industry classified as "bronze castings" at another census.

Included under "brass" are the statistics of establishments making brass and marketing it as such in the form of ingots or shapes for remanufacture. If an establishment not only makes the brass but rolls it and markets the products in the form of bars, rods, or sheets, then it falls into the industry "brass and copper, rolled;" or if its major products are in the form of castings, then it comes under "brass castings and brass finishing." The majority of the establishments manufacturing brassware purchase the ingot brass and the rods, sheets, tubes, or wire used in manufacture, but some of the largest establishments make their own brass and carry the manufacture through to the innumerable finished products included under the general title "brassware."

The products of these industries are consumed to a considerable extent in the manufacture of gas and lamp fixtures, and gas and lamp fixtures are often the minor products of establishments included in the brass industries, while brass castings and brassware are sometimes the minor products of establishments classed as "gas and lamp fixtures." The six separate classifications are thus so closely related that in many cases it is impossible to make a classification of the reports of separate factories which would result in the totals conveying a correct idea of the magnitude of the operations of the different branches of the group.

The statistics show that the tendency now is to concentrate the manufacture from start to finish under one management, from the manufacture of the brass to the completion of the highly finished final products; whereas formerly the manufacture of the alloy as a separate business was an important industry. Therefore a better idea of the brass and copper industry will be obtained by considering as a group the industries which compose it rather than by studying each industry separately, since they are subject to fluctuations due to the shifting of individual establishments from one classification to another at different census years. Viewed separately, according to the classification, the manufacture of brass shows a progressive and heavy decrease for each census period, due to the fact that more establishments making finished brass products or rolled or cast brassware make their own brass than formerly; but when the totals for the group are considered they show a vigorous growth.

Table cxxxI shows the value of products for the brass and bronze industries as a group (not including gas and lamp fixtures) for the years 1890, 1900, and 1905.

TABLE CXXXI.—Value of products of brass and bronze manufactures and rolled copper: 1890 to 1905.

	1905	1900	1890
Total.....	\$102,407,104	\$88,653,987	\$50,056,101
Brass.....	700,772	1,419,817	2,549,860
Brass and copper, rolled.....	51,912,853	44,300,829	8,381,472
Brass castings and brass finishing.....	29,071,928	23,891,248	24,344,434
Brassware.....	17,499,056	16,803,764	13,615,172
Bronze castings.....	2,622,495	2,220,329	1,105,163

It must be borne in mind that this statement necessarily includes large duplications, the products of some establishments becoming the material for others. This table does not include the brass and copper wire product from the "wire" industry, which amounted in 1905 to \$19,657,743 and in 1900 to \$4,278,635; the figures for 1890 are not available. Of the total value of this wire reported for 1905, over 95 per cent was marketed as either copper wire or insulated wire and cables. This amount added to the value of the copper wire produced by rolling mills makes a total value of approximately \$26,000,000. These wire products were

in the main manufactured from bars and rods made by industries included in Table cxxxI.

It is evident that some method should be devised of classifying the reports so as to obtain consistent totals for the separate classifications, or the separation should be abandoned and one total given, covering the classes "brass," "brass and copper, rolled," "brass castings and brass finishing," and "brassware." The "bronze castings" industry is a substantially distinct industry, with the lines of separation from the brass industries fairly distinct.

*Plumbers' supplies.*—The products included in this classification consist chiefly of pipes, faucets, valves, sinks, laundry and bath tubs, hydrants, hose connections, plumbers' woodwork, and fittings used in the construction of the water, light, ventilating, and sewerage systems of buildings and cities. Some of the products are similar to those included in the classifications "foundry and machine shop products," "brass castings and brass finishing," "steam fittings and heating apparatus," and "pottery, terra cotta, and fire clay products." Therefore the statistics should not be accepted as representing the total production of the articles used for the purposes indicated.

Plumbers' supplies are consumed in building trades, in the construction of water and gas systems, and in similar industries, which were represented to some extent by the classifications "plumbing, and gas and steam fitting," and "masonry, brick and stone," which were included in the statistics of manufactures for prior censuses but omitted from the factory census of 1905.

While the reports for the censuses prior to 1890 contain information concerning the manufacture of plumbers' supplies, the statistics are so interwoven with those for the building trades that it is impracticable to make a segregation that would convey a correct idea of the magnitude of the industry. The statistics given in Table 1 indicate that at each census since 1890 the industry has increased.

*Stamped ware.*—This classification represents a great variety of articles which are stamped out from sheet metal and made, principally, from sheet iron or steel, black plates, tin plates, brass, aluminum, and German silver. The "stamped ware" industry is in fact much larger than the statistics indicate, for the process of forming articles from sheet metal by presses and dies is employed extensively in a number of the industries. A large part of the products in the industry "enameling and enameled goods" are stamped forms that have been given an enameled coating or finish; metal buttons, also, are to a large degree the products of stamping; and in "brassware," "gas and lamp fixtures," and "structural ironwork," a large amount of ware is formed by stamping processes. In addition a small amount of stamped ware is made by rolling mills,

which roll the plates or sheets and carry the manufacture through to the finished stamped product.

The following are some of the most important products of the class:

Architectural sheet metal ornaments, bag frames and trimmings, belt fasteners, bottle caps, brush backs, buckles, buttons, badges, caps for jars, checks, comb ornaments, cooking utensils, covers for dishes, ferrules, hat and millinery ornaments, harness ornaments, labels, letters and signs, pocketbook trimmings, purse frames, satchel frames and locks, screw caps and oilers, shade reflectors, suspender trimmings, toilet novelties, trays, and umbrella mountings.

This list is only representative and by no means exhaustive, since many of the articles will be found as minor products in the related industries above noted. Although drop presses for stamping ware were used in the United States as early as 1833, the statistics for "stamped ware" were first shown separately in the census of 1880, when the value of the product was \$3,997,926.

It is not practicable to assemble from the different industries all products made by the process of stamping, for in many cases they are so merged with other products that a segregation is impossible.

Table CXXXII, however, shows the value of stamped products for 1905 so far as they can be segregated.

TABLE CXXXII.—*Products—stamped ware: 1905.*

	Value.
Total.....	\$33,537,453
Stamped ware.....	21,953,049
Enameling and enameled goods.....	10,027,965
Buttons, metal.....	1,253,516
Iron and steel, steel works and rolling mills.....	292,923

The stamped ware manufactured in establishments classified as "enameling and enameled goods" constitutes nearly two-thirds of the products of that industry, and the value of the products as given necessarily includes the value added to the ware by the enameling of the stamped forms.

#### TOBACCO.

The manufacture of cigars and cigarettes and of chewing and smoking tobacco and snuff are the only industries included in this group. Establishments engaged exclusively in the assorting, stemming, and re-handling of tobacco were omitted from the factory census of 1905, although included in prior censuses. When the assorting and stemming was done in connection with the manufacture of cigars and cigarettes or of chewing and smoking tobacco, the data for these processes were included. The quantities of the different classes of products for these industries are reported to the Bureau of Internal Revenue of the Treasury Department and therefore were not compiled by the Census.

Both the absolute and the relative increases were greater during the period from 1900 to 1905 than during the decade ending with 1900. At the census of 1905 as compared with 1900 the number of establishments increased 1,869, or 12.5 per cent, and the value of products, \$67,404,508, or 25.6 per cent.

The total production of chewing and smoking tobacco reported at the census of 1905 was valued at \$110,090,940. Of this sum, \$109,147,576 was obtained from 392 establishments engaged primarily in its production and \$943,364, from establishments engaged primarily in the manufacture of cigars, cigarettes, or snuff.

The total value of the production of cigars, including some stems and clippings sold as such, amounted to \$198,186,372. Of the total, \$197,353,977 was reported by 16,240 large and small establishments that made a specialty of cigars, \$831,245 was reported by establishments that made a specialty of cigarettes, and \$1,150 by establishments engaged primarily in the manufacture of snuff.

The production of cigarettes was valued at \$16,354,803, and of this amount, \$15,429,080 was obtained from 155 cigarette factories, \$94,692 from cigar factories, and \$831,031 from establishments engaged primarily in the manufacture of chewing and smoking tobacco. The production of snuff was valued at \$6,473,225, of which amount, \$6,458,827 was reported by 41 snuff factories, \$12,472 by the chewing and smoking tobacco factories, and \$1,926 by cigar factories. Miscellaneous and by-products to the value of \$12,341 were reported for the 16,828 establishments in the group.

#### VEHICLES FOR LAND TRANSPORTATION.

The manufacture of all classes of vehicles for transportation on land are included in this group, which comprises 11 branches of industry which are shown separately in Table 3. The group as a whole shows a satisfactory growth. In 1905 as compared with 1900 the number of establishments decreased 1,454, or 16.6 per cent, but the value of products increased \$138,829,988, or 27.5 per cent. The operations of repair shops of steam railroad companies and the manufacture of carriages and wagons and of steam railroad cars are the most important industries in the group.

*Steam and electric railway cars.*—The four classifications of cars for which separate totals are given in Table 3 represent to some extent the same general class of work and are largely interdependent. Steam railroad cars are not only built in establishments especially equipped for their manufacture, for which statistics are given under the classification "cars, steam railroad, not including the operations of railroad companies," but are also constructed in railroad repair shops and in establishments especially equipped for the manufacture of street railroad cars. Therefore the classifications

should not always be accepted as confined exclusively to the class of products which their wording indicates.

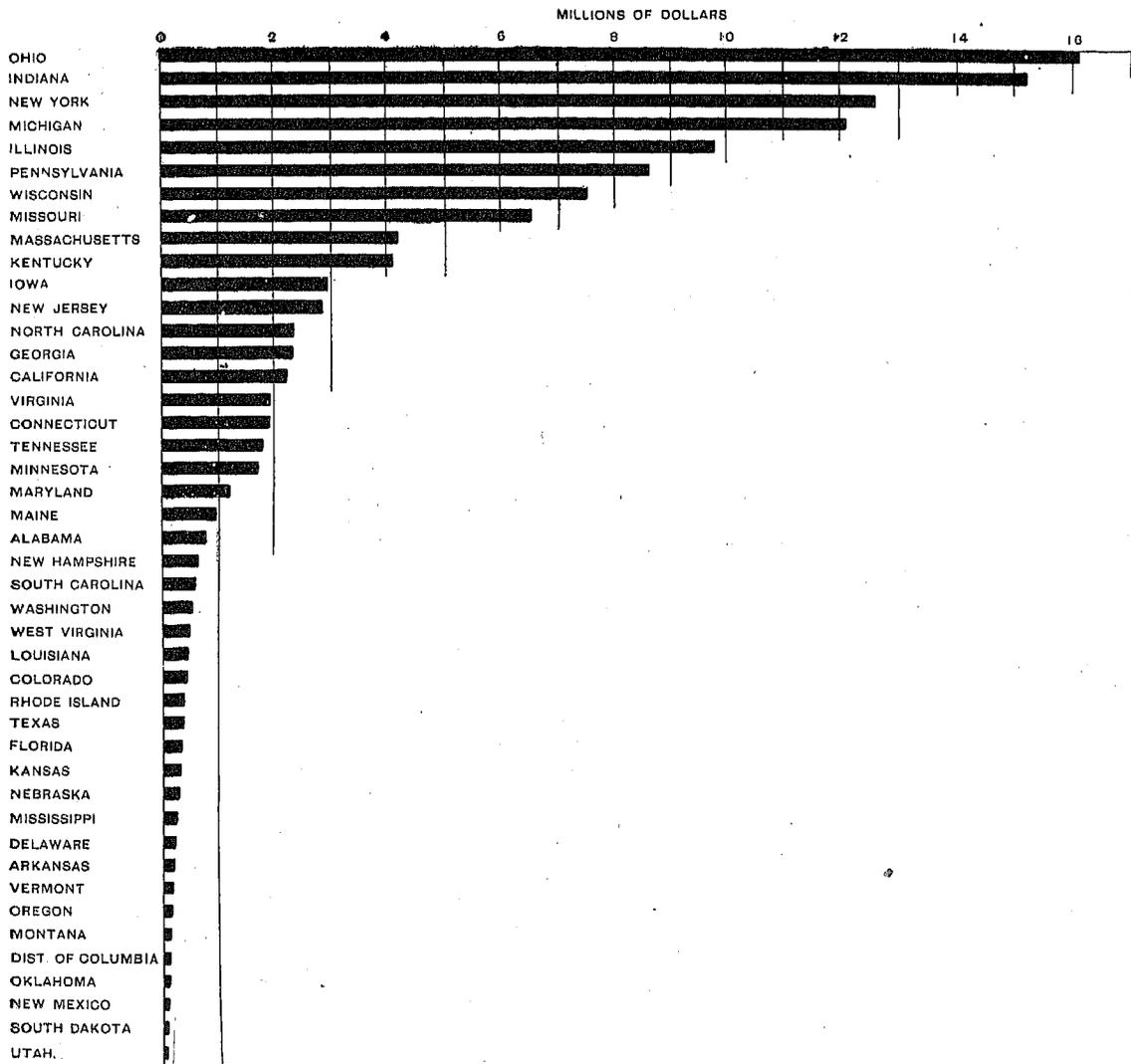
The establishments included in the two classifications confined principally to the construction and repair of steam railroad cars, and those included in the classification "cars, street railroad, not including operations of railroad companies," reported the manufacture of 119,940 cars of all varieties at the census of 1905 as compared with 144,502 at the census of 1900.

The street railway cars consist almost entirely of cars designed for use on electric roads. The manufacture of this class of cars is a comparatively new industry and has developed very rapidly with the increased use of electric current for motive power in urban railways. There were but a limited number of these cars manufactured prior to 1890, but the production at the census of 1905 amounted to 4,694 cars, valued at \$9,902,310. Of the four branches of the industry, the operation of the steam railroad repair shops is by far the most important. It is now one of the principal

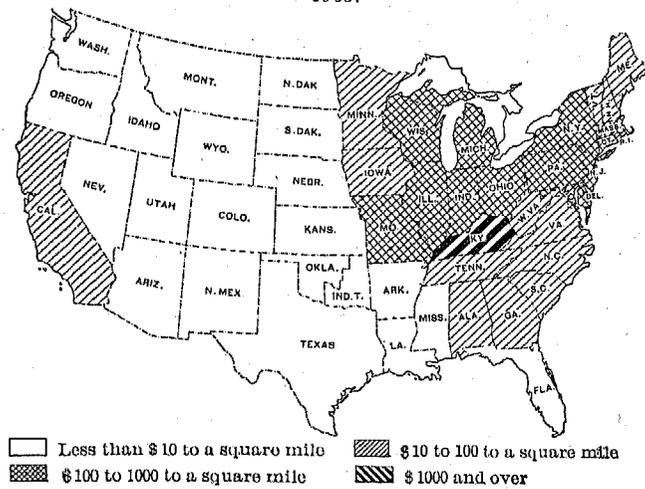
industries included in the statistics of manufactures, ranking fifth in the number of wage-earners employed at the census of 1905.

*Carriages, wagons, automobiles, and bicycles.*—The manufacture of carriages and wagons, automobiles, and bicycles, which are shown as separate industries, are to some extent interdependent. Automobiles to the value of \$235,675 were manufactured in the establishments classed as carriages and wagons. The classes "automobiles" and "automobile bodies and parts" are dependent. Practically the entire product of the latter is consumed in the manufacture of the complete machine, though a few finished vehicles may be produced in the factories the principal product of which consists of bodies and parts. The classification "bicycles and tricycles" is also related to that of automobiles, as the bicycles and bicycle parts and attachments manufactured in automobile factories were valued at \$234,265.

DIAGRAM 17.—CARRIAGES AND WAGONS—VALUE OF PRODUCTS BY STATES AND TERRITORIES 1905.



MAP 14.—Carriages and wagons—value of products per square mile: 1905.



The industries representing the manufacture of vehicles for land transportation, other than those running on tracks have increased rapidly since 1900. The increase for these industries considered as a whole is due largely to the rapid development of the automobile manufacture. At the census of 1900 the two branches of this industry were not of sufficient importance to warrant separate classifications, but at the census of 1905 they reported the employment of 12,049 wage-earners and products valued at \$30,033,536. Contrasted with this increase is the decrease in the manufacture of bicycles, for which the value of products declined from \$31,915,908 at the census of 1900 to \$5,153,240 at that of 1905.

SHIPBUILDING.

This group covers the building and repairing of all classes of water craft, iron and steel and wooden ves-

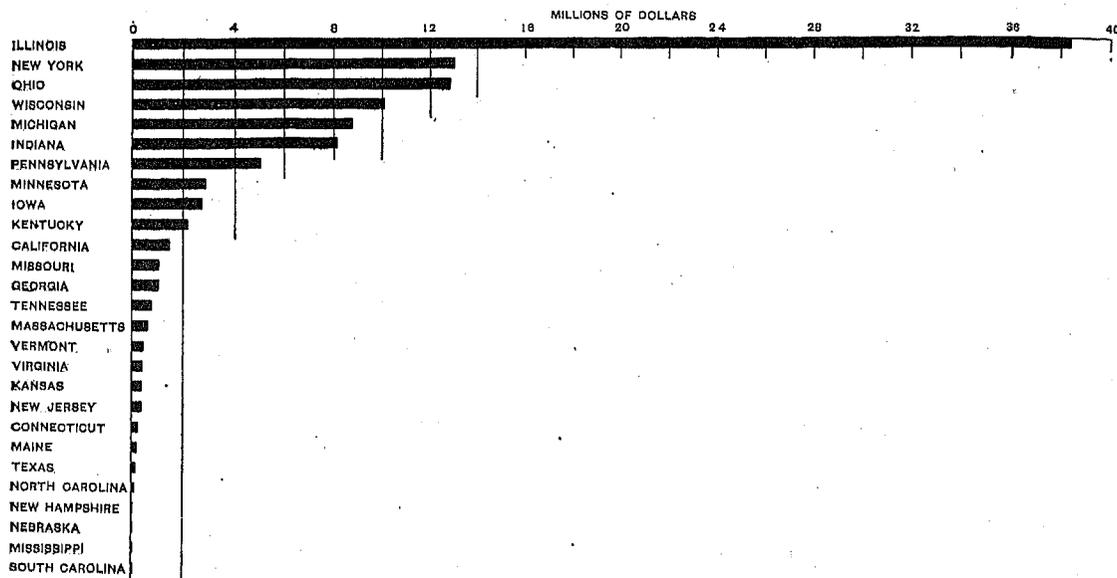
sels, yachts, boats, barges, and scows, irrespective of their uses or the class of traffic in which they are employed. The statistics, however, do not include data for the shipyards operated by the Federal Government. Reports were received for 9 Government yards, from which 31 vessels, each of 5 tons or more displacement, were launched during the year 1904. These vessels had an aggregate tonnage (displacement) of 27,252 and an estimated value of \$6,447,009. The statistics for Government yards are shown in the special report on shipbuilding.

While the capital, number of persons employed, and value of products given in Table 1 show that the industry has increased, its relative importance is measured more accurately by the number, size, and character of the vessels launched. The number of vessels of over 5 tons reported at the census of 1900 as launched in private yards was 2,081, with an aggregate gross tonnage of 687,159; of these, 134, with a gross tonnage of 262,516, or 38.2 per cent of the total, were iron and steel. At the census of 1905 there were 2,248 vessels of this size reported, with a tonnage of 700,852, and of these, 155, with a tonnage of 328,819, or 46.9 per cent of the total, were iron and steel. The construction of small power boats having a capacity of less than 5 tons has also increased. There were 1,687 boats of this kind, valued at \$1,058,915, reported at the census of 1900 and 3,771, valued at \$1,981,815, at the census of 1905.

MISCELLANEOUS.

This group comprises 65 industries which, by reason of their peculiar character or variety of products or the varied character of the raw material utilized, could not properly be classed with any of the other groups.

DIAGRAM 18.—AGRICULTURAL IMPLEMENTS—VALUE OF PRODUCTS BY STATES: 1905.

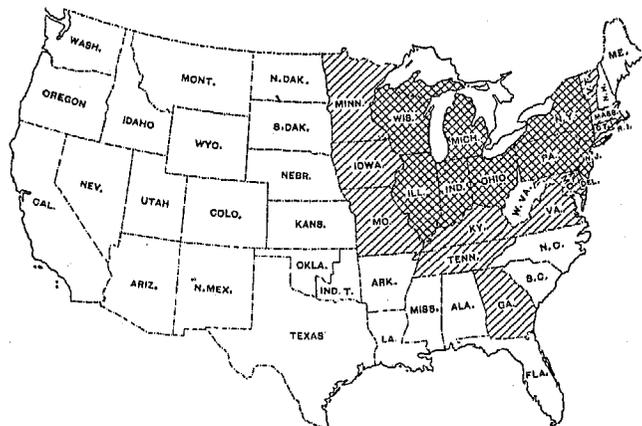


At the census of 1905 the group comprised 12,377 establishments, employing 390,831 wage-earners, pay-

ing \$187,514,312 in wages, and manufacturing products valued at \$941,604,873. While these totals are

much larger than those reported at the census of 1900 for the same group, the comparison does not indicate the conditions existing in any particular line of manufacture, and therefore does not have the significance attached to a similar comparison for the 13 other groups of industries.

MAP 15.—Agricultural implements—value of products per square mile: 1905.



Less than \$10 to a square mile      \$10 to 100 to a square mile  
 \$100 to 1000 to a square mile      \$1000 and over

Some of the industries have been referred to in connection with other groups. The statistics for "artificial feathers and flowers," "boots and shoes, rubber," "buttons," "fur goods," "furs, dressed," "hats, straw," "hat and cap materials," and "straw goods, not elsewhere specified" are shown with those for "clothing and kindred products," and the data for "engravers' materials" are included with the totals for industries allied to printing.

There are many other important industries included in the group, and in addition to those for which special reports are given, one of them being for agricultural implements, attention is called to the following:

**Ammunition.**—This classification includes the production of loaded shells or cartridges, both for small arms and machine guns, and rapid firing guns of small caliber, safety fuse, lead shot, miners' squibs, torpedoes, fog signals, detonators, etc.

This industry first appeared in the Census reports at the census of 1860, although there is a record in the Census reports for 1810 of the manufacture of "lead shot," establishments being reported in Pennsylvania, in Virginia, and in Louisiana territory. The next reference to the industry appears in the census of 1850, when the classification was "shot." The statistics prior to the census of 1890 do not show a consistent development of the industry. The large increases and decreases are due probably to some extent to differences in classification and Office methods. At the censuses of 1860 and 1880 the statistics for the manufacture of lead shot were included apparently with those for various manufactures of lead; therefore, the large increase during the decade ending with 1890 is not a true indication of conditions.

Some of the establishments engaged in the manufacture of ammunition also manufacture firearms, and in such cases, the entire operations being included in one report, it has been impracticable to make separate returns. The statistics, therefore, while representing principally the manufacture of ammunition, also include products of a kind which constitute the major products of the classification "firearms."

During the past fifteen years the capital invested in the industry has more than doubled, the average number of wage-earners has increased more than threefold, and the value of the products more than twofold. The number of women employed showed a marked increase at the census of 1900 compared with that of 1890, and at the census of 1905 formed 34 per cent of the total number of wage-earners.

**Artists' materials.**—This classification includes products such as palettes, canvas boards, sketching canvas, oil colors, Roman gold, gilders' cushions and burnishers, pastels, crayons, etc. The statistics for the industry shown in the Census reports are by no means indicative of the magnitude of the work of this character; they represent only the manufacture conducted on a factory basis and do not include data for the production of the large amount of artists' materials made on a small scale in retail stores.

With the exception of 1880, the industry has appeared in the reports of each census since 1860. The totals for the censuses of 1860 and 1870 are summarized in Table CXXXIII.

TABLE CXXXIII.—Comparative summary—artists' materials: 1870 and 1860.

	1870	1860
Number of establishments.....	8	8
Capital.....	\$43,800	\$14,500
Wage-earners, average number.....	50	43
Total wages.....	\$20,062	\$15,500
Cost of materials used.....	\$21,080	\$11,065
Value of products.....	\$94,150	\$44,800

The figures in this table and in Table 1 indicate an irregular and inconsistent development of the industry, but this is caused probably by defective canvasses at some of the censuses, and also by the difficulty of deciding whether certain establishments engaged in the industry should be included in the Census reports and if included to which classification they should be assigned. The decrease in the value of products from 1890 to 1900 is explained in the reports of the Twelfth Census as follows:

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."

**Brooms and brushes.**—The classification includes such articles as toothbrushes, hairbrushes, horse brushes, paint and varnish brushes, calcimine brushes, printers' brushes, hatters' brushes, wire hairbrushes,

pipe cleaners, bath brushes, leather brushes, shoe polishers and daubers, feather dusters, woolen dusters, whisk brooms, floor brooms, hand street brooms, and brewery brooms. It does not include the brushes used as constituent parts of machinery, such as gin brushes or the metallic brushes used in electrical machinery, nor does it include the revolving street sweepers.

The product is confined almost entirely to articles that are finished completely before they are sent from the factory and are to be used individually for a special purpose.

The materials used in the construction of the brush proper consist principally of broom corn, bristles, feathers, sea grass, rattan, and bamboo.

The census of 1810 was the first to contain information concerning the industry. Brushes were then reported as being manufactured in Massachusetts, Maryland, and Pennsylvania, with products valued at \$5,000, \$21,000, and \$94,760, respectively. The same census reported the manufacture of brooms in Massachusetts to the value of \$4,000. At the census of 1820 the industry was reported as existing in Maryland, New York, Ohio, and Pennsylvania, but no reference is made to it as a distinct industry at the census of 1840. Table CXXXIV gives the totals for the censuses of 1850, 1860, and 1870.

TABLE CXXXIV.—Comparative summary—brooms and brushes: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	792	349	449
Capital.....	\$3,699,595	\$1,419,343	\$1,025,785
Wage-earners, average number.....	7,631	3,562	3,589
Total wages.....	\$1,960,280	\$881,644	\$799,102
Cost of materials used.....	\$4,985,734	\$1,807,985	\$1,167,201
Value of products.....	\$9,317,108	\$3,524,777	\$2,514,945

The industry was originally carried on in the household, and a large proportion of the product has always come from comparatively small establishments. It is probable that the decrease in the number of establishments from 1900 to 1905 is due to the fact that some of the smaller ones were omitted from the enumeration at the latter census. As measured by the capital, and the value of products, the industry has increased constantly.

*Lapidary work.*—This classification includes establishments cutting, recutting, and polishing diamonds and other precious stones, and was reported first at the census of 1860 as "lapidaries' work." The classification for 1870 and subsequent censuses was "lapidary work." The statistics for 1860 and 1870 are summarized in Table CXXXV.

TABLE CXXXV.—Comparative summary—lapidary work: 1870 and 1860.

	1870	1860
Number of establishments.....	13	7
Capital.....	\$34,400	\$13,400
Wage-earners, average number.....	88	29
Total wages.....	\$38,800	\$14,760
Cost of materials used.....	\$37,184	\$14,004
Value of products.....	\$107,300	\$36,850

The decrease from 1880 to 1890, shown by the statistics in Table 1, is more apparent than real. Other census statistics<sup>1</sup> for the calendar year 1889, for the diamond cutting industry alone, give the number of wage-earners as 236, the wages as \$148,114, and the value of the gems after cutting as \$1,006,716, a considerable increase over the entire lapidary industry in 1880. The increase of \$1,860,533, or 32.2 per cent, in value of products from 1900 to 1905 indicates that the industry is maintaining its prosperity.

*Paving materials.*—The establishments included under this classification at the census of 1905 were confined, as far as possible, to those engaged in the manufacture of the material. The operations of the construction companies were included in the reports of prior censuses. While the totals for the census of 1900 have been revised and brought as nearly as possible to a comparable basis, it was impossible to make such a revision of the totals for the censuses of 1880 and 1890; therefore the large decrease shown in Table 1 does not reflect actual conditions.

The paving materials consist principally of asphalt, crushed stone, small stones, tar, cement, powdered limestone, and sand. Some paving blocks of wood and stone are also included. At the census of 1905 the production of brick and stone materials used for paving was, as a rule, reported with the manufacture of products of these materials used for other purposes and classed with "brick and tile" and "marble and stone work," respectively.

*Rubber and elastic goods.*—The classification includes the manufacture of mackintoshes, rubber coated cloth, carriage cloth, elastic webbing, dress shields, massage brushes, reclaimed rubber, druggists' sundries made wholly or partly from rubber, and automobile, bicycle, and truck tires. It does not include the manufacture of rubber boots and shoes, rubber belting and hose, or such rubber articles as are manufactured in connection with hand stamps, sporting goods, steam packing, and surgical appliances.

Previous to 1850 rubber goods of a certain kind had

<sup>1</sup> Eleventh Census, Mineral Industries, pages 676 and 677.

been manufactured to a considerable extent, but the census of 1850 is the first to report statistics for "india rubber goods." This classification included all manufactured products of rubber, such as belting and hose, boots and shoes, car springs, coats, fabrics, packing, and suspenders. The census of 1880 is the first to show a separate classification for "rubber and elastic goods," prior censuses having reported the industry under the captions "india rubber goods," "gutta-percha," and "india rubber and elastic goods." Table CXXXVI shows the statistics as returned at the censuses of 1850, 1860, and 1870.

TABLE CXXXVI.—Comparative summary—rubber and elastic goods: 1850 to 1870.

	1870	1860	1850
Number of establishments.....	56	29	34
Capital.....	\$7,486,000	\$3,634,000	\$1,455,700
Wage-earners, average number.....	6,025	2,802	2,568
Total wages.....	\$2,550,877	\$816,170	\$637,828
Cost of materials used.....	\$7,434,742	\$3,125,300	\$1,608,728
Value of products.....	\$14,506,374	\$5,708,450	\$3,024,335

The discovery by Charles Goodyear of the process of vulcanizing rubber, for which a patent was issued in 1844, gave a great impetus to the industry between 1850 and 1860, and, although the number of establishments decreased, the value of products increased \$2,744,115, or 90.7 per cent. The decrease in number of establishments may have been due to the litigation over alleged infringements of the patents. During the next decade the industry grew much more rapidly. Connecticut ranked first in the manufacture of these goods until 1880, when Massachusetts took the lead, which position that state held until the census of 1905 when Ohio gained first place.

The increase since 1880 has been somewhat remarkable. In that year there were 90 establishments employing 6,268 wage-earners, and having products valued at \$13,751,724. In addition there were 3 establishments classified as "rubber, vulcanized," having 495 wage-earners and products valued at \$767,200. The number of establishments decreased from 261 at the census of 1900 to 224 at the census of 1905, while the number of wage-earners increased from 20,404 to 21,184, and the value of products, from \$52,621,830 to \$62,995,909, an increase for the latter item of 19.7 per cent. The decrease of 37 in number of establishments occurred principally in Massachusetts and New Jersey, and is due in part to a change in the product of chief value in some establishments which made it necessary to reclassify them under the heads of "belting and hose, rubber," "steam packing," and "furnishing goods, men's," and in part to the closing of a number of small establishments.

The products included in this industry were among the first manufactured from india rubber. To Mr. Mackintosh, of Glasgow, belongs the credit of being the first to effect the manufacture of waterproof clothing for practical use. He secured a patent for his

process in 1823,<sup>1</sup> after which he built the first factory in Great Britain for making india rubber goods. The garments made from the cloth manufactured by this process were known as "mackintoshes."

The first factory established in the United States for the manufacture of rubber clothing was erected by the Roxbury India Rubber Company, at Roxbury, Mass., in 1833.<sup>2</sup> The product from this factory included rubber cloth, rubber life-preservers, and various other rubber articles. Other companies were soon organized in the vicinity of Boston and New York, but it was not until the discovery of the vulcanizing process that rubber goods came into general use or were of any great utility.

The Civil War gave a great impetus to the business by creating a large demand for rubber blankets and rubber clothing. The extensive use of the rubber tire and the increase and diversification of mechanical trades since that time have necessitated the use of rubber in various manufactured forms and increased greatly the manufacture.

#### RELATION OF MANUFACTURES, MINING, AND AGRICULTURE.

The raw materials for manufactures are composed principally of the products of mines, quarries, and farms, although the forest and the sea furnish a small proportion of such material. The statistics of manufactures take cognizance of the standing timber as a material for the timber camps, the sawmills, charcoal burning, and various products of wood distillation, and of the bark as a material for tanneries.

Table LII shows that in 1905 the products of the sea consumed in manufactures constituted only four-tenths of 1 per cent of the total raw material. From the same table it appears that the agricultural and mining industries furnished 94.4 per cent. A considerable proportion of the products of the mines and quarries, and of the agricultural products of the country, pass through one or more processes of manufacture before they are ready for final consumption. Not only are the three great branches of productive industry thus dependent upon each other, but it happens frequently that two or more of them are carried on by the same individual, company, or corporation by the use of the same capital. For example, a company may operate a mine and also the smelter or blast furnace in which the ore is treated, the different operations of production being carried on as a continuous process. These conditions were appreciated and the instructions for the enumerators at the Twelfth Census provided that "butter, cheese, cider, wine, sugar, molasses, dried fruits, olive oil, and similar products made on the farm are considered farm products and are to be re-

<sup>1</sup> Dr. Ure's Dictionary of Arts, Manufactures, and Mines, Vol. I, page 696.

<sup>2</sup> "One Hundred Years of American Commerce," Vol. II, page 499.

ported on the farm schedule; but the same products made in factories, creameries, wineries, or similar establishments not forming a part of the farm, are to be considered for Census purposes as factory products, and must be reported on the schedule for manufactures, and not on the agricultural schedule." The special agents at the mining census of 1902, were instructed as follows:

There are several branches of mining in which the mineral products do not reach the market in the crude condition, but are subjected to certain processes at the mine or quarry before being regarded as marketable commodities. These may be processes of milling, separating, washing, burning, calcining, or other forms of manufacture. In some industries these processes are performed entirely at the mine or quarry, and in such cases the special agents are instructed that the Census schedule should include the statistics of employees and wages, miscellaneous expenses, and supplies and materials involved in the entire work of mining the crude material and preparing the same for market.

The instructions for the field force at the census of 1905 contained the following paragraph:

The manufacture of butter, cheese, cider, vinegar, wine, molasses, sirup, sorghum, and other products may be carried on either upon farms or in factories. In the former case the products will be classed as agricultural and no report is required, but in the latter they will be classed with those reported under the head of manufactures. Returns will accordingly be made upon the manufacturing schedule of all factories engaged in the manufacture of these and similar products. Factories canning fruits and vegetables, etc., for the trade must be reported, even though carried on in connection with a farm.

At the census of 1905 further instructions were given to the effect that all marble and stone work, including quarries where the cutting and finishing is done and the manufacture of monuments, tombstones, etc., is carried on must be reported as manufactures.

Notwithstanding this interdependence of the industries, the census law provides that the censuses of manufactures, mining, and agriculture shall be taken independently and the statistics for each published separately. It is only by such a segregation that the amount and relative importance of each can be determined. Therefore, when manufacturing and mining or manufacturing and agriculture are carried on under the same ownership, it is necessary, in order to comply literally with the requirements of the law, to prepare separate Census reports for each. A separation of the data for the industries, however, is not always practicable, and it may be impossible on account of the business methods under which the establishments are conducted. As a result there have been at every census a number of enterprises reported in their entirety in two branches of the industrial statistics.

Theoretically a perfect mining census should terminate with the delivery of the ore or crude rock at the mine or quarry, but in many cases the employees work indiscriminately in both branches of the industry, and no value is placed on the ore as it leaves the mine. Where the milling, separating, washing, burning, calcining, or other forms of reduction or manufacture were performed at the mine or quarry the census of mines of

1902 included, as a rule, the employees and expenses involved in the entire work of the establishment. The inclusion of the statistics for the manufacture of butter in those of agriculture, because the butter is made on a farm, or of a calcining plant in the report of mines and quarries, because such plant is operated by a mining company as a part of the mining plant, injects into the agricultural or mining statistics data of capital, employees, wages, and products that are just as much a part of the census of manufactures as they would be if these processes had been carried on independently of the farm or the mine. To be accurate, the statistics for enterprises of this character, operating in two branches of industry, should be included in separate groups and certain of the data assigned to each of the different branches.

At the Twelfth Census the value for continental United States and Alaska of all farm products, not fed to live stock but including animal products, amounted to \$3,742,136,975. The products of manufactures for the census of 1905 amounted to \$14,802,147,087. The cost of the materials consumed in the raw state at the census of 1905 that could be traced to the farm amounted to \$2,492,836,646. As a considerable period elapsed between the years covered by the two reports, no direct comparison should be made between the totals; they indicate, however, that a considerable proportion of the farm products sold are consumed in manufactures.

Unfortunately the past censuses covered a different year for each of the three branches. The census of 1900 covered the year ending May 31, 1900, for manufactures, and the calendar year 1899 for agriculture, while the last census of mines and quarries covered the calendar year 1902. The census of manufactures of 1905 covered the calendar year 1904. While for administrative reasons it is of advantage to have the censuses for the industries cover different years, the arrangement makes it impossible to compile combined statistics for the same period to cover all branches of industry. There may have been a radical difference in the industrial conditions prevailing during the years covered by the different censuses, and the combination of the statistics for the two censuses could not be accepted as indicating the conditions prevailing during either year.

The cessation of work in the anthracite coal industry for a number of months during 1902 tends to reduce the value of the statistics for the mining census as representing conditions during a normal year. However, if allowance be made for such conditions during the period covered by the census of mines and quarries and for the industrial conditions in the manufacturing industries referred to elsewhere, the totals may be accepted as showing approximately the aggregate value of products of the two industries during a period of twelve months, and the proportion which each contributes to this aggregate.

Therefore the totals for the mining census of 1902

and the census of manufactures of 1905 are presented in Table CXXXVII.

TABLE CXXXVII.—*Manufactures in 1905, and mining in 1902.*

	Total.	Manufactures, 1905.	Mining, 1902.
Number of establishments.....	307,778	216,262	1151,516
Salaried officials, clerks, etc.:			
Number.....	557,879	519,751	38,128
Salaries.....	\$613,781,783	\$574,761,231	\$30,020,552
Wage-earners:			
Average number.....	6,052,049	5,470,321	581,728
Wages.....	\$2,981,500,492	\$2,611,540,532	\$369,959,960
Miscellaneous expenses.....	\$1,526,791,186	\$1,455,019,478	\$71,771,713
Cost of supplies and materials.....	\$3,627,704,723	\$3,503,949,756	\$123,754,967
Value of products.....	\$15,598,973,504	\$14,802,147,087	\$796,826,417

<sup>1</sup> Number of mines, quarries, and wells.

The table indicates that the industries of mining and manufacturing gave employment on the average to approximately 6,609,928 persons annually and paid about \$3,595,282,275 in salaries and wages. Of this total, the salaried officials, clerks, and other salaried employees numbered 557,879, or 8.4 per cent, and the wage-earners, 6,052,049, or 91.6 per cent. The mining industries contributed 9.4 per cent of the number of all employees and 11.4 per cent of the wages and salaries, and the manufacturing industries, 90.6 per cent and 88.6 per cent, respectively. Of the \$15,598,973,504 reported as the gross value of products, manufactures contributed 94.9 per cent and mining 5.1 per cent.

## CHAPTER IX.

### COMPARATIVE IMPORTANCE OF STATES, TERRITORIES, AND INDUSTRIES.

#### RANK OF INDUSTRIES.

It is of great advantage to have a uniform standard of measurement to determine the relative importance in manufactures of the different industries and of the several states and territories. The gross value of products has been used for this purpose, because it can be readily applied and conveys a general idea of the relative standing of the industries, cities, states, or divisions; but, as explained in the sections on "materials" and "products," the gross value is not the best indication of the character or extent of the manufacturing forces expended in production, and is not, therefore, the most efficient means of determining the economic value of any industry which is reflected more adequately by the amount of capital invested, the number of persons to whom it gives employment, and the additional value created by labor and the expenditure of manufacturing forces. The net value of products as computed by Census methods, and the value of product remaining after deducting the total cost of both raw and partially manufactured materials, also assist in determining the economic importance of one industry as compared with another.

In Table CXXXVIII the 66 industries each having products in excess of \$50,000,000 are arranged according to their rank in gross value of products.

TABLE CXXXVIII.—RANK OF INDUSTRIES HAVING PRODUCTS VALUED AT OVER \$50,000,000, ARRANGED ACCORDING TO GROSS VALUE OF PRODUCTS: 1905.

INDUSTRY.	ESTABLISHMENTS.		CAPITAL.		WAGE-EARNERS.		WAGES.		VALUE OF PRODUCTS.				VALUE ADDED TO MATERIALS BY MANUFACTURING PROCESSES. <sup>1</sup>	
	Number.	Rank.	Amount.	Rank.	Average number.	Rank.	Amount.	Rank.	Net.		Gross.		Amount.	Rank.
									Amount.	Rank.	Amount.	Rank.		
Slaughtering and meat packing, wholesale.	559	41	\$210,818,027	12	69,593	18	\$37,090,399	16	\$681,710,442	2	\$801,757,137	1	\$101,781,314	18
Flour and grist mill products.	10,051	5	265,117,434	8	39,110	30	19,822,196	32	687,572,915	1	713,033,395	2	103,417,607	17
Foundry and machine shop products.	8,993	6	845,024,825	1	348,380	2	190,247,431	1	427,265,232	4	685,901,388	3	429,423,091	1
Iron and steel, steel works and rolling mills.	415	46	700,182,310	3	207,562	5	122,461,993	4	271,300,232	6	673,965,026	4	274,355,721	3
Lumber and timber products.	19,127	1	517,224,128	5	404,626	1	183,021,519	2	474,460,567	3	580,022,690	5	410,110,201	2
Cotton goods.	1,077	24	605,190,164	4	310,458	3	94,377,606	5	393,342,986	5	442,451,218	6	178,818,517	6
Clothing, men's.	4,504	12	153,177,600	19	137,190	7	57,225,506	8	171,930,345	12	355,796,571	7	172,015,512	7
Boots and shoes.	1,316	20	122,526,093	27	149,024	6	69,059,680	6	125,107,253	17	320,107,468	8	125,458,496	11
Cars and general shop construction and repairs by steam railroad companies.	1,141	22	146,943,720	21	236,900	4	142,188,336	3	164,054,409	13	309,863,499	9	166,553,912	8
Printing and publishing, newspapers and periodicals.	18,038	3	239,518,524	10	96,868	13	59,830,768	7	242,536,653	8	309,327,606	10	242,937,433	4
Liquors, malt.	1,531	18	515,630,792	6	48,139	27	34,642,897	17	248,623,020	7	295,358,732	11	232,246,743	5
Sugar and molasses, refining.	344	52	165,468,320	17	13,549	55	7,575,650	53	59,123,632	41	277,285,449	12	37,035,050	44
Bread and other bakery products.	18,227	2	122,363,327	28	81,284	15	43,179,822	14	125,575,745	16	269,009,061	13	119,071,858	12
Leather, tanned, curried, and finished.	1,049	25	242,584,254	9	57,239	25	27,049,152	24	223,600,560	10	252,620,986	14	65,086,486	27
Clothing, women's.	3,351	13	73,947,823	41	115,705	9	51,180,193	10	118,058,868	22	247,661,560	15	118,101,627	13
Lumber, planing mill products, including sash, doors, and blinds.	5,009	9	177,145,734	15	97,674	12	50,713,607	11	109,253,498	26	247,441,959	16	100,264,674	15
Smelting and refining, copper.	40	62	76,824,640	39	12,752	56	10,827,043	45	119,667,326	21	240,780,216	17	56,637,642	33
Iron and steel, blast furnaces.	190	57	236,145,529	11	35,078	36	18,034,513	34	224,403,313	9	231,822,707	18	117,939,681	14
Tobacco, cigars and cigarettes.	16,395	4	145,135,945	22	135,418	8	55,864,978	9	203,276,332	11	214,350,051	19	134,002,914	9
Paper and wood pulp.	761	36	277,444,471	7	65,964	21	32,019,212	18	117,391,770	23	188,715,189	20	94,683,481	20
Smelting and refining, lead.	32	63	63,822,810	44	7,573	63	5,374,691	57	82,220,685	31	185,826,839	21	20,992,781	60
Printing and publishing, book and job.	8,244	7	142,015,638	23	87,740	14	48,720,854	13	132,227,851	15	182,611,720	22	132,438,866	10
Petroleum, refining.	98	59	136,280,541	25	16,770	52	9,989,367	49	148,858,284	14	175,005,320	23	41,676,745	38
Furniture.	2,482	14	152,712,732	20	110,133	10	49,883,235	12	100,146,511	30	170,446,825	24	99,851,253	19
Worsted goods.	226	55	162,464,929	18	69,251	19	26,209,787	26	123,799,330	18	165,745,052	25	60,218,832	30
Woolen goods.	792	32	140,302,488	24	72,747	17	28,827,556	22	105,876,260	27	142,196,658	26	59,320,878	32
Electrical machinery, apparatus, and supplies.	784	33	174,066,026	16	60,466	24	31,841,521	19	78,244,136	32	140,809,369	27	77,201,835	22
Hosiery and knit goods.	1,079	23	106,663,531	32	103,715	11	31,536,024	20	74,001,364	34	136,558,139	28	62,464,486	28
Silk and silk goods.	624	40	109,556,021	31	79,601	16	26,767,943	25	104,113,997	28	133,288,072	29	59,404,166	31
Liquors, distilled.	805	31	50,101,362	51	5,355	65	2,657,025	66	122,747,232	19	131,209,886	30	107,302,313	16
Carrriages and wagons.	4,956	10	126,320,604	26	60,722	23	30,878,229	21	66,431,486	38	125,332,976	31	66,637,153	26
Gas, illuminating and heating.	1,019	28	725,035,204	2	30,566	40	17,057,917	36	110,895,819	20	125,144,945	32	91,032,850	21

<sup>1</sup>Obtained by deducting from net value of products the cost of raw materials and adding cost of mill supplies.

MANUFACTURES.

TABLE CXXXVIII.—RANK OF INDUSTRIES HAVING PRODUCTS VALUED AT OVER \$50,000,000, ARRANGED ACCORDING TO GROSS VALUE OF PRODUCTS: 1905—Continued.

INDUSTRY.	ESTABLISHMENTS.		CAPITAL.		WAGE-EARNERS.		WAGES.		VALUE OF PRODUCTS.				VALUE ADDED TO MATERIALS BY MANUFACTURING PROCESSES. <sup>1</sup>	
	Num-ber.	Rank.	Amount.	Rank.	Average number.	Rank.	Amount.	Rank.	Net.		Gross.		Amount.	Rank.
									Amount.	Rank.	Amount.	Rank.		
Butter.....	5,235	8	\$30,080,419	63	9,530	02	\$5,405,872	56	\$114,968,964	24	\$118,520,099	33	\$19,500,760	61
Tobacco, chewing and smoking, and snuff.....	493	44	178,847,556	14	23,900	45	6,775,325	54	103,823,843	29	116,767,630	34	72,514,528	23
Slaughtering, wholesale, not including meat packing.....	370	50	17,896,063	65	4,541	66	3,236,573	64	109,513,430	25	112,157,487	35	14,120,408	65
Agricultural implements.....	648	38	196,740,700	13	47,394	28	25,002,650	28	66,471,008	37	112,007,344	36	66,856,113	25
Cars, steam railroad, not including operations of railroad companies.....	73	60	88,179,047	38	34,058	38	20,247,821	31	87,822,057	52	111,175,310	37	37,870,548	42
Oil, cottonseed and cake.....	715	37	73,770,417	42	15,540	53	4,837,694	60	70,212,568	35	96,407,621	38	19,342,482	62
Structural ironwork.....	775	34	76,598,507	40	34,276	37	19,760,210	33	45,205,832	48	90,044,697	30	45,551,731	33
Confectionery.....	1,348	19	43,125,408	55	36,230	34	11,699,257	43	43,448,215	40	87,087,253	40	39,609,422	39
Coffee and spice, roasting and grinding.....	421	45	38,734,868	59	5,959	64	2,830,243	65	74,550,937	33	84,188,301	41	19,137,030	63
Glass.....	399	49	89,389,151	36	63,909	22	37,288,148	15	60,238,240	40	70,607,998	42	60,503,684	29
Canning and preserving, fruits and vegetables.....	2,261	15	47,629,497	52	39,988	20	10,428,521	47	55,358,210	43	78,142,022	43	27,754,487	50
Chemicals.....	275	54	96,621,294	34	19,806	49	10,789,780	46	46,009,892	47	75,222,249	44	38,530,982	41
Patent medicines and compounds.....	2,245	16	45,611,640	54	10,980	50	4,351,867	63	55,189,306	44	74,520,765	45	53,850,500	35
Brick and tile.....	4,634	11	119,956,959	20	66,021	20	28,046,005	23	69,921,625	36	71,152,062	46	60,593,615	24
Boots and shoes, rubber.....	22	65	39,441,826	58	18,991	50	8,896,806	52	58,219,775	42	70,065,296	47	38,722,581	40
Soap.....	436	43	54,816,301	48	11,044	58	4,762,076	61	25,770,272	62	68,274,700	48	25,803,240	52
Paints.....	449	42	55,783,250	47	9,781	61	5,063,177	59	24,909,584	65	67,277,910	49	22,050,157	59
Pottary, terra cotta, and fire clay products.....	873	29	110,926,018	30	52,428	26	25,177,665	27	60,557,925	39	64,200,792	50	55,105,260	34
Rubber and elastic goods.....	224	56	46,297,537	53	21,184	48	9,412,368	50	39,384,541	51	62,995,009	51	25,482,178	53
Carpets and rugs, other than rag.....	139	58	56,781,074	46	33,221	39	13,724,233	40	35,763,201	54	61,586,433	52	24,889,704	54
Food preparations.....	766	35	51,784,434	50	11,333	57	4,398,348	62	41,972,407	50	61,180,416	53	24,636,725	56
Locomotives.....	15	66	38,421,043	60	24,806	44	15,798,432	37	33,212,007	56	59,552,092	54	33,354,484	46
Marble and stone work.....	1,165	21	63,210,814	45	38,399	31	23,629,867	29	52,545,958	45	58,931,621	55	43,703,384	37
Shipbuilding, iron and steel.....	54	61	101,528,251	33	36,742	32	20,809,008	30	31,953,057	57	58,433,314	56	32,109,531	47
Boxes, wooden packing.....	1,023	26	39,543,096	57	30,320	41	12,171,104	42	25,447,952	64	57,047,743	57	24,428,472	57
Fertilizers.....	400	48	69,023,264	43	14,201	54	5,142,147	58	29,442,597	60	56,632,853	58	18,770,372	64
Coppersmithing and sheet iron working.....	1,989	17	31,944,237	62	22,556	46	13,765,688	39	29,557,410	59	56,082,020	59	29,591,419	48
Stoves and furnaces, not including gas and oil stoves.....	415	46	52,971,105	49	29,728	42	17,823,434	35	37,347,090	53	54,409,108	60	37,110,702	43
Jewelry.....	1,023	26	39,578,956	56	22,080	47	12,592,846	41	29,897,398	58	53,225,681	61	29,428,534	49
Brass and copper, rolled.....	25	64	32,942,594	61	10,000	60	5,733,487	55	13,272,249	66	51,012,853	62	14,049,240	66
Coke.....	278	53	99,712,877	35	18,981	51	9,304,498	51	50,581,647	46	61,728,647	63	22,406,525	54
Shirts.....	641	39	23,379,774	64	36,490	33	11,233,392	44	25,765,550	63	50,071,105	64	25,822,210	51
Dyeing and finishing textiles.....	360	51	88,708,576	37	35,565	35	15,460,205	38	35,098,642	55	50,849,545	65	35,761,117	45
Millinery and lace goods.....	860	30	17,849,821	66	27,500	43	10,307,241	45	27,218,931	61	59,777,768	66	24,821,949	55

<sup>1</sup> Obtained by deducting from net value of products the cost of raw materials and adding cost of mill supplies. NOTE.—Iron and steel, steel works and rolling mills, and stoves and furnaces, not including gas and oil stoves, have the same number of establishments; also boxes, wooden packing, and jewelry.

As the industries given in this table follow the classifications used in the general tables, and as only those are represented which have a gross value of product in excess of \$50,000,000, the figures do not in every case cover all products, even of the same general class. For example, the figures for "shipbuilding, iron and steel," alone are given, although there is another classification, "shipbuilding, wooden, including boat building." The figures for the meat industry appear under two classifications—"slaughtering and meat packing, wholesale," and "slaughtering, wholesale, not including meat packing." If combinations were made for these and other closely allied industries, they would have a higher rank in some particulars than the table shows for one classification only.

Seven sets of rankings are given for these industries, based respectively upon the number of establishments, capital, number of wage-earners, wages, value of products, both gross and net, and the value of products obtained after deducting the cost of materials purchased in both raw and partially manufactured form, which is designated as "value added by manufactur-

ing processes." None of the industries has the same rank for all seven of the standards of measurement, and but few have the same rank for as many as three. The two industries "slaughtering and meat packing, wholesale," and "flour and grist mill products," which rank first and second in the gross value of products, and by this standard of measurement are the leading industries of the country, show the greatest variation when measured by some of the other standards. Their order of rank is reversed in the net value of products, but they still hold the first two places. In these industries, however, the net value of products is composed largely of materials purchased in a raw state. The value of such materials is due to agricultural or other forces expended upon them before they reach the factory, and as these values were not created by manufacturing processes it is proper to eliminate them in order to ascertain the amount added by such processes. When this is done the rank of the two industries falls to eighteenth and seventeenth, respectively, as shown by the last column of the table. "Flour and grist mill products," which ranks first in net value of product,

falls to the thirtieth place in the number of wage-earners employed and thirty-second in the amount of wages paid. "Slaughtering and meat packing, wholesale," which ranks second in net value of products, falls to eighteenth in wage-earners and sixteenth in wages. In other words, these two industries, which are in the lead when measured by gross value of products, are, when measured by a truer test of their economic importance, outranked by a large number of other industries.

While considerable variation is shown for most of the industries under the seven standards of measurement, the greatest degree of consistency appears for industries involving a large number and variety of processes of manufacture, such as iron and steel and textile manufactures. "Foundry and machine shop products" holds first place in capital, wages, and value added to materials by manufacture, second in wage-earners, third in gross value, and fourth in net value of products, there being a variation of only three points in its standing under these tests. The manufacture of cotton goods holds third place in wage-earners, fourth in capital, fifth in wages and net value of products, and sixth both in gross value and in added value, also a variation of but three points. In marked contrast is the variation of thirty-one places in the case of "flour and grist mill products," and, leaving out of consideration the ranking by establishments, of seventeen places in the case of "slaughtering and meat packing, wholesale."

The value added to materials by manufacturing processes is perhaps the best index of the relative importance of the manufacturing industries, since it embodies salaries and wages—and hence the labor factor—together with the enhanced value due to the investment of capital in manufacturing equipment. The rank of an industry according to gross value of products is an expression of its importance as a commercial factor. The greater the value of products the larger, as a rule, is the quantity of materials and products to be handled by the transportation companies and the larger the volume of money circulated. On the other hand, the rank by wage-earners or by wages indicates the labor value of an industry as an industrial factor.

The rank by number of establishments indicates the degree of concentration of an industry; for a low rank in number of establishments in connection with high rank in other respects shows a high degree of concentration. Moreover, of two industries presenting like statistics with respect to wage-earners, wages, and value of products, the one showing a large number of establishments is of greater general importance than the one which is concentrated in a few large establishments. Otherwise the ranking by number of establishments has but slight significance.

The industries classified as "slaughtering and meat packing, wholesale," and "foundry and machine shop products" may be selected as typifying opposite condi-

tions, the former being concentrated in relatively few establishments, with a minimum of wage-earners employed and of added values to materials and a maximum for value of products, while the latter shows a large number of establishments and a maximum of wage-earners and added value to materials, with a lesser amount for the value of the products.

Table CXXXIX shows the rank of the 20 leading industries according to the values added to the materials by the various manufacturing processes, wage-earners, wages, and value of products, both net and gross.

TABLE CXXXIX.—Twenty leading industries according to value added to materials by manufacturing processes, wage-earners, wages, and net and gross value of products: 1905.

INDUSTRY.	Rank according to added value.	RANK ACCORDING TO WAGE-EARNERS.		RANK ACCORDING TO VALUE OF PRODUCTS.	
		Average number.	Wages.	Net.	Gross.
Foundry and machine shop products.....	1	2	1	4	3
Lumber and timber products.....	2	1	2	3	5
Iron and steel, steel works and rolling mills.	3	5	4	6	4
Printing and publishing, newspapers and periodicals.....	4	13	7	8	10
Liquors, malt.....	5	27	17	7	11
Cotton goods.....	6	3	5	5	6
Clothing, men's.....	7	7	8	12	7
Cars and general shop construction and repairs by steam railroad companies.....	8	4	3	13	9
Tobacco, cigars and cigarettes.....	9	8	9	11	19
Printing and publishing, book and job.....	10	14	13	15	22
Boots and shoes.....	11	6	6	17	8
Bread and other bakery products.....	12	15	14	16	13
Clothing, women's.....	13	9	10	22	15
Iron and steel, blast furnaces.....	14	36	34	9	18
Lumber, planing mill products, including sash, doors, and blinds.....	15	12	11	26	16
Liquors, distilled.....	16	65	66	19	30
Flour and grist mill products.....	17	30	32	1	2
Slaughtering and meat packing, wholesale.	18	18	16	2	1
Furniture.....	19	10	12	30	24
Paper and wood pulp.....	20	21	18	23	20

The table shows that in the industries where the great part of the expenditures was for wages the rank by added value and by total wages is substantially the same. In certain industries there is a very much lower ranking by wages than by added value. Two of these industries—"liquors, malt," and "liquors, distilled"—are subject to special forms of taxation, and the amount paid for wages forms a small proportion of the total expenditures. The variation is marked in "liquors, distilled," which is sixteenth according to added value, but sixty-sixth in total wages paid. "Iron and steel, blast furnaces," and "flour and grist mill products" are examples of industries in which expenses other than for wages, such as the cost of fuel in the former industry and interest on capital borrowed in the latter industry, are very great. In such cases, therefore, the ranking by wages paid is generally much lower than by added value.

By arranging the industries into 14 groups, as described on page cxxiv, it is possible to bring together those in which the same general methods prevail and,

MANUFACTURES.

by applying the methods of ranking described above, | great groups of industries. This is done in Table to show at a glance the relative importance of the | OXL.

TABLE CXL.—INDUSTRIAL GROUPS, RANKED ACCORDING TO CAPITAL, NUMBER OF WAGE-EARNERS, WAGES, NET AND GROSS VALUE OF PRODUCTS, AND VALUE ADDED TO MATERIALS BY MANUFACTURING PROCESSES: 1905.

GROUP.	ESTABLISHMENTS.		CAPITAL.		WAGE-EARNERS.		WAGES.		VALUE OF PRODUCTS.				VALUE ADDED TO MATERIALS BY MANUFACTURING PROCESSES. <sup>1</sup>	
	Number.	Rank.	Amount.	Rank.	Average number.	Rank.	Amount.	Rank.	Net.		Gross.		Amount.	Rank.
									Amount.	Rank.	Amount.	Rank.		
United States.....	216,262	....	\$12,686,265,673	....	5,470,321	....	\$2,611,540,532	....	\$9,821,205,387	....	\$14,802,147,087	....	\$6,743,399,718	....
Food and kindred products.....	45,790	1	1,173,151,270	4	354,054	6	164,601,803	7	2,176,489,026	1	2,845,234,900	1	581,789,412	4
Textiles.....	17,042	4	1,744,169,234	2	1,156,305	1	419,841,630	2	1,397,009,940	2	2,147,441,418	3	948,038,552	2
Iron and steel and their products.....	14,239	6	2,331,498,157	1	857,293	2	482,357,503	1	1,239,490,273	3	2,176,739,726	2	1,140,628,721	1
Lumber and its remanufactures.....	32,720	2	1,013,827,138	5	735,945	3	336,053,173	3	805,315,333	4	1,223,730,336	4	730,913,171	3
Leather and its finished products.....	4,945	13	440,777,194	12	253,368	9	116,694,140	10	401,011,414	10	705,747,470	9	242,209,606	12
Paper and printing.....	30,737	3	798,758,312	7	350,205	7	185,547,791	6	596,872,350	7	857,112,256	8	574,971,999	5
Liquors and beverages.....	6,381	11	659,547,020	8	68,340	13	45,146,285	13	431,735,208	9	501,266,605	11	373,530,068	7
Chemicals and allied products.....	9,080	9	1,594,728,510	3	219,195	11	93,965,248	11	714,489,549	5	1,031,965,263	5	452,640,337	8
Clay, glass, and stone products.....	10,775	8	553,846,682	10	285,365	8	148,471,003	8	334,971,057	11	391,230,422	12	312,300,562	10
Metals and metal products, other than iron and steel.....	6,310	12	598,340,758	9	211,706	10	117,599,837	9	442,912,699	8	922,262,456	7	305,090,486	11
Tobacco.....	16,828	5	323,983,501	13	159,408	12	62,640,303	12	307,100,175	13	331,117,681	13	206,517,442	13
Vehicles for land transportation.....	7,285	10	447,697,020	11	384,577	5	221,590,517	4	324,109,901	12	643,924,442	10	324,742,039	9
Shipbuilding.....	1,097	14	121,623,700	14	50,754	14	29,241,057	14	46,707,258	14	82,769,239	14	46,991,223	14
Miscellaneous.....	12,377	7	974,316,571	6	390,831	4	187,514,312	5	602,990,604	6	941,004,873	6	503,130,100	6

<sup>1</sup> Obtained by deducting from net value of products the cost of raw materials and adding the cost of mill supplies.

As far as possible kindred industries have been grouped together in this table, but as each group contains a large number of establishments the varying conditions of operation tend to adjust more evenly its rankings under the different methods of measurement. The group "food and kindred products," however, which ranks first in gross and in net value of products, falls to sixth place in wage-earners and seventh in wages, as great a variation relatively as that shown for "flour and grist mill products" in Table CXXXVIII.

Table CXL presents the 14 generic groups in the order of their ranks by added value compared according to rankings selected from Table CXL.

TABLE CXLI.—Fourteen generic groups of industries, ranked according to added value, wage-earners, wages, and gross and net value of products: 1905.

GROUP.	Rank according to added value.	RANK ACCORDING TO WAGE-EARNERS.		RANK ACCORDING TO VALUE OF PRODUCTS.	
		Average number.	Wages.	Gross.	Net.
Iron and steel and their products.....	1	2	1	2	3
Textiles.....	2	1	2	3	2
Lumber and its remanufactures.....	3	3	3	4	4
Food and kindred products.....	4	6	7	1	1
Paper and printing.....	5	7	6	8	7
Miscellaneous.....	6	4	5	6	6
Chemicals and allied products.....	7	11	11	5	5
Liquors and beverages.....	8	13	13	11	9
Vehicles for land transportation.....	9	5	4	10	12
Clay, glass, and stone products.....	10	8	8	12	11
Metals and metal products, other than iron and steel.....	11	10	9	7	8
Leather and its finished products.....	12	9	10	9	10
Tobacco.....	13	12	12	13	13
Shipbuilding.....	14	14	14	14	14

RANK OF STATES AND TERRITORIES.

The rank of the states and territories under the different standards of measurement is an indication not only of the magnitude but of the relative economic importance of their manufactures. In Table CXLII, which is a comparison for 1900 and 1905, the states and territories are arranged in the order of their rank in gross value of products for 1905, and they are also ranked in the six other standards of measurement shown for industries in Table CXXXVIII. In addition to the statistics of manufactures this table shows the estimated population of each state and territory for 1905 and the population for 1900, together with the gross value per capita of the products of manufactures.

Agriculture is the predominating industry in many of the states and territories, while mining and commerce are leading factors in the development of others. Therefore the relative rank of a state or territory in manufactures is of comparatively slight significance unless it is considered in connection with the other forces which assist in its general industrial advancement.

The development of the manufactures of a state or territory depends for the most part upon its geographic location, natural resources, transportation facilities, proximity to markets, and available capital.

The growth and concentration of population are closely related to increase in, and the distribution of, manufactures. Thus the extent to which a community is engaged in manufactures is best indicated by considering jointly the number of persons employed in the various manufacturing industries, the proportion they are of the total population, and the per capita value of the products of manufacture.

MANUFACTURES.

TABLE CXLII.—RANK OF STATES AND TERRITORIES IN MANUFACTURES.

	STATE OR TERRITORY.	Census.	ESTABLISHMENTS.		CAPITAL.		WAGE-EARNERS.	
			Number.	Rank.	Amount.	Rank.	Average number.	Rank.
1	United States.....	1905	219,262	.....	\$12,686,265,673	.....	5,470,321	.....
2		1900	207,562	.....	8,078,825,200	.....	4,715,023	.....
3	New York.....	1905	37,194	1	2,031,459,515	1	856,947	1
4		1900	35,957	1	1,523,502,651	1	726,909	1
5	Pennsylvania.....	1905	23,495	2	1,995,836,088	2	763,282	2
6		1900	23,402	2	1,449,814,740	2	663,960	2
7	Illinois.....	1905	14,921	3	975,844,799	3	379,436	4
8		1900	14,374	3	732,829,771	4	332,871	4
9	Massachusetts.....	1905	10,723	5	965,948,887	4	488,399	3
10		1900	10,920	5	781,807,715	3	438,234	3
11	Ohio.....	1905	13,785	4	856,988,830	5	364,298	5
12		1900	13,808	4	570,908,008	5	308,109	5
13	New Jersey.....	1905	7,010	9	715,080,174	6	266,336	6
14		1900	6,415	10	477,301,605	6	213,975	6
15	Missouri.....	1905	6,464	11	379,368,827	8	133,167	11
16		1900	6,853	9	223,781,088	10	107,704	11
17	Michigan.....	1905	7,446	7	337,894,102	10	175,229	8
18		1900	7,310	7	246,906,520	9	155,800	8
19	Wisconsin.....	1905	8,558	6	412,647,051	7	150,391	10
20		1900	7,841	6	286,060,566	8	137,525	10
21	Indiana.....	1905	7,044	8	312,071,234	11	154,174	9
22		1900	7,128	8	210,321,080	11	130,017	9
23	Connecticut.....	1905	3,477	16	373,283,580	9	181,605	7
24		1900	3,382	17	299,206,925	7	150,733	7
25	California.....	1905	6,839	10	282,647,201	12	100,355	12
26		1900	4,997	11	175,467,806	13	77,224	15
27	Minnesota.....	1905	4,756	13	184,903,271	15	69,636	19
28		1900	4,096	13	133,076,600	15	64,557	18
29	Maryland.....	1905	3,852	14	201,877,906	14	94,174	14
30		1900	3,886	14	140,155,313	14	94,170	12
31	Rhode Island.....	1905	1,617	32	215,901,375	13	97,318	13
32		1900	1,673	32	176,901,606	12	88,197	13
33	Kansas.....	1905	2,475	24	88,680,117	30	35,570	32
34		1900	2,299	23	59,458,256	29	27,119	33
35	Louisiana.....	1905	2,091	26	150,810,608	16	55,850	25
36		1900	1,826	27	100,874,729	17	40,878	26
37	Iowa.....	1905	4,785	12	111,427,429	24	49,481	26
38		1900	4,828	12	85,667,334	21	44,420	25
39	Kentucky.....	1905	3,734	15	147,282,478	18	59,794	23
40		1900	3,648	15	87,995,822	20	51,735	22
41	Nebraska.....	1905	1,819	29	80,235,310	32	20,260	36
42		1900	1,695	31	65,906,052	24	18,669	37
43	Georgia.....	1905	3,219	18	135,211,551	21	92,749	15
44		1900	3,015	21	79,303,316	22	83,336	14
45	Texas.....	1905	3,158	21	115,664,871	22	49,086	27
46		1900	3,107	20	63,455,616	25	38,604	27
47	Virginia.....	1905	3,187	19	147,989,182	17	80,285	17
48		1900	3,186	18	92,299,589	18	66,223	20
49	Maine.....	1905	3,145	22	143,707,750	19	74,958	18
50		1900	2,878	22	114,007,715	16	69,914	17
51	North Carolina.....	1905	3,272	17	141,000,639	20	85,339	16
52		1900	3,465	16	68,283,005	23	72,322	16

<sup>1</sup> Obtained by deducting from the net value of products the cost of raw materials and adding the cost of mill supplies.

COMPARATIVE IMPORTANCE OF STATES AND INDUSTRIES.

ARRANGED BY ORDER OF GROSS VALUE OF PRODUCTS IN 1905: 1905 AND 1900.

WAGES.		VALUE OF PRODUCTS.				VALUE ADDED TO MATERIALS BY MANUFACTURING PROCESSES. <sup>1</sup>		POPULATION. <sup>2</sup>		GROSS VALUE OF PRODUCTS PER CAPITA.		
Amount.	Rank.	Net.		Gross.		Amount.	Rank.	Number.	Rank.	Amount.	Rank.	
\$2,611,540,532	.....	\$9,821,205,387	.....	\$14,802,147,087	.....	\$6,743,309,718	.....	81,358,064	.....	\$182	.....	1
2,009,735,790	.....	7,443,067,400	.....	11,411,121,122	.....	5,213,663,386	.....	76,058,167	.....	150	.....	2
430,014,851	1	1,405,789,488	1	2,488,345,870	1	1,184,529,784	1	7,907,025	1	315	5	3
337,323,585	1	1,134,802,615	1	1,871,830,872	1	890,088,600	1	7,208,804	1	258	7	4
307,960,800	2	1,211,886,027	2	1,955,551,332	2	899,408,628	2	6,719,715	2	291	6	5
296,875,545	2	993,701,794	2	1,649,882,380	2	708,507,028	2	6,502,115	2	262	5	6
208,405,408	4	947,302,597	3	1,410,842,129	3	605,909,813	3	5,219,630	3	270	8	7
159,104,179	4	754,025,590	3	1,120,868,308	3	467,966,515	3	4,821,550	3	232	8	8
232,388,946	3	723,666,388	4	1,124,092,051	4	524,489,300	4	2,964,013	7	370	2	9
195,278,276	3	550,192,232	4	907,026,439	4	432,437,786	4	2,805,346	7	324	3	10
182,429,425	5	601,540,057	5	960,811,887	5	471,459,717	5	4,351,633	4	221	11	11
136,427,579	5	471,563,923	5	743,070,855	5	371,158,462	5	4,157,545	4	180	11	12
128,168,801	6	440,813,097	6	774,369,025	6	324,448,561	6	2,092,048	15	370	4	13
95,164,913	6	321,031,734	6	553,005,684	6	236,279,914	6	1,883,669	16	294	4	14
66,644,126	11	305,612,584	7	439,548,957	7	196,876,618	8	3,277,657	6	134	24	15
46,713,734	11	214,751,695	9	316,304,095	10	138,954,305	11	3,106,665	5	102	25	16
81,278,837	8	207,858,698	0	429,120,060	8	214,435,201	7	2,530,016	9	170	19	17
62,531,812	8	198,365,009	10	310,661,856	9	154,599,355	8	2,420,982	9	132	21	18
71,471,805	10	302,482,122	8	411,139,681	9	195,362,191	9	2,196,967	13	187	17	19
55,695,816	10	231,903,919	8	326,752,378	8	152,414,414	9	2,069,042	13	158	17	20
72,058,099	9	270,714,705	10	393,954,405	10	186,163,976	11	2,046,086	8	149	22	21
59,280,131	9	234,761,770	7	337,071,630	7	151,936,907	10	2,516,462	8	134	20	22
87,942,628	7	225,454,902	13	369,082,091	11	189,463,448	10	973,284	20	379	2	23
75,394,062	7	184,856,238	11	315,106,150	11	155,585,134	7	908,420	23	347	2	24
64,656,686	12	245,580,743	12	367,218,494	12	159,581,361	12	1,563,717	21	230	10	25
31,889,997	12	152,011,620	12	257,385,521	12	101,696,216	12	1,485,053	21	173	13	26
35,843,145	15	249,705,785	11	307,858,073	13	103,029,875	13	1,934,208	18	159	21	27
29,029,100	15	172,340,235	12	223,692,922	13	79,466,071	15	1,751,394	19	128	22	28
30,144,244	14	137,889,338	15	243,375,996	14	99,262,066	14	1,246,304	26	195	16	29
32,414,429	14	120,209,870	15	211,076,143	14	86,838,080	13	1,188,044	26	178	12	30
43,112,637	13	132,499,150	16	202,100,583	15	95,256,264	15	460,776	30	430	1	31
35,995,101	13	108,339,001	16	165,550,382	15	82,851,880	14	428,555	34	386	1	32
18,883,071	20	168,111,853	14	198,244,992	16	46,401,543	29	1,534,471	22	129	25	33
12,802,006	28	125,512,374	14	154,008,544	16	36,187,644	28	1,470,495	22	108	24	34
25,315,750	21	119,001,055	19	186,379,592	17	74,876,613	17	1,486,841	23	125	27	35
14,725,437	26	65,932,356	28	111,397,919	21	40,423,336	26	1,381,025	23	81	27	36
22,997,053	24	122,367,358	17	160,572,313	18	62,180,596	25	2,214,411	12	73	33	37
18,020,653	21	101,780,023	18	132,870,865	17	50,870,719	20	2,231,853	10	60	32	38
24,438,084	23	110,877,739	22	159,753,968	19	76,728,610	16	2,262,590	11	71	35	39
18,454,252	20	90,208,749	19	126,508,660	19	62,684,434	16	2,147,174	12	59	33	40
11,022,149	37	104,576,896	24	154,918,220	20	33,012,686	34	1,067,756	27	145	23	41
8,842,429	35	107,142,948	17	130,302,453	18	37,041,043	27	1,066,300	27	122	23	42
27,392,442	20	113,693,905	21	151,040,455	21	72,078,314	18	2,367,923	10	64	38	43
19,958,153	19	71,955,748	23	94,532,368	24	49,220,743	24	2,216,331	11	43	38	44
24,468,942	22	120,504,142	18	150,528,389	22	64,459,648	21	3,373,982	5	45	43	45
16,911,681	23	68,751,484	26	92,894,433	25	42,927,056	23	3,048,710	6	30	42	46
27,943,058	18	110,646,581	23	148,850,525	23	70,020,227	19	1,933,464	19	77	32	47
20,273,889	18	80,713,492	20	108,644,150	22	55,083,077	18	1,854,184	17	59	33	48
32,601,750	16	100,177,873	25	144,020,197	24	69,437,527	20	707,818	30	203	15	49
25,730,735	17	76,846,999	21	112,959,098	20	56,673,543	17	694,466	30	163	16	50
21,375,294	27	117,080,591	20	142,520,776	25	67,432,826	21	2,004,154	16	71	35	51
14,051,784	27	69,041,877	25	85,274,083	28	44,040,162	22	1,893,810	15	45	37	52

<sup>1</sup> Population for 1905 is that estimated by this Bureau as of June 1, 1904.  
<sup>2</sup> State census figures used.

## MANUFACTURES.

TABLE CXLII.—RANK OF STATES AND TERRITORIES IN MANUFACTURES.

	STATE OR TERRITORY.	Census.	ESTABLISHMENTS.		CAPITAL.		WAGE-EARNERS.	
			Number.	Rank.	Amount.	Rank.	Average number.	Rank.
53	Tennessee.....	1905	3,175	20	\$102,430,481	28	60,672	22
54		1900	3,116	19	63,140,657	26	45,963	24
55	Washington.....	1905	2,761	23	96,952,021	29	45,199	28
56		1900	1,926	26	41,574,744	33	31,523	31
57	New Hampshire.....	1905	1,618	31	109,495,072	25	65,366	20
58		1900	1,771	29	92,146,025	19	67,646	19
59	Alabama.....	1905	1,882	28	105,382,850	27	62,173	21
60		1900	2,000	24	60,165,904	28	52,711	21
61	Colorado.....	1905	1,606	33	107,663,500	26	21,813	35
62		1900	1,323	35	58,172,865	30	19,498	36
63	West Virginia.....	1905	2,109	25	86,820,823	31	43,758	29
64		1900	1,824	28	49,103,138	31	33,080	29
65	South Carolina.....	1905	1,399	37	113,422,224	23	59,441	24
66		1900	1,369	34	62,750,027	27	47,025	23
67	Montana.....	1905	382	45	52,589,810	34	8,957	39
68		1900	395	42	38,224,915	35	9,854	39
69	Vermont.....	1905	1,609	30	62,658,741	33	33,106	33
70		1900	1,938	25	43,499,033	32	28,179	32
71	Mississippi.....	1905	1,520	35	50,256,300	36	38,600	31
72		1900	1,294	36	22,712,186	39	26,799	34
73	Oregon.....	1905	1,602	34	44,023,548	38	18,523	37
74		1900	1,406	33	28,359,089	36	14,450	38
75	Arkansas.....	1905	1,907	27	46,306,116	37	33,080	34
76		1900	1,746	30	25,384,636	38	31,525	30
77	Florida.....	1905	1,413	36	32,971,082	39	42,001	30
78		1900	1,275	37	25,682,171	37	35,471	28
79	Delaware.....	1905	631	40	50,925,630	35	18,475	38
80		1900	633	38	38,791,402	34	20,562	35
81	Utah.....	1905	606	41	26,094,011	40	8,052	40
82		1900	575	40	13,219,039	41	5,413	41
83	Arizona.....	1905	169	48	14,395,654	42	4,793	42
84		1900	154	48	9,517,573	42	3,126	42
85	District of Columbia.....	1905	482	43	20,199,783	41	9,290	41
86		1900	401	41	17,060,498	40	6,155	40
87	Oklahoma.....	1905	657	39	11,107,763	43	3,190	44
88		1900	316	44	2,462,438	46	1,294	49
89	South Dakota.....	1905	686	38	7,585,142	46	2,492	46
90		1900	624	39	6,051,288	43	2,224	45
91	North Dakota.....	1905	507	42	5,703,837	47	1,755	50
92		1900	337	43	3,511,968	45	1,358	48
93	Idaho.....	1905	364	46	9,689,445	45	3,061	45
94		1900	287	45	2,130,112	48	1,552	47
95	Alaska.....	1905	82	51	10,684,799	44	1,938	48
96		1900	48	51	3,568,704	44	2,260	44
97	Indian Territory.....	1905	466	44	5,016,654	48	2,257	47
98		1900	170	46	1,591,953	50	1,087	50
99	New Mexico.....	1905	199	47	4,638,248	49	3,478	43
100		1900	174	47	2,160,718	47	2,490	43
101	Wyoming.....	1905	169	48	2,695,889	51	1,834	49
102		1900	139	49	2,047,883	49	2,090	46
103	Nevada.....	1905	115	50	2,891,997	50	802	51
104		1900	99	50	1,251,298	51	504	51

NOTE.—States or territories having equal rank in 1905 in number of establishments are Arizona and Wyoming, each forty-eighth; and in gross value of products per capita, Connecticut and Massachusetts, each second; Ohio and Washington, each eleventh; Colorado and Michigan, each nineteenth; Iowa and Nevada, each thirty-third; Kentucky and North Carolina, each thirty-fifth; Alabama and South Carolina, each fortieth; Mississippi and Wyoming, each forty-fifth.

# COMPARATIVE IMPORTANCE OF STATES AND INDUSTRIES.

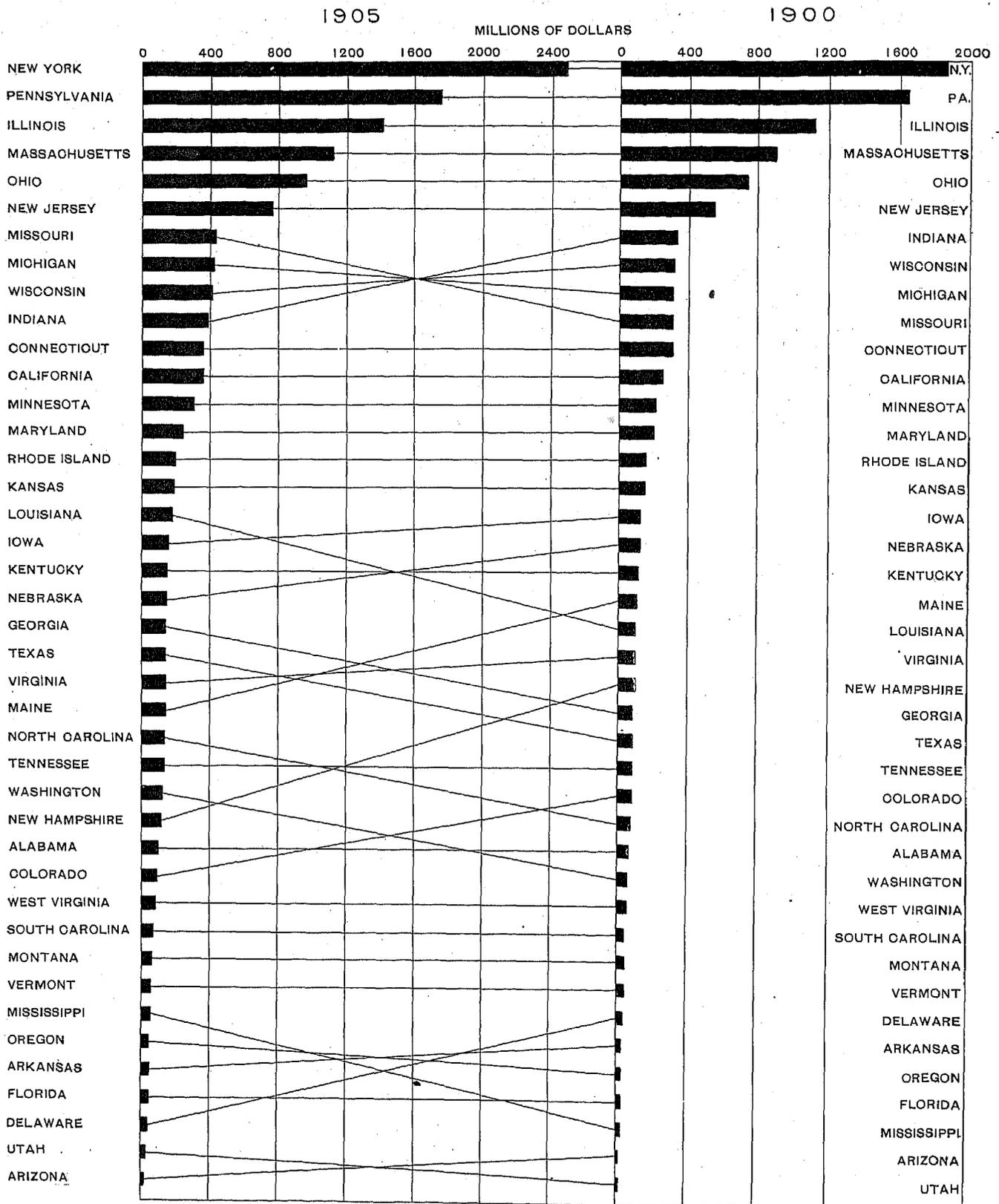
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ARRANGED BY ORDER OF GROSS VALUE OF PRODUCTS IN 1905: 1905 AND 1900—Continued.

WAGES.		VALUE OF PRODUCTS.				VALUE ADDED TO MATERIALS BY MANUFACTURING PROCESSES. <sup>1</sup>		POPULATION. <sup>2</sup>		GROSS VALUE OF PRODUCTS PER CAPITA.		
		Net.		Gross.								
Amount.	Rank.	Amount.	Rank.	Amount.	Rank.	Amount.	Rank.	Number.	Rank.	Amount.	Rank.	
\$22,805,028	25	\$100,003,567	26	\$137,000,476	26	\$63,657,243	24	2,121,856	14	65	37	53
14,727,506	26	65,529,832	27	92,749,120	26	42,921,191	24	2,020,616	14	46	36	54
30,087,287	17	99,380,279	27	128,821,667	27	66,683,460	22	582,451	33	221	11	55
17,065,140	22	50,399,715	30	70,831,345	30	35,742,832	29	518,103	33	137	19	56
27,693,203	19	85,008,010	29	123,610,904	28	54,087,614	27	425,612	39	290	7	57
25,849,631	16	71,022,446	24	107,590,803	23	51,218,822	19	411,588	36	261	6	58
21,878,451	26	80,946,201	28	109,109,022	29	59,498,988	26	1,954,817	17	56	40	59
14,011,683	24	56,709,701	29	72,109,929	29	41,742,117	25	1,828,697	18	39	40	60
15,100,365	32	81,071,269	30	100,143,999	30	42,168,400	30	590,280	32	170	19	61
11,707,566	30	76,094,757	22	89,067,379	27	32,529,284	30	539,700	31	165	15	62
21,153,042	28	69,290,281	32	99,040,676	31	48,445,501	28	1,037,204	28	95	30	63
12,639,850	29	44,356,765	33	67,006,822	31	32,400,851	31	958,800	28	70	28	64
13,868,950	35	70,333,177	31	79,376,262	32	33,385,330	35	1,415,984	24	56	40	65
9,130,209	34	44,978,430	32	53,335,811	32	25,417,815	34	1,340,316	24	40	39	66
8,652,217	38	62,955,316	33	66,415,452	33	32,041,717	37	283,493	44	234	9	67
7,376,822	38	48,162,383	31	52,744,967	33	28,242,011	32	243,329	44	217	10	68
15,221,050	31	46,896,884	35	63,083,611	34	32,564,107	36	348,129	41	181	18	69
11,426,548	31	37,550,304	34	51,515,228	34	27,259,844	33	343,641	40	150	18	70
14,819,034	33	47,662,771	34	57,451,445	35	33,527,166	33	1,655,938	20	35	45	71
7,009,607	37	25,540,507	39	33,718,517	39	18,862,784	37	1,551,270	20	22	46	72
11,443,512	36	41,530,050	38	55,525,123	36	26,294,017	38	454,337	37	122	28	73
6,822,011	39	25,753,999	38	36,592,714	37	17,168,507	39	413,536	35	88	26	74
14,543,635	34	43,465,931	36	53,864,394	37	33,005,200	32	1,384,904	25	39	44	75
10,184,154	33	28,190,515	35	39,887,578	36	23,255,365	35	1,311,564	25	30	42	76
15,767,182	30	42,777,534	37	50,298,290	38	34,080,956	31	595,741	31	85	31	77
10,916,443	32	27,710,550	36	34,183,509	38	22,169,198	36	528,542	32	65	30	78
8,158,203	39	28,824,645	40	41,160,276	39	17,554,836	39	191,231	46	215	13	79
8,457,033	36	20,618,014	37	41,321,061	35	18,100,062	38	184,735	46	224	9	80
5,157,400	40	34,442,417	39	38,920,464	40	16,392,371	41	303,137	42	128	26	81
2,762,522	41	15,163,244	41	17,081,648	41	7,627,084	42	276,749	43	65	30	82
3,960,248	41	20,186,750	41	28,083,192	41	16,750,104	40	136,807	48	205	14	83
2,287,352	42	18,954,240	40	20,438,987	40	15,338,227	40	122,931	48	166	14	84
3,658,370	42	13,794,339	43	18,359,159	42	11,127,557	42	298,050	43	62	39	85
3,022,006	40	12,398,326	42	16,426,408	42	9,380,923	41	278,718	42	50	33	86
1,655,324	45	14,459,835	42	16,549,656	43	5,615,903	43	526,275	34	31	47	87
514,879	49	4,965,844	45	5,504,869	45	1,967,155	48	398,331	38	14	50	88
1,421,680	46	11,743,053	44	13,085,333	44	4,727,662	46	444,462	38	29	48	89
1,129,787	46	8,578,997	43	9,629,946	43	3,039,281	43	401,570	37	24	45	90
1,031,307	50	9,115,959	45	10,217,914	45	3,462,571	48	415,571	40	25	50	91
671,321	48	5,534,047	44	6,259,840	44	2,349,595	45	319,146	41	20	48	92
2,059,391	44	7,261,486	46	8,768,743	46	5,016,232	44	191,060	47	46	42	93
818,239	47	2,381,546	49	3,001,442	49	1,706,020	49	161,772	47	19	49	94
1,095,579	49	6,263,441	48	8,244,524	47	4,821,187	45	76,208	50	108	29	95
1,374,630	43	2,563,868	47	4,194,421	46	2,571,271	44	63,592	50	66	29	96
1,144,078	48	6,538,503	47	7,909,451	48	3,395,012	49	476,812	35	17	51	97
379,188	50	2,221,408	50	2,629,067	50	1,050,495	50	392,050	39	7	51	98
2,153,068	43	4,149,830	49	5,705,880	49	3,736,402	47	209,322	45	27	49	99
1,190,496	45	3,292,614	46	4,060,924	47	2,306,399	46	195,310	45	21	47	100
1,261,122	47	2,804,652	50	3,523,200	50	2,324,485	50	99,959	49	35	45	101
1,209,123	44	2,432,040	48	3,268,555	48	2,039,009	47	92,531	49	35	41	102
693,407	51	2,380,837	51	3,096,274	51	1,537,295	51	42,335	51	73	33	103
352,606	51	951,127	51	1,261,005	51	670,740	51	42,335	51	30	42	104

<sup>1</sup> Obtained by deducting from the net value of products the cost of raw materials and adding the cost of mill supplies.  
<sup>2</sup> Population for 1905 is that estimated by this Bureau as of June 1, 1904.

DIAGRAM 19.—VALUE OF PRODUCTS, BY STATES AND TERRITORIES: 1905 AND 1900.



MAP 16.—GROSS VALUE OF PRODUCTS: 1905.

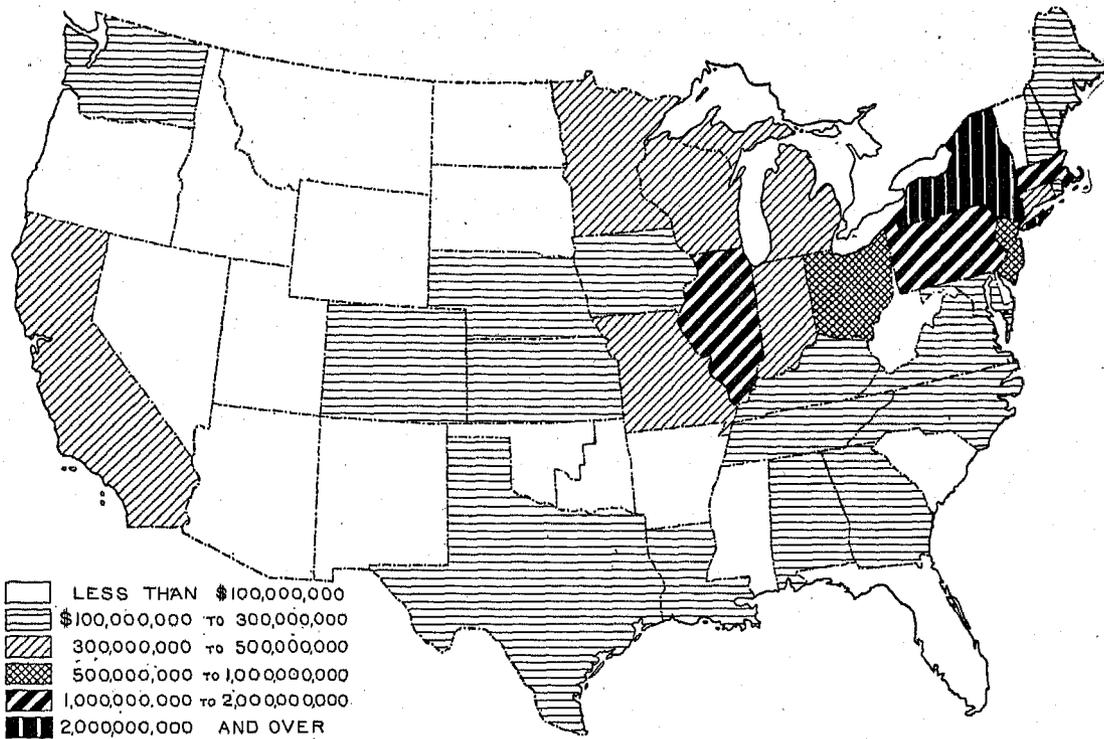
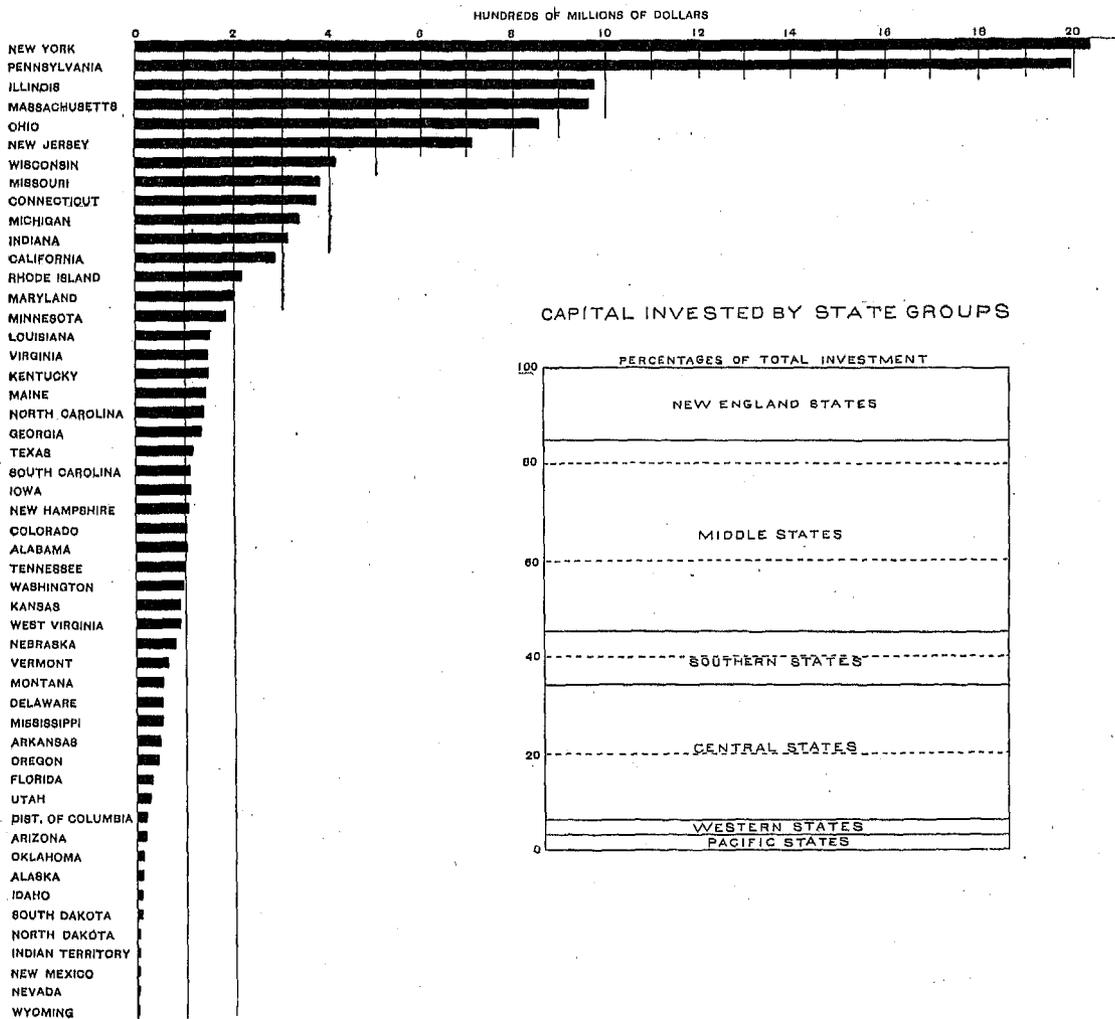


DIAGRAM 20.—CAPITAL INVESTED, BY STATES AND TERRITORIES: 1905.



The state reporting the largest number of wage-earners employed in manufactures at both censuses was New York, which was followed by Pennsylvania, Massachusetts, and Illinois, in the order named. The average number of wage-earners for Massachusetts constituted 16.5 per cent of the estimated population of the state in 1904, as compared with 15.6 per cent in 1900, the largest percentage shown at both periods by any of the 4 leading states. Of these 4 states Pennsylvania ranked next in this respect with 11.4 per cent of the people of the state engaged in manufactures at the census of 1905, and 10.5 per cent in 1900; New York came next with 10.8 per cent in 1905, and 10 per cent in 1900; and Illinois with 7.3 per cent in 1905, and 6.9 per cent in 1900. In each of these 4 states the percentage of the population of the state employed as wage-earners in manufactures was slightly larger in 1905 than in 1900. The proportion of the population engaged in manufactures was highest in Rhode Island where the wage-earners employed in manufacturing industries constituted 20.7 per cent of the population at the census of 1905 and 20.6 at the census of 1900; the per capita value of products for the state in 1905 was also the highest, namely, \$430, and \$386 in 1900. In the former respect Connecticut follows Rhode Island, the wage-earners employed in manufactures forming 18.7 per cent of the population in 1905, as compared with 17.6 per cent in 1900, and then comes Massachusetts, with ratios as above noted.

The 3 states, New York, Pennsylvania, and Illinois, ranking first, second, and third in population, are the leading states in gross and net value of products of manufactures.

That the area or size of a state or territory has very slight bearing on its rank in manufactures is indicated by the fact that of the 20 states or territories which have the greatest area, only 5 rank as high as twentieth in the gross value of products.

Taking into consideration the seven methods of ranking given in both Tables CXLII and CXXXVIII, it will be seen that there is a greater uniformity in the rank of states and territories as compared with that of industries, under the standards of measurement thus presented.

Eleven of the states have the same rank in four or more of the seven methods of ranking and 16 others have the same rank in three of the methods. The greatest variation is shown for Rhode Island, which ranks thirteenth in capital, wage-earners, and wages, and thirty-second in number of establishments, a relative difference of nineteen places. This greater uniformity in rank is due to the equalizing effect of the different industries which are included in the total. The characteristic features of these industries are pronounced when the statistics for them are shown separately, as in Table CXXXVIII, and, as already noted, it is the

exception for any industry to have the same rank in as many as three of the standards of measurement.

While a consideration of all seven methods of ranking shown in Table CXXXVIII is necessary for a proper appreciation of the relative importance of the manufacturing industries of any state or territory, still the gross value of products is a very convenient method of measurement, and it is adopted in Table CXLIII.

TABLE CXLIII.—Gross value of products, distributed according to states and territories grouped by value of products in 1905: 1905 and 1900.

STATE OR TERRITORY.	1905		1900	
	Value of products.	Rank.	Value of products.	Rank.
\$1,000,000,000 and over:				
New York.....	\$2,488,345,579	1	\$1,871,830,872	1
Pennsylvania.....	1,955,551,332	2	1,649,882,380	2
Illinois.....	1,410,342,120	3	1,120,808,308	3
Massachusetts.....	1,124,302,051	4	907,626,439	4
\$500,000,000 but less than \$1,000,000,000:				
Ohio.....	960,811,857	5	748,070,855	5
New Jersey.....	774,369,025	6	553,005,684	6
\$300,000,000 but less than \$500,000,000:				
Missouri.....	430,548,957	7	316,304,095	10
Michigan.....	429,120,060	8	319,691,856	9
Wisconsin.....	411,139,081	9	326,752,878	8
Indiana.....	393,954,405	10	337,071,630	7
Connecticut.....	369,082,091	11	315,106,150	11
California.....	367,218,494	12	257,385,521	12
Minnesota.....	307,858,073	13	223,002,922	13
\$200,000,000 but less than \$300,000,000:				
Maryland.....	243,375,096	14	211,076,143	14
Rhode Island.....	202,109,583	15	165,550,382	15
\$100,000,000 but less than \$200,000,000:				
Kansas.....	198,244,992	16	154,008,544	16
Louisiana.....	186,379,592	17	111,397,919	21
Iowa.....	160,572,813	18	132,870,805	17
Kentucky.....	159,753,908	19	126,508,600	19
Nebraska.....	154,618,220	20	130,302,453	18
Georgia.....	151,040,455	21	94,532,368	24
Texas.....	150,528,389	22	92,894,433	25
Virginia.....	148,856,525	23	108,644,150	22
Maine.....	144,020,197	24	112,959,098	20
North Carolina.....	142,520,776	25	85,274,083	28
Tennessee.....	137,960,476	26	92,740,120	26
Washington.....	128,821,067	27	70,831,345	30
New Hampshire.....	123,610,504	28	107,590,803	23
Alabama.....	109,109,922	29	72,109,029	29
Colorado.....	109,143,999	30	89,067,879	27
Less than \$100,000,000:				
West Virginia.....	99,040,676	31	67,006,822	31
South Carolina.....	79,376,202	32	53,345,811	32
Montana.....	66,415,452	33	52,744,097	33
Vermont.....	63,083,611	34	51,515,228	34
Mississippi.....	57,451,446	35	33,718,517	39
Oregon.....	55,526,123	36	36,562,714	37
Arkansas.....	53,864,394	37	30,887,578	36
Florida.....	50,298,230	38	34,183,509	38
Delaware.....	41,190,276	39	41,321,061	35
Utah.....	38,926,404	40	17,081,048	41
Arizona.....	28,083,192	41	20,438,987	40
District of Columbia.....	18,359,159	42	16,426,408	42
Oklahoma.....	16,549,056	43	5,504,869	45
South Dakota.....	13,085,333	44	9,529,946	43
North Dakota.....	10,217,914	45	6,259,840	44
Idaho.....	8,768,743	46	3,001,442	49
Alaska.....	8,244,624	47	4,194,421	46
Indian Territory.....	7,909,451	48	2,629,067	50
New Mexico.....	5,765,880	49	4,060,624	47
Wyoming.....	3,523,290	50	3,268,555	48
Nevada.....	3,096,274	51	1,261,005	51

The gross value of products reported for each of the leading 4 manufacturing states at the census of 1905 exceeded \$1,000,000,000. Massachusetts, which ranked fourth at both censuses, was the only state of the group for which the products fell below this amount at the census of 1900. New York and Pennsylvania for many years have been the 2 leading manufacturing states. Until the census of 1890 Massachusetts occupied the third rank, but it was then passed by

Illinois, which assumed the third place and has since retained that position. The products reported for these 4 states formed 48.6 and 47.1 per cent, respectively, of the total products for the United States at the censuses of 1900 and 1905.

The next group includes states having a gross value of products in excess of \$500,000,000, but less than \$1,000,000,000, and comprises 2 states, Ohio and New Jersey, which have retained their relative rank of fifth and sixth place at both censuses.

The third group comprises 7 states, for each of which the gross value of products at the census of 1905 exceeded \$300,000,000 but was less than \$500,000,000. There has been considerable change in the relative rank of the states in this group. Missouri, which occupied the tenth place at the census of 1900, advanced to the seventh place in 1905, and Indiana, which ranked seventh, now ranks tenth. Michigan and Wisconsin have also changed positions. The remaining 3 states of the group retained their relative standing at the two censuses.

Maryland and Rhode Island constitute the fourth group of states, for which the gross value of products amounted to more than \$200,000,000 but less than \$300,000,000. At the census of 1900 California and Minnesota were also included in this group, but at the census of 1905 they showed a sufficient increase in value of products to place them in the third group. At the previous census Rhode Island was included in the fifth group.

The value of products of the 15 states comprising the first four groups formed 80.2 per cent of the total gross value of products for the census of 1905 as compared with 81.7 per cent in 1900. While the two remaining groups contain 36 states and territories, including the District of Columbia, their products formed only 19.8 per cent of the total in 1905 and 18.3 per cent in 1900. A number of the states in these groups had the same relative standing at the two censuses, but there have been pronounced changes among some of them. Louisiana advanced from the twenty-first to the seventeenth place, Georgia from the twenty-fourth to the twenty-first, Mississippi from the thirty-ninth to the thirty-fifth, and North Carolina from the twenty-eighth to the twenty-fifth. It is a significant fact, indicative of the industrial development of the Southern states, that of the 15 Southern states and territories, 7 made an actual advance in their respective ranks, 6 had the same rank at the two censuses, and but 2, Arkansas and Virginia, show a slight retrogression; while of the 6 New England states, 2 show a considerable retrogression and 4 retained the same relative rank.

Table CXLIV shows the number of states and territories producing a given value of product as reported at each census from 1850 to 1905, inclusive.

TABLE CXLIV.—States and territories grouped according to gross value of products: 1850 to 1905.

CENSUS.	NUMBER OF STATES AND TERRITORIES WITH A GROSS VALUE OF PRODUCTS OF—					
	Less than \$100,000,000.	\$100,000,000 but less than \$200,000,000.	\$200,000,000 but less than \$300,000,000.	\$300,000,000 but less than \$500,000,000.	\$500,000,000 but less than \$1,000,000,000.	\$1,000,000,000 and over.
1905.	21	15	2	7	2	4
1900.	28	9	3	5	3	3
1890.	33	6	5	2	2	2
1880.	33	8	1	2	2	1
1870.	36	5	3	—	3	—
1860.	35	1	—	1	—	—
1850.	33	2	1	—	—	—

The value of products on which this table is based includes for the censuses previous to 1900 the neighborhood industries and mechanical trades, so that although the figures are not comparable, yet the number of states in each group at each period indicates the advance in the volume of production of the individual states. At the census of 1850 there was no state for which the gross value of products amounted to as much as \$300,000,000. By 1900 there were 11 states for each of which the product exceeded this amount, and the number of such states has increased to 13 in 1905. At the census of 1905 the value of products of 10 states was in excess of the maximum for any state or territory in 1860; in 5 states it exceeded the maximum for 1870; in 4 states, the maximum for 1880; and there were 2 states with products exceeding in value the maximum state product for 1890 and 1900.

RANK OF STATES AND TERRITORIES IN SELECTED INDUSTRIES.

The statistics for the leading industries of the different states and territories are shown separately and discussed in detail in the reports on manufactures contained in Part II. The number of industries treated depended upon the number, magnitude, and diversity of the industries of the various states and territories; in some cases, as Nevada, New Mexico, and the District of Columbia, where the manufactures were comparatively unimportant, no industries were selected, but in each important manufacturing state or territory a number of industries were treated in this manner, the number being as high as 72 in New York, 57 in Pennsylvania, and 45 in Massachusetts. Altogether there are 130 different classifications for which statistics are thus presented in the reports. The value of products for each industry selected formed either a considerable percentage of the value for all manufactures in the state or territory or a notable proportion of the value of the total production of the industry in the United States. Therefore, while some of the industries are well distributed throughout the states and territories,

others, such as the dyeing and finishing of textiles, and glass, are confined to a comparatively limited number. In the aggregate they are all among the leading industries of the United States, and a comparison of the relative standing of the states and territories in them develops some interesting facts. Of the 130 classifications, 36 have been selected for this comparison, but as a result of certain combinations of industries they appear in Table cXLV as 32.

In 1900 the industries that were interdependent or used materials of a similar nature were combined and presented as one industry. In 1905, for purposes of

comparison, the same combinations have been made and appear in the table as follows: Iron and steel, blast furnaces, and iron and steel, steel works and rolling mills, are presented as iron and steel; brick and tile, and pottery, terra cotta, and fire clay products, as clay products; and butter, cheese, and condensed milk, as cheese, butter, and condensed milk. In each of these classes the rank of each state and territory is based on the combined value of products.

The rank of each state in each of the selected industries at the censuses of 1900 and 1905 is shown in Table cXLV.

## MANUFACTURES.

TABLE CXLV.—RANK OF THE STATES AND TERRITORIES

	INDUSTRY.	Census.	Alabama.	Arizona.	Arkansas.	California.	Colorado.	Connecticut.	Delaware.	Dist. of Columbia.	Florida.	Georgia.	Idaho.	Illinois.	Indian Territory.	Indiana.	Iowa.	Kansas.
			1905	1900	1905	1900	1905	1900	1905	1900	1905	1900	1905	1900	1905	1900	1905	1900
1	Agricultural implements.....	1905				11		20				13		1		6	9	18
2		1900				10		20				13		1		5	9	27
3	Boots and shoes.....	1905				15		16				23		8		22	18	
4		1900				13		14				22		8		17	19	
5	Carriages and wagons.....	1905	22		36	15	28	17	35	40	31	14		5		2	11	32
6		1900	23	44	35	15	27	13	32	41	34	17		5	49	2	10	33
7	Cheese, butter, and condensed milk.....	1905		27	36	8	18	23	28			35	30	4		17	3	11
8		1900	39	27	36	11	23	18	26			38	30	4		19	3	10
9	Clay products <sup>1</sup> .....	1905	25	47	28	8	21	23	41	36	40	18	44	4		6	9	12
10		1900	23	44	34	12	21	20	38	33	41	16	45	5	39	6	8	25
11	Clothing, men's.....	1905	34			13	29	27				18		2		11	17	31
12		1900	28			9		27				19		2		11	17	30
13	Clothing, women's.....	1905				11	23	12						4		10	15	
14		1900				10		13	24					3		11	23	
15	Confectionery.....	1905	28		30	7	22	23	34	32	38	14		4		15	17	37
16		1900	30		33	8	21	20	36	25	38	15		3		11	12	31
17	Cotton goods.....	1905	9					8				4				19		
18		1900	11					8	21			7			18			
19	Dyeing and finishing textiles.....	1905						6						9				
20		1900						6						10				
21	Electrical machinery, apparatus, and supplies.....	1905				12	16	8						3		10		
22		1900				12	17	8						3		9		
23	Fertilizers.....	1905	9			17		16	19		13	1		21		20		
24		1900	9			10		20	15	24	18	6		10		22		17
25	Flour and grist mill products.....	1905	38	42	31	13	27	37	40	44	48	21	30	5	33	8	18	3
26		1900	37	44	32	12	25	35	39	43	50	23	42	6	38	5	15	10
27	Food preparations.....	1905				13	23	21	15		25	26		5		14	3	
28		1900				11	22	19		16				4		12	3	24
29	Furniture.....	1905	35		21	13	29	26				15		2		4	16	30
30		1900	33		28	16	32	22				15		2		7	14	26
31	Glass.....	1905				11								5		2		10
32		1900												5		2		
33	Hosiery and knit goods.....	1905	21			22		4	24			13		9		15		
34		1900				22		4	18			15		10		9		
35	Iron and steel <sup>2</sup> .....	1905	5			19		14	18			20		3		8		
36		1900	6			21	14	17	19			22		3		5		
37	Jewelry.....	1905				6	15	16		21				5		19	13	25
38		1900				8	13							5				
39	Leather, tanned, curried, and finished.....	1905	22			9		23	7			17		6		21		
40		1900	21		33	8		22	6			20		7		18		
41	Liquors, distilled.....	1905	16		21	10		17	22			19		1		2		
42		1900	17		20	15		13	22			16		1		2		
43	Liquors, malt.....	1905	32			9	23	17	31	29		27	35	5		11	19	
44		1900	32			11	17	16	31	23		28	35	3		9	20	
45	Lumber and timber products <sup>3</sup> .....	1905	13	38	7	10	34	35	40		24	18	32	26	30	16	20	45
46		1900	19	38	6	15	35	34	39		21	16	36	27	43	7	26	45
47	Lumber, planing mill products, including sash, doors, and blinds.....	1905	30	47	19	6	36	24	40	38	31	10	39	3	41	12	13	32
48		1900	34	43	21	10	30	20	42	39	33	13	46	4	38	9	8	37
49	Oil, cottonseed and cake.....	1905	5		8						14	2			12			
50		1900	8		6							2			11			
51	Paper and wood pulp.....	1905				20		10	16					15		11	21	22
52		1900						10	14					15		9	10	
53	Petroleum, refining.....	1905				5												
54		1900				5												
55	Slaughtering and meat packing, wholesale.....	1905				14	21	20	27	26		29	30	1		7	6	2
56		1900				12	20	21	20	26		28	1	1		4	7	2
57	Tobacco, cigars and cigarettes.....	1905	37	40	38	14	22	18	39	44	3	34	43	5	49	12	15	23
58		1900	30	39	42	16	23	17	37	38	4	35	46	5		14	13	21
59	Turpentine and rosin.....	1905	3								1	2						
60		1900	3								2	1						
61	Woolen goods.....	1905			28	21		4				22		20		12	23	
62		1900	30		31	18		4				23		15		11	25	
63	Worsted goods.....	1905						6										
64		1900						6										

<sup>1</sup> Includes classifications of "brick and tile" and "pottery, terra cotta, and fire clay products."<sup>2</sup> Includes classifications of "iron and steel, blast furnaces," and "iron and steel, steel works and rolling mills."<sup>3</sup> Exclusive of Alaska.

# COMPARATIVE IMPORTANCE OF STATES AND INDUSTRIES.

IN THIRTY-TWO SELECTED INDUSTRIES: 1905 AND 1900.

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.				
10	11	21	15	5	8	26	12	25	24	19	2	23	3	7	27	14	22	16	17	4	1																
14	21	7	17	1	12	11	4	24	21	19	2	23	3	7	27	14	22	16	17	4	1																
21	30	0	10	1	12	11	7	27	27	5	9	9	9	6	23	26	10	28	24	20	13	25	25	10	10	3	4										
10	27	21	20	0	4	10	8	39	33	23	12	42	3	3	13	45	1	41	38	6	29	24	43	18	30	44	37	16	25	26	7	5	6				
33	29	22	20	0	4	14	37	39	36	48	20	22	11	47	3	10	29	9	37	6	24	26	43	18	25	42	37	16	25	26	7	40	8				
32	13	21	16	8	8	6	25	41	12	28	14	26	24	1	1	24	10	32	15	6	35	14	38	34	20	9	37	13	40	2	31	7	8				
11	27	31	13	15	14	19	7	38	24	48	33	3	3	46	5	29	42	1	37	2	2	32	45	22	20	35	43	16	26	10	17	49	9				
14	31	27	11	15	15	17	32	36	24	48	30	3	3	43	4	26	39	1	40	2	2	28	46	22	20	35	42	19	29	13	10	49	10				
9	16	26	4	6	12	15	7	7	22	30	10	30	3	3	1	19	5	5	28	3	3	33	14	21	18	37	24	23	25	8	8	11	12				
10	15	18	4	6	13	14	7	7	22	30	12	24	10	1	1	20	5	5	29	3	3	33	14	21	18	37	24	23	25	8	8	11	12				
24	21	18	9	5	7	10	8	8	30	25	17	14	6	1	1	20	5	3	25	2	2	22	22	22	20	35	42	16	26	10	17	49	10				
10	12	10	7	5	9	15	6	6	30	28	14	14	6	1	1	20	5	4	22	2	2	22	22	22	20	35	42	16	26	10	17	49	10				
16	24	26	8	3	12	13	31	0	30	25	42	10	10	11	41	6	6	5	40	27	2	35	43	29	11	19	20	33	21	18	36	9	15	16			
14	23	24	7	4	10	13	34	5	30	28	37	23	1	1	41	6	6	40	27	2	2	32	43	29	16	17	22	37	19	18	35	9	15	16			
18	21	10	13	1	1	1	16	17	6	6	12	12	11	10	3	3	23	23	7	5	4	5	2	15	17	19	20	14	14	22	22	17	18				
16	9	13	13	2	2	2	2	2	7	7	7	7	1	1	5	8	8	8	8	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
17	18	15	4	13	14	15	11	11	10	18	16	5	5	1	1	7	10	6	6	2	2	7	7	19	19	19	19	19	19	19	19	19	19	19	19		
18	14	22	2	12	13	15	15	11	10	16	16	5	5	1	1	7	10	6	6	2	2	7	7	19	19	19	19	19	19	19	19	19	19	19	19	19	
21	14	25	1	8	15	10	23	3	3	3	3	3	3	11	12	11	11	11	11	5	4	5	4	8	13	13	13	13	13	13	13	13	13	13	13	13	
14	50	30	22	20	10	1	49	7	36	17	45	34	28	46	2	23	25	4	10	20	6	41	43	24	11	12	35	32	16	15	26	9	47	25	20		
13	47	30	18	21	9	1	45	7	40	17	40	33	22	46	2	24	26	3	28	20	4	34	41	29	11	14	36	31	16	15	27	8	48	26	28		
28	11	27	16	6	4	12	8	8	10	14	7	7	10	1	1	1	2	2	18	6	8	20	18	22	17	23	20	24	24	10	9	27	28	27	28		
25	21	15	15	6	7	13	5	5	14	14	10	10	10	1	1	1	2	2	18	8	8	18	18	17	17	17	20	20	24	10	9	27	28	27	28		
18	27	31	11	8	3	14	32	10	33	20	19	19	19	1	9	12	6	6	23	6	30	34	12	28	31	17	22	25	24	23	7	8	29	30	29	30	
13	25	21	10	4	3	11	9	9	30	30	20	20	19	1	12	13	3	3	27	5	35	35	18	31	34	17	20	24	24	23	6	7	31	32	31	32	
9	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
25	24	24	17	3	8	18	18	7	11	12	11	11	11	1	12	16	13	6	6	2	2	10	10	17	20	23	23	16	14	14	5	8	33	34	33	34	
13	13	9	10	10	12	20	17	18	22	4	4	4	4	6	4	8	2	2	20	7	7	1	1	16	16	16	16	16	16	16	16	16	16	16	16	16	16
17	17	11	3	18	12	16	9	9	22	4	4	4	4	4	24	3	3	8	8	20	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
13	12	16	18	2	8	27	20	23	10	5	5	5	5	4	15	10	10	10	24	1	26	30	14	28	14	27	32	24	12	20	11	3	30	40	39	40	
4	4	7	9	9	11	11	15	21	15	18	18	18	18	5	8	12	3	23	6	5	9	10	13	9	23	14	14	20	18	6	6	41	42	41	42		
16	20	13	8	10	12	12	4	25	26	36	21	7	7	1	1	1	6	6	30	2	18	18	34	24	15	33	28	14	22	3	37	43	43	44			
14	21	13	8	10	12	12	7	24	22	38	18	6	6	37	1	1	5	5	30	2	19	19	34	26	15	33	29	14	25	4	36	44	44	44			
17	4	11	33	30	3	5	23	31	46	25	37	36	37	19	14	14	21	22	6	42	42	27	43	9	12	44	28	20	1	15	2	41	45	45	46		
17	9	18	32	28	3	3	12	22	31	47	25	33	41	13	14	48	8	46	23	4	42	30	40	10	11	44	29	20	5	24	1	37	46	46	46		
16	25	28	21	9	5	8	14	46	37	33	11	44	44	1	22	4	43	26	2	35	34	45	17	27	42	23	18	15	20	7	48	47	47	48			
22	26	27	15	7	3	14	28	12	41	32	25	11	44	1	16	5	48	36	2	35	31	45	19	24	40	18	17	29	23	6	47	48	48	48			
6	3	3	4	4	4	4	4	13	4	4	4	4	4	9	10	11	11	11	11	11	11	7	7	10	1	1	1	1	1	1	1	1	1	1	1	1	
5	3	3	4	4	4	4	4	13	4	4	4	4	4	9	10	11	11	11	11	11	11	7	7	10	1	1	1	1	1	1	1	1	1	1	1	1	
3	3	3	13	2	8	19	4	5	3	47	26	6	48	1	17	45	4	42	30	2	31	36	32	29	27	33	41	9	8	25	20	11	9	44	57	58	
3	3	3	13	2	8	19	4	5	3	47	26	6	48	1	17	45	4	42	30	2	31	36	32	29	27	33	41	9	8	25	20	11	9	44	57	58	
17	16	32	15	5	19	11	4	5	3	47	26	6	48	1	17	45	4	42	30	2	31	36	32	29	27	33	41	9	8	25	20	11	9	44	57	58	
10	21	28	10	8	7	13	50	16	35	24	47	26	48	1	31	41	3	43	34	2	27	45	32	28	25	36	45	9	8	26	20	11	9	44	57	58	
18	10	20	10	7	6	15	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
14	17	3	16	1	18	19	27	24	5	5	8	5	8	7	6	24	13	13	17	2	2	6	7	11	28	27	8	15	19	25	21	10	12	61	62	61	62
7	7	7	1	1	1	1	27	24	5	5	8	5	8	7	6	24	13	13	17	2	2	6	7	11	28	27	8	15	19	25	21	10	12	61	62	61	62
7	7	7	1	1	1	1	27	24	5</																												

States or territories having less than 3 establishments in any of the 36 industries have not been considered in fixing the rank. In the above table the rank of states in industries in which only one or two establishments were returned has not been given. In such cases, in order to avoid disclosing individual operations, the totals in all tables, showing states by industries, have been merged in the totals for "all other industries." It is impracticable to make a segregation of these totals, but the value of products is small and with unimportant exceptions the omission does not disturb the ranking.

In states or territories for which a small number of establishments was reported in 1900 an increase would result in the state being represented in the industry and a decrease in its being omitted. In 1900 for Delaware there were reported 2 and for the District of Columbia 5 establishments engaged in the manufacture of food preparations. The District of Columbia appeared in the table as sixteenth and Delaware received no rank. In 1905 the number of establishments in this industry had increased to 3 for Delaware and decreased to 2 for the District of Columbia, with the result that Delaware appeared in the table as fifteenth and the District of Columbia received no rank.

A small increase in value of products is reflected more plainly in states or territories having a comparatively low rank. In 1900 Alabama ranked seventeenth in the production of liquors, distilled, but at the census of 1905 it had attained sixteenth place by an increase of \$45,638 in value. The opposite is also true as shown by the production of clay products in Massachusetts, the state ranking ninth in 1900 and falling to fifteenth in 1905, with a decrease in value of products amounting to but \$292,545.

In 1900 Arizona ranked forty-third in the manufacture of lumber, planing mill products, including sash, doors, and blinds, and at the census of 1905 it was forty-seventh in rank, although the products had increased in value by \$4,857. Therefore a decrease in rank does not indicate a decrease in the total value of products.

Of the 32 classes shown in Table CXLV, those in the greatest number of states and territories at the census of 1905 were as follows: Flour and grist mill products; tobacco, cigars and cigarettes; clay products; lumber, planing mill products, including sash, doors, and blinds; lumber and timber products; carriages and wagons; and confectionery. In 1900 the order was: Flour and grist mill products, appearing in 50 states and territories; carriages and wagons; clay products; and lumber, planing mill products, including sash, doors, and blinds, each appearing in 49; lumber and timber products in 48; and tobacco, cigars and cigarettes in 47.

The states that held first, second, third, fourth, or fifth rank, either at the census of 1905 or 1900, in one or

more of the various industries shown by the table, together with the names of the industries in which they attained their rank, are as follows:

*New York.*—At both censuses the state ranked first in cheese, butter, and condensed milk; clothing, men's; clothing, women's; confectionery; electrical machinery, apparatus, and supplies; food preparations; furniture; hosiery and knit goods; liquors, malt; lumber, planing mill products, including sash, doors, and blinds; paper and wood pulp; and tobacco, cigars and cigarettes. It was second in rank in boots and shoes, and in flour and grist mill products; third in carriages and wagons and in petroleum refining; and fifth in dyeing and finishing textiles, and in worsted goods. From 1900 to 1905 it advanced from third rank to second in agricultural implements, and in jewelry; from eighth to fourth in iron and steel; and to fifth in liquors, distilled; but dropped from third to fourth place in leather, tanned, curried, and finished; and from fourth to fifth in clay products.

*Pennsylvania.*—At both censuses the state ranked first in glass; iron and steel; leather, tanned, curried, and finished; and petroleum, refining; second in clay products; clothing, women's; confectionery; electrical machinery, apparatus, and supplies; hosiery and knit goods; liquors, malt; lumber, planing mill products, including sash, doors, and blinds; tobacco, cigars and cigarettes; and woolen goods; third in clothing, men's, and in worsted goods; and fourth in dyeing and finishing textiles. From 1900 to 1905 it dropped from fourth rank to fifth in fertilizers, and in paper and wood pulp; and to sixth in flour and grist mill products, and in lumber and timber products; from fifth to sixth in boots and shoes; cheese, butter, and condensed milk; furniture; and liquors, distilled; and to seventh in cotton goods.

*Illinois.*—At both censuses the state ranked first in agricultural implements; liquors, distilled; and slaughtering and meat packing, wholesale; second in clothing, men's, and furniture; third in electrical machinery, apparatus, and supplies, and in iron and steel; fourth in cheese, butter, and condensed milk; and fifth in carriages and wagons; glass; jewelry; and tobacco, cigars and cigarettes. From 1900 to 1905 the state advanced from fourth to third in lumber and in planing mill products; from fifth to fourth in clay products; and from sixth to fifth in flour and grist mill products; but dropped from third to fifth in liquors, malt; to fourth in clothing, women's, and in confectionery; and from fourth to fifth in food preparations.

*Massachusetts.*—At both censuses the state ranked first in boots and shoes; cotton goods; woolen goods; and worsted goods; second in dyeing and finishing textiles; leather, tanned, curried, and finished; and paper and wood pulp; third in hosiery and in knit goods; fourth in electrical machinery, apparatus, and supplies; and fifth in clothing, women's. From 1900 to 1905 it advanced from fourth to third place in confectionery and from sixth to fifth in slaughtering and meat packing, whole-

sale; but dropped from second to third in jewelry, and from fourth to eighth in furniture.

*Ohio.*—At both censuses the state ranked first in carriages and wagons, and clay products; second in food preparations, and in iron and steel; third in liquors, distilled; fourth in petroleum, refining; and fifth in clothing, men's. From 1900 to 1905 it advanced from fourth rank to third in boots and shoes; clothing, women's; and glass; from fifth to fourth in lumber, planing mill products; and from sixth to fifth in confectionery and in furniture; but dropped from second to third in agricultural implements; from third to fourth in flour and grist mill products, and in tobacco, cigars and cigarettes; and from fifth to sixth in liquors, malt.

*New Jersey.*—At both censuses the state ranked first in dyeing and finishing textiles, second in petroleum refining, third in clay products and fertilizers, fourth in jewelry and worsted goods, and fifth in leather, tanned, curried, and finished, and electrical machinery, apparatus, and supplies. From 1900 to 1905 the state dropped from third to fourth in glass and from fourth to sixth in iron and steel.

*Missouri.*—From 1900 to 1905 the state advanced from seventh to fourth place in boots and shoes, and liquors, malt, and from fifth to fourth in slaughtering and meat packing, wholesale, but dropped from fifth to sixth in confectionery, and from fifth to eighth in food preparations.

*Michigan.*—At both censuses the state ranked third in furniture and fourth in carriages and wagons. From 1900 to 1905 it advanced in rank from seventh to fourth place in food preparations and from sixth to fifth in agricultural implements, but dropped from second to third in lumber and timber products; from third to fifth in lumber, planing mill products, including sash, doors, and blinds, and from fifth to eighth in hosiery and knit goods.

*Wisconsin.*—At both censuses the state ranked second in cheese, butter, and condensed milk and fourth in agricultural implements. From 1900 to 1905 it advanced from fourth to third place in leather, tanned, curried, and finished, and in liquors, malt; from fifth to fourth in paper and wood pulp; and from eighth to fifth in hosiery and knit goods, but dropped from first to second in lumber and timber products.

*Indiana.*—At both censuses the state ranked second in carriages and wagons, in glass, and in liquors, distilled. From 1900 to 1905 it advanced in rank from seventh to fourth in furniture, but dropped from fourth to seventh in slaughtering and meat packing, wholesale, from fifth to sixth in agricultural implements, and to eighth in iron and steel, and flour and grist mill products.

*Connecticut.*—At both censuses the state held fourth place in hosiery and knit goods and in woolen goods.

*California.*—At both censuses the state was fifth in rank in petroleum, refining.

*Minnesota.*—At both censuses the state ranked first in flour and grist mill products. From 1900 to 1905 it advanced from sixth rank to fifth in cheese, butter, and condensed milk, but dropped from third to fifth in lumber and timber products.

*Maryland.*—At both censuses the state ranked fourth in clothing, men's. It dropped from first rank in 1900 to second in 1905 in fertilizers.

*Rhode Island.*—At both censuses the state ranked first in jewelry, second in worsted goods, and third in dyeing and finishing textiles. From 1900 to 1905 it dropped from fourth rank to fifth in cotton goods.

*Kansas.*—At both censuses the state ranked second in slaughtering and meat packing, wholesale. It advanced from tenth place in 1900 to third place at the census of 1905 in flour and grist mill products.

*Louisiana.*—At both censuses the state ranked third in oil, cottonseed and cake. From 1900 to 1905 it advanced from ninth to fourth place in lumber and timber products.

*Iowa.*—At both censuses the state ranked third in cheese, butter, and condensed milk and in food preparations.

*Kentucky.*—At both censuses the state ranked fourth in liquors, distilled. In 1900 the state ranked fifth in oil, cottonseed and cake, but dropped to sixth place in 1905.

*Nebraska.*—At both censuses the state ranked third in slaughtering and meat packing, wholesale.

*Georgia.*—At both censuses the state ranked second in oil, cottonseed and cake. From 1900 to 1905 it advanced from sixth to first place in fertilizers and from seventh to fourth in cotton goods, but dropped from first to second in turpentine and rosin.

*Texas.*—At both censuses the state ranked first in oil, cottonseed and cake.

*Virginia.*—The state gained fourth place at the census of 1905 from fifth in 1900 in fertilizers.

*Maine.*—At both censuses the state ranked third in paper and wood pulp and in woolen goods.

*North Carolina.*—At both censuses the state ranked third in cotton goods and fifth in turpentine and rosin.

*Washington.*—The state gained first place at the census of 1905 from fifth in 1900 in lumber and timber products.

*New Hampshire.*—At both censuses the state ranked fifth in woolen goods, but dropped from third to fifth rank in boots and shoes at the census of 1905.

*Alabama.*—At both censuses the state ranked third

in turpentine and rosin. From 1900 to 1905 it advanced in rank from sixth to fifth place in iron and steel and from eighth to fifth in oil, cottonseed and cake.

*South Carolina.*—At both censuses the state ranked second in cotton goods. It dropped from second rank in 1900 to sixth at the census of 1905 in fertilizers.

*Mississippi.*—At both censuses the state ranked fourth in oil, cottonseed and cake, and in turpentine and rosin.

*Florida.*—From 1900 to 1905 the state advanced from second to first place in turpentine and rosin, and from fourth to third in tobacco, cigars and cigarettes.

INDUSTRIES BY GEOGRAPHIC DIVISIONS.

The United States, the states and territories; and the cities with a population of 8,000 and over at the census of 1900 are the only political divisions presented in the

statistics of manufactures for the census of 1905. To preserve uniformity of treatment, as well as for convenience of reference, the alphabetical arrangement has, as a rule, been followed in the general tables. In addition, it is essential to have some geographic grouping of the states to illustrate the increase or decrease in larger areas, which are subject to the same general conditions, or to show the extent of the concentration of industries in broader areas than those included within state lines.

The employment of the same geographic arrangement of the states for all branches of census work not only secures uniformity of methods but avoids the possibility of confusion in the use of geographic terms, and makes it possible to obtain the totals for population, manufactures, agriculture, mining, etc., for exactly the same subdivisions. With this end in view the geographic arrangement given in Table CXLVI has been adopted.

TABLE CXLVI.—SUMMARY—UNITED STATES, BY GEOGRAPHIC DIVISIONS, STATES, AND TERRITORIES: 1905.

GEOGRAPHIC DIVISION AND STATE OR TERRITORY.	Number of establishments.	Capital.	WAGE-EARNERS AND WAGES.		Miscellaneous expenses.	Cost of materials used.	Value of products, including custom work and repairing.
			Average number.	Wages.			
United States.....	216,262	\$12,686,265,073	5,470,321	\$2,611,540,532	\$1,455,019,473	\$8,503,949,756	\$14,802,147,087
Continental United States.....	216,180	12,675,580,874	5,468,383	2,610,444,053	1,453,167,757	8,500,207,810	14,793,602,543
•North Atlantic division.....	89,978	6,613,352,082	2,827,317	1,365,194,774	702,599,687	4,078,268,071	7,244,264,373
New England.....	22,279	1,870,995,405	940,752	439,050,232	167,203,071	1,116,272,902	2,025,998,437
Maine.....	3,145	143,707,750	74,958	32,661,759	12,485,167	80,042,090	144,020,197
New Hampshire.....	1,618	109,495,072	65,366	27,693,203	9,006,821	73,216,387	123,610,904
Vermont.....	1,699	62,658,741	33,106	15,221,050	4,923,366	32,429,852	63,083,611
Massachusetts.....	10,723	905,948,887	488,399	232,388,946	93,840,185	626,410,431	1,124,092,051
Rhode Island.....	1,617	215,901,375	97,318	43,112,637	14,623,430	112,872,261	202,100,583
Connecticut.....	3,477	373,283,580	181,605	87,942,628	32,325,002	101,301,881	360,082,091
Southern North Atlantic.....	67,699	4,742,356,677	1,886,565	920,144,542	535,395,716	2,961,995,169	5,218,265,936
New York.....	37,194	2,031,459,515	856,947	430,014,851	301,575,788	1,348,603,286	2,488,345,570
New Jersey.....	7,010	715,060,174	266,336	123,168,801	66,552,081	470,449,176	774,369,025
Pennsylvania.....	23,495	1,995,836,988	763,282	367,960,890	167,267,247	1,142,642,707	1,955,551,332
South Atlantic division.....	19,564	930,419,780	522,611	175,400,785	91,770,695	550,101,771	974,028,415
Northern South Atlantic.....	10,261	507,813,384	242,091	97,056,917	49,990,908	320,708,198	550,792,632
Delaware.....	631	50,925,630	18,475	8,158,203	2,601,218	24,883,806	41,160,276
Maryland.....	3,852	201,877,966	94,174	36,144,244	21,904,752	150,024,066	243,375,096
District of Columbia.....	482	20,199,783	6,209	3,658,370	2,724,840	7,731,971	18,359,159
Virginia.....	3,187	147,989,182	80,285	27,943,058	14,403,382	83,649,149	148,856,525
West Virginia.....	2,109	86,820,823	43,758	21,153,042	8,266,716	54,410,208	99,040,076
Southern South Atlantic.....	9,303	422,606,396	270,620	78,403,868	41,779,787	220,393,573	423,235,783
North Carolina.....	3,272	141,000,639	85,339	21,375,294	17,952,050	79,268,004	142,520,776
South Carolina.....	1,399	113,422,224	59,441	13,868,950	6,013,241	49,968,626	79,376,262
Georgia.....	3,219	135,211,551	92,749	27,392,442	12,206,634	83,624,504	151,040,455
Florida.....	1,413	32,971,982	42,091	15,767,182	5,607,862	16,532,439	50,298,290
North Central division.....	73,246	3,753,340,940	1,536,889	773,486,165	518,132,418	2,007,547,583	4,889,813,934
Eastern North Central.....	51,754	2,895,446,016	1,224,528	615,943,634	413,259,173	2,045,536,931	3,605,368,132
Ohio.....	13,785	856,988,830	364,298	182,429,425	102,704,746	527,636,585	960,811,857
Indiana.....	7,044	312,071,234	154,174	72,058,099	40,682,513	220,507,007	393,054,405
Illinois.....	14,921	975,844,709	370,436	208,405,468	172,185,567	840,057,316	1,410,342,129
Michigan.....	7,446	337,894,102	175,229	81,278,837	40,012,191	230,080,931	429,120,060
Wisconsin.....	8,558	412,647,051	151,391	71,471,805	227,255,092	45,674,156	411,139,681
Western North Central.....	21,492	857,903,933	312,361	157,542,531	104,873,245	862,010,652	1,284,445,802
Minnesota.....	4,756	184,903,271	69,636	35,843,145	24,493,840	210,553,940	307,858,073
Iowa.....	4,785	111,427,429	49,481	22,997,053	12,152,888	102,843,892	160,672,313
Missouri.....	6,464	379,368,827	133,167	66,644,126	49,522,457	252,258,417	459,548,657
North Dakota.....	507	5,703,837	1,755	1,031,307	500,880	7,065,986	10,217,914
South Dakota.....	686	7,555,142	2,492	1,421,680	833,360	8,666,831	13,085,353
Nebraska.....	1,819	80,235,310	20,260	11,022,149	8,490,360	124,051,628	154,918,220
Kansas.....	2,475	88,680,117	35,570	18,883,071	8,870,460	156,509,940	198,244,992

TABLE CXLVI.—SUMMARY—UNITED STATES, BY GEOGRAPHIC DIVISIONS, STATES, AND TERRITORIES: 1905—Continued.

GEOGRAPHIC DIVISION AND STATE OR TERRITORY.	Number of establishments.	Capital.	WAGE-EARNERS AND WAGES.		Miscellaneous expenses.	Cost of materials used.	Value of products, including custom work and repairing.
			Average number.	Wages.			
South Central division.....	18,590	\$734,267,139	364,699	\$151,069,526	\$82,908,012	\$498,088,696	\$879,567,293
Eastern South Central.....	10,311	405,361,127	221,229	83,941,797	46,525,537	252,156,463	464,335,811
Kentucky.....	3,734	147,282,478	59,794	24,438,684	20,530,852	86,545,464	159,753,968
Tennessee.....	3,175	102,439,481	60,572	22,805,628	12,090,099	79,351,746	137,936,476
Alabama.....	1,882	105,382,859	62,173	21,878,451	8,948,819	60,458,368	109,100,922
Mississippi.....	1,520	50,256,309	38,690	14,819,034	5,855,767	25,800,885	57,451,445
Western South Central.....	8,279	328,906,012	143,470	67,127,729	36,382,475	246,832,233	415,231,482
Louisiana.....	2,091	150,810,608	55,859	25,315,750	16,047,105	117,035,305	180,379,592
Arkansas.....	1,907	46,306,116	33,089	14,543,635	6,648,843	21,789,346	53,864,394
Indian Territory.....	466	5,016,654	2,257	1,144,078	492,530	4,848,646	7,909,451
Oklahoma.....	657	11,107,763	3,199	1,655,324	970,016	11,545,306	16,549,656
Texas.....	3,158	115,664,871	49,066	24,468,942	12,215,472	91,003,630	150,528,380
Western division.....	14,802	644,191,924	216,867	145,233,703	57,756,945	465,301,689	806,228,548
Rocky Mountain.....	2,720	177,276,892	39,143	20,226,163	12,532,023	111,649,687	184,567,334
Montana.....	382	52,589,810	8,957	8,652,217	4,052,081	40,930,060	66,415,462
Idaho.....	364	9,689,445	3,061	2,059,391	1,111,699	4,068,523	8,768,743
Wyoming.....	169	2,695,889	1,834	1,261,122	420,667	1,800,773	3,523,260
Colorado.....	1,606	107,663,500	21,813	15,100,365	6,519,100	63,114,997	100,143,999
New Mexico.....	199	4,638,248	3,478	2,153,088	428,546	2,235,934	5,705,880
Basin and Plateau.....	800	43,291,662	13,647	9,820,055	2,858,927	41,162,600	70,105,930
Arizona.....	169	14,395,654	4,793	3,960,248	1,208,320	14,595,057	28,083,192
Utah.....	606	26,004,011	8,052	5,157,400	1,465,707	24,939,827	38,926,494
Nevada.....	115	2,891,997	802	693,407	184,900	1,627,776	3,096,274
Pacific.....	11,192	423,623,370	164,077	106,187,485	42,365,995	312,480,342	551,565,284
Washington.....	2,751	96,952,621	45,199	30,987,287	11,034,750	66,166,165	128,821,667
Oregon.....	1,602	44,023,848	18,523	11,443,512	4,185,695	30,606,763	55,525,123
California.....	6,839	282,647,201	100,355	64,656,686	27,145,650	215,726,414	367,218,404
Alaska.....	82	10,684,799	1,938	1,095,579	1,851,716	3,741,946	8,244,524

This table arranges the states and territories in five divisions and twelve subdivisions, bringing together contiguous states, and giving subtotals for limited areas in which the same general conditions predominate. It also brings together these subtotals, presenting aggregates for larger sections of the country. This method of presentation, although it may not give the figures for the separate states in so convenient a form as an alphabetical arrangement, permits the broader comparison of the statistics for the country by its principal geographic divisions, and also facilitates the comparison of the manufactures of adjoining states, developing interesting facts as to their relative importance. The following brief comparisons will serve to indicate the advantages of the table.

Of the 4 states comprising the Southern South Atlantic subdivision at the census of 1905, Georgia was the most important and North Carolina ranked second. The manufactures of these 2 states gave employment to 63.7 per cent of the wage-earners, and the value of their products formed 69.4 per cent of the total for the subdivision. Each of them gave employment to more than twice as many wage-earners as were reported for Florida, the last of the group, and exceeded by more than 25,000 the number reported for South Carolina, the remaining state. Considering the entire South

Atlantic division, it is found that the manufactures are divided quite evenly between the northern and southern subdivisions. The southern subdivision contains 53.5 per cent of the wage-earners and 43.5 per cent of the value of products, and the northern subdivision 46.5 and 56.5 per cent, respectively. In the Eastern South Central group the total value of products for Kentucky is not far from being three times as large as that for Mississippi, while that for Tennessee is over twice as large, and that for Alabama lacks only a little of being double.

Of the twelve subdivisions shown in the table, the Southern North Atlantic is the most important. The establishments included in it gave employment to 1,886,565 wage-earners, and their products were valued at \$5,218,265,936, forming 34.5 and 35.3 per cent, respectively, of the totals for the United States, including Alaska. The Eastern North Central division ranks second, reporting 1,224,528 wage-earners and products valued at \$3,605,368,132, forming 22.4 and 24.4 per cent of the totals for the United States.

In addition to the established official grouping of the states as shown in Table CXLVI, further interesting features of the statistics are developed by adopting the broader and more familiar grouping given in Table CXLVII.

## MANUFACTURES.

TABLE CXLVII.—COMPARATIVE SUMMARY—UNITED STATES BY GROUPS

GROUP OF STATES.	Census.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.	
				Number.	Salaries.
1 United States.....	1905	216,262	\$12,086,265,673	519,751	\$574,761,231
2	1900	207,562	8,978,825,200	364,202	380,889,091
3 Per cent of increase.....		4.2	41.3	42.7	50.0
4 New England states <sup>2</sup> .....	1905	22,270	1,870,995,405	60,258	72,790,265
5	1900	22,576	1,507,620,610	45,402	53,306,463
6 Per cent of increase.....		11.3	24.1	32.7	36.3
7 Middle states <sup>3</sup> .....	1905	72,664	5,015,360,056	198,370	225,050,766
8	1900	70,844	3,656,526,169	136,213	150,907,229
9 Per cent of increase.....		2.6	37.2	45.6	49.0
10 Southern states <sup>4</sup> .....	1905	33,189	1,391,083,540	55,637	55,128,940
11	1900	31,366	805,405,187	34,940	31,072,813
12 Per cent of increase.....		5.8	72.8	59.2	77.4
13 Central states <sup>5</sup> .....	1905	67,759	3,571,145,543	174,211	185,975,455
14	1900	66,298	2,498,042,005	127,608	125,091,748
15 Per cent of increase.....		2.2	42.0	30.5	48.7
16 Western states <sup>6</sup> .....	1905	9,097	402,772,960	13,370	14,860,306
17	1900	8,101	261,651,877	9,834	9,432,106
18 Per cent of increase.....		12.3	53.9	36.0	57.6
19 Pacific states <sup>7</sup> .....	1905	11,192	423,023,370	17,710	20,624,590
20	1900	8,329	245,401,630	10,123	10,780,965
21 Per cent of increase.....		34.4	72.6	74.9	91.3
22 Alaska.....	1905	82	10,684,790	195	321,009
23	1900	48	3,568,704	82	117,770
24 Per cent of increase.....		70.8	199.4	137.8	173.3

<sup>1</sup> Decrease.<sup>2</sup> Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.<sup>3</sup> New York, New Jersey, Pennsylvania, Delaware, Maryland, and District of Columbia.<sup>4</sup> Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Indian Territory, Oklahoma, and Texas.

COMPARATIVE IMPORTANCE OF STATES AND INDUSTRIES.

OF STATES, WITH PER CENT OF INCREASE: 1905 AND 1900.

WAGE-EARNERS AND 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.				
5,470,321 4,716,023 16.0	\$2,611,540,532 2,009,735,709 29.9	4,244,538 3,635,236 16.8	\$2,266,273,317 1,730,347,184 30.5	1,065,884 918,511 16.0	\$317,279,008 245,814,074 27.5	159,899 161,276 10.9	\$27,988,207 24,574,541 13.9	\$1,455,019,473 905,000,225 60.7	\$8,503,949,756 6,577,614,074 29.3	\$14,802,147,087 11,411,121,122 29.7	1 2 3
940,752 851,903 10.4	430,050,232 367,074,353 19.4	650,148 582,572 11.6	845,138,972 283,229,908 19.7	203,050 244,541 7.8	88,086,475 74,804,009 17.8	26,954 24,790 8.7	5,824,785 4,639,770 25.5	107,203,971 109,963,995 52.1	1,116,272,902 904,030,950 23.5	2,025,998,437 1,660,349,100 22.0	4 5 6
2,005,513 1,725,731 10.2	974,105,359 773,258,384 20.0	1,477,425 1,250,992 17.3	823,343,753 651,271,340 26.4	471,400 400,687 15.9	140,893,364 112,563,092 25.1	56,688 59,052 14.0	9,958,242 9,423,943 5.7	502,716,526 354,108,289 58.9	3,144,635,012 2,472,959,497 27.2	5,521,161,367 4,343,542,548 27.1	7 8 9
768,302 628,053 22.3	278,599,494 185,683,781 50.0	632,880 515,182 22.8	253,872,560 168,450,100 50.7	80,743 71,895 24.8	18,406,704 12,839,900 43.4	45,739 40,976 11.6	6,290,230 4,398,781 43.0	147,357,897 82,283,645 79.1	860,450,624 564,148,540 53.6	1,550,700,277 1,020,370,844 52.0	10 11 12
1,476,812 1,290,003 14.5	741,127,958 560,803,094 30.8	1,234,315 1,084,064 13.9	674,264,787 518,589,176 30.0	215,757 174,120 23.9	61,826,884 42,927,898 44.0	26,740 31,819 116.0	5,036,287 5,286,020 14.7	499,428,358 322,473,914 54.9	2,611,193,189 2,007,843,884 26.3	4,513,347,475 3,525,923,409 28.0	13 14 15
112,867 93,867 20.2	71,404,425 51,159,359 39.6	102,562 85,885 19.4	68,435,276 49,213,042 39.1	8,443 5,712 47.8	2,532,294 1,544,618 63.9	1,862 2,270 118.0	436,855 401,699 8.8	34,095,010 17,589,874 93.9	449,166,741 342,902,544 31.0	631,129,723 491,026,220 28.3	16 17 18
164,077 123,206 33.2	106,187,485 63,777,148 66.5	145,313 105,282 38.0	100,132,329 50,219,274 69.1	16,892 15,555 8.4	5,615,099 4,133,552 35.8	1,902 2,309 119.7	440,057 424,322 3.7	42,365,995 19,031,454 122.0	312,489,342 223,960,046 39.5	551,595,284 304,809,580 51.2	19 20 21
1,938 2,280 114.2	1,095,579 1,374,680 120.3	1,895 2,259 116.1	1,085,640 1,374,275 121.0	20 1 2,800.0	8,188 405 1,921.7	14 405 -----	1,751 ----- -----	1,851,716 158,054 1,071.6	3,741,946 1,702,583 112.3	8,244,594 4,194,421 66.6	22 23 24

<sup>6</sup> Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, and Missouri.

<sup>6</sup> Montana, Idaho, Wyoming, North Dakota, South Dakota, Nebraska, Nevada, Utah, Colorado, Kansas, Arizona, and New Mexico.

<sup>7</sup> Washington, Oregon, and California.

MANUFACTURES.

This grouping brings the states together into geographic divisions which are more comprehensive and from the standpoint of manufactures more broadly homogeneous than those shown by the grouping in Table CXLVI. With respect to it the following appeared in the Twelfth Census Report on Manufactures:<sup>1</sup>

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

<sup>1</sup>Twelfth Census, Manufactures, Part I, page clxxi.

governed by conditions altogether different from those prevailing elsewhere.

Table CXLVII shows the relative importance of the manufacturing industries in these seven geographic divisions of the country, but as it is confined to two censuses and covers a period of but about four and one-half years it conveys only a limited idea of the rapidity of development in the different sections. To be complete the table should show the statistics for the earlier censuses, but as the totals for the censuses prior to 1900 can not be reduced to a comparative basis with those for the factory census of 1905 they are not reproduced in this connection. Reference should be made to Part I of the Twelfth Census Report on Manufactures for information concerning the increase prior to 1900.<sup>2</sup> This table should be considered in connection with Table CXLVIII, which shows the percentage the manufactures of each of the seven geographic divisions constitutes of the total for the United States.

<sup>2</sup>Twelfth Census, Manufactures, Part I, page clxxii.

TABLE CXLVIII.—PER CENT DISTRIBUTION OF MANUFACTURES IN THE UNITED STATES, BY GROUPS OF STATES: 1850 TO 1905.

GROUP OF STATES.	Census.	PER CENT OF TOTALS FOR UNITED STATES.						
		Number of establishments.	Capital.	Wage-earners.		Miscellaneous expenses.	Cost of materials used.	Value of products.
				Average number.	Wages.			
New England states	1905	10.3	14.7	17.2	16.8	11.5	13.1	13.7
	1900	10.9	16.8	18.1	18.3	12.2	13.8	14.6
	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		24.3	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	1905	33.6	39.5	36.7	37.3	38.7	37.0	37.3
	1900	34.1	40.7	36.0	38.4	39.1	37.6	38.1
	1890	35.2	39.2	38.5	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	1905	15.3	11.0	14.0	10.7	10.1	10.2	10.5
	1900	15.1	9.0	13.3	9.2	9.1	8.6	8.9
	1890	13.1	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	6.0	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	1905	31.3	28.2	27.0	28.4	34.3	30.7	30.5
	1900	32.0	27.8	27.4	28.3	35.6	31.4	30.9
	1890	31.8	29.7	28.2	27.6	34.7	32.5	31.4
	1880	32.3	25.1	23.6	24.1		20.4	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	1905	4.2	3.2	2.1	2.7	2.4	5.3	4.3
	1900	3.9	2.9	2.0	2.5	1.9	5.2	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	1905	5.2	3.3	3.0	4.1	2.9	3.7	3.7
	1900	4.0	2.4	2.6	3.2	2.1	3.4	3.2
	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
Alaska	1905	0.1	0.1	(1)	(1)	0.1	(1)	(1)
	1900	(1)	0.1	(1)	(1)	(1)	(1)	(1)
	1890	(1)	(1)	(1)	(1)	(1)	(1)	(1)

<sup>1</sup>Less than one-tenth of 1 per cent.

As explained on page xxxiii, although the inclusion of the neighborhood industries and mechanical trades at prior censuses destroys the availability of the figures for direct comparison with those for the census of 1905, it has but slight effect on the statistics other than to increase the number of establishments. While totals in which such industries are included should not be used in comparative tables, their employment in computing percentages similar to those given in Table CXLVII does not greatly disturb the proportions. In this way it is made possible to extend the table to earlier censuses, thus adding greatly to its value; the percentages are therefore presented for the censuses prior to 1900, subject to the qualifications just noted.

1. *The New England states.*—This group comprises the states in which manufactures were first established, and during the earlier history of the country it contained the major portion of many of the most important industries. At the census of 1850, when the relative importance in manufactures of the different states was first definitely determined, it was found that the New England states gave employment to 32.7 per cent of the wage-earners and produced 27.8 per cent of the total products of the United States. These proportions have decreased at each succeeding census until 1905, when the wage-earners formed 17.2 and the value of products 13.7 per cent of the total. This group of states is now surpassed in the magnitude of its manufactures by both the Middle and the Central geographic divisions, as it is exceeded by them in population also. Since 1900 there has been a larger actual as well as proportional increase in value of products for the Middle, Southern, and Central divisions than for the New England states.

Notwithstanding the more rapid increase in the manufactures of other sections of the country and the resulting decrease in the proportion of the total represented by the New England states, the manufactures of the division have increased enormously since 1850, and they now represent a large proportion of many of the most important industries. Among them are the following, in each of which more than 50 per cent of the value of products was reported at the census of 1905 by factories located in these states: Ammunition; boots and shoes, leather; boots and shoes, rubber; brass and copper, rolled; brassware; clocks; combs; corsets; cotton goods; envelopes; firearms; hardware; needles, pins, and hooks and eyes; nets and seines; plated ware; silversmithing and silverware; woolen goods; worsted goods. In these states, also, were produced more than 49.9 per cent of the cutlery and edge tools, 46.3 per cent of the jewelry, 38.6 per cent of the paper and wood pulp, and 40 per cent of rubber and elastic goods. Over 49 per cent of the textiles dyed and finished in establishments not parts of textile mills were dyed and finished in New England.

2. *The Middle states.*—This geographic division also contains some of the oldest manufacturing communi-

ties of the United States. It contains eight out of the twenty largest manufacturing cities, and its factories cover practically all branches of industry. The rate of increase for the division has been considerably greater than that for the New England states. The gross value of its products is now more than twice as great, and its factories give employment to more than twice the number of wage-earners that there are in the New England division. The value of products, \$5,521,161,367, reported for the census of 1905, is far in excess of that for any other geographic division and is an increase of \$1,177,618,819 over that reported by this division for 1900, a larger actual increase than is reported for any other division. The increase in the manufactures of other states has, however, also tended to reduce the proportion in the Middle states, and, as shown by Table CXLVIII, their percentage of the total value of products has decreased from 46.4 per cent in 1850 to 37.3 per cent at the census of 1905. While a large proportion of all of the leading manufactures are found in these states, they especially predominate in the following, their factories producing more than 50 per cent of the products of each class: Belting and hose, rubber; buttons; carpets and rugs, other than rag; cement; chemicals; clothing, men's; clothing, women's; coke; dyestuffs and extracts; electrical machinery, apparatus, and supplies; gas and lamp fixtures; gloves and mittens, leather; hats, felt; hats, straw; hosiery and knit goods; iron and steel, blast furnaces; iron and steel, steel works and rolling mills; lapidary work; lead pencils (the entire product); leather goods; locomotives; millinery and lace goods; mirrors; perfumery and cosmetics; petroleum, refining; phonographs and graphophones; photographic apparatus; photographic materials; silk and silk goods; shirts; smelting and refining, copper; stamped ware; sugar and molasses, refining; tin and terne plate; tobacco, cigars and cigarettes; varnishes; wall paper; wire; wood distillation, not including turpentine and rosin.

Other industries represented largely in the Middle states were as follows: Leather, tanned, curried, and finished, 49.4 per cent of the total value of product for the industry; glass, 49 per cent; lamps and reflectors, 48.9 per cent; paints, 48.2 per cent; steam fittings and heating apparatus, 47.5 per cent; sewing machines and attachments, 47.4 per cent; wirework, including wire rope and cable, 45.9 per cent; druggists' preparations, 45.2 per cent; shipbuilding, iron and steel, 44.3 per cent; printing and publishing, book and job, 42.1 per cent; pottery, terra cotta, and fire clay products, 41.6 per cent; mattresses and spring beds, 40.7 per cent; confectionery, 38.1 per cent.

3. *The Southern states.*—It is probable that the industrial development of the Southern states has been more rapid during the years between the censuses of 1900 and 1905 than for any other equal period of their history. As shown by Table CXLVII, the increase, 52 per cent, in gross value of products was almost

twice as large as that for any of the other divisions, with the exception of the Pacific states and Alaska, where the amounts involved were comparatively small. The increases in capital invested, wage-earners, wages, and the other items indicating industrial prosperity were in keeping with the increase in production. At the census of 1860 the products of manufactures in this division formed 10.3 per cent of the total for the United States, but at the census of 1870, immediately following the Civil War, the proportion had decreased to 6.6 per cent, and it continued to decrease until 1880, when it was but 6.3 per cent. Since then there has been a steady growth, the census of 1905 showing a slight gain of two-tenths of 1 per cent over 1860. The manufactures of the entire country have increased enormously since the latter year, and that the South now occupies the same relative position that it held before the ravages of the Civil War had depleted its resources conveys at once an impression of its rapid recovery and wonderful increase. The value of the products of manufactures reported for these states at the census of 1905 was a sum more than eight times greater than the value in 1860. From the standpoint of the number of wage-earners, the manufacturers of the South have more than recovered their ground, for at the census of 1905 they gave employment to 14.2 per cent of the wage-earners reported for the entire country, against but 10.1 per cent in 1860. This exceptional increase in the number of wage-earners is due to the development of industries requiring more labor and involving a greater number of processes, such as the textile industries and iron and steel.

At the census of 1905 the rice cleaning and polishing industry was principally, and the turpentine and rosin industry was wholly confined to this division, and the cottonseed oil and cake and the peanut grading, roasting, cleaning, and shelling industries almost wholly; while more than 50 per cent of the value of products for the canning and preserving of oysters, the manufacture of fertilizers, and wood preserving were also reported. In addition, the Southern states showed 47.7 per cent of the total value of products for chewing and smoking tobacco and snuff; over 40 per cent for lumber and timber products; more than 37 per cent of the total value for cotton goods; over 30 per cent of the manufactured ice; and over 12 per cent in value of the blast furnace product of the iron and steel industry.

4. *The Central states.*—As measured by the value of products, the relative importance of this group of states has increased from 14.3 per cent in 1850 to 30.5 per cent at the census of 1905, a relative increase of 16.2 per cent. During the same period the relative importance of the New England states has decreased by 14.1 per cent.

Table CXLVIII indicates that the increase in the proportion of wage-earners for the division has not been

quite as rapid as in the value of products. This is explained by the fact that one of the principal industries—slaughtering and meat packing—reports a comparatively low average number of employees to a product of a given value.

In magnitude of operations the manufactures of the Central states exceeded those of all the other geographic divisions except the Middle states. The rapid increase in the manufactures of this section has been due primarily to the development of the iron and copper mines of Michigan and Wisconsin, to the lumber and timber industry, and to the slaughtering and meat packing industries. For the following industries these states reported more than 50 per cent of the value of products: Agricultural implements; automobiles; butter; candles; carriages and wagons; cars, steam railroad; cars, street railroad; cash registers and calculating machines; cheese; food preparations; furniture; glucose; liquors, distilled; oil, linseed; oleomargarine; refrigerators; slaughtering and meat packing, wholesale; and stoves and furnaces. Other industries for which the Central states showed a relatively large value of product at the census of 1905 are as follows: Flour and grist mill products, 49.7 per cent of the total value of products for the industry; soap, 48.2 per cent; druggists' preparations, 47.3 per cent; glue, and wirework, including wire rope and cable, each 45.9 per cent; starch, 46.5 per cent; condensed milk, 45.6 per cent; matches, 43.9 per cent; mattresses and spring beds, 40.7 per cent; lime, 39.3 per cent; and foundry and machine shop products, 37 per cent.

5. *The Western states.*—The 4 states of Colorado, Nebraska, Kansas, and Montana reported 82.3 per cent of the manufactures of this geographic division as measured by the value of product. All the states in this division, especially those not enumerated above, are engaged principally in agriculture and stock raising. The relative importance of the manufactures of this division has, however, increased constantly since 1850. At that census the value of the products formed only one-tenth of 1 per cent of the total for the United States. This proportion had increased to 4.3 per cent at the census of 1905.

At the census of 1905 the Western states reported nearly 40 per cent of the value of product for the beet sugar industry. They reported more than 50 per cent of the total value of product for the smelting and refining of zinc, 43 per cent for the smelting of lead, and 35.5 per cent for the smelting and refining of copper. The smelting of lead and copper ores is done largely in the Western states and the refining largely in the Middle states. If in the refining only the value added by the process could be given as the value of the product, the Western states would show much more than 50 per cent of the total product for the lead and copper smelting and refining industries. The value of the ore smelted is, however, duplicated in the

value of the metal refined, and thus, as the refining is done largely in the Middle states, the geographic division made up of these states is accredited with the greater value of product in these industries.

6. *The Pacific states.*—This division comprises but 3 states. The value of their products as reported at the census of 1905 formed 3.7 per cent of the total for the United States. The proportion is somewhat less than that for the Western states, though their manufacture gave employment to a slightly larger proportion of the total wage-earners. Since the census of 1900 the value of products has increased 51.2 per cent and the number of wage-earners 33.2 per cent, the percentage of increase in value of products being almost as great as that for the Southern states and that for the number of wage-earners considerably

in excess. For vinous liquors the Pacific states reported more than 50 per cent of the value of products; for canning and preserving, fruits and vegetables, over 25 per cent; for canning and preserving, fish, 24.8 per cent; and for beet sugar, more than 20 per cent. Other principal industries of the division are lumber and timber products; flour and grist mill products; foundry and machine shop products; shipbuilding, iron and steel; and petroleum, refining.

7. *Alaska.*—The canning and preserving of fish was the only industry of any importance in Alaska at the census of 1905, reporting 93.8 per cent of the total value of products for the territory. The other industries for which reports were obtained were lumber and timber products, fertilizers, malt liquors, and the printing and publishing of newspapers and periodicals.

## CHAPTER X.

### POWER EMPLOYED IN MANUFACTURES.

As explained on page xxi, the census of 1905 was not confined to large establishments but covered all that had an annual product of \$500, provided they were not engaged in the neighborhood and mechanical industries. Therefore many of the establishments included were not of sufficient size to employ motive power with advantage, while others were engaged in industries where power was not necessary.

In reducing the totals for the census of 1900 to a comparative basis, it was found to be impracticable to elim-

inate the statistics of power for all the neighborhood and mechanical industries, the other statistics for which were excluded. Comparatively little motive power, however, was employed in these industries, and consequently their inclusion has but slight effect on comparisons with the statistics for the census of 1905, except for "total number of establishments reporting power."

The statistics of power, by kind, as reported at each census since 1870, are summarized in Table CXLIX, which gives for each census the total horsepower.

TABLE CXLIX.—COMPARATIVE SUMMARY, WITH PER CENT OF INCREASE, FOR EACH CENSUS PERIOD:  
1870 TO 1905.

[For 1900 the number of establishments reporting power and the horsepower include the hand trades and neighborhood industries, except custom gristmills, custom sawmills, and cotton ginning. Prior to 1900 the total number of establishments, the number reporting power, and the horsepower include all hand trades and neighborhood industries.]

	CENSUS.					PER CENT OF INCREASE.			
	1905	1900	1890	1880	1870	1900 to 1905	1890 to 1900	1880 to 1890	1870 to 1880
Number of establishments.....	216,262	207,562	355,415	253,852	252,148	4.2	141.6	40.0	0.7
Number of establishments reporting power.....	134,544	133,456	100,735	85,923	(2)	0.8	32.5	17.2	.....
Total horsepower.....	14,041,544	10,409,625	5,954,655	3,410,837	2,346,142	40.7	74.8	74.6	45.4
Average horsepower per establishment.....	108.8	78.0	60.1	39.7	39.3	39.5	32.0	48.9	326.9
Owned:									
Engines—									
Steam—									
Number.....	127,425	130,754	91,410	56,483	(2)	12.5	43.0	61.8	.....
Horsepower.....	10,828,111	8,140,533	4,581,595	2,185,458	1,215,711	33.0	77.7	100.0	79.8
Per cent of total horsepower.....	73.9	78.2	76.0	64.1	51.8				
Gas and gasoline—									
Number.....	21,525	14,334	(2)	(2)	(2)	50.2			
Horsepower.....	289,514	134,742	8,930	(2)	(2)	114.9	1,408.0		
Per cent of total horsepower.....	2.0	1.3	0.1						
Water wheels <sup>1</sup> —									
Number.....	20,996	23,104	30,008	55,404	(2)	19.1	140.8	120.6	.....
Horsepower.....	1,047,969	1,454,229	1,255,206	1,225,379	1,130,431	13.3	15.9	2.4	8.4
Per cent of total horsepower.....	11.3	14.0	21.1	35.9	48.2				
Electric motors—									
Number.....	73,120	16,902	(2)	(2)	(2)	332.6			
Horsepower.....	1,150,891	310,661	15,569	(2)	(2)	270.5	1,895.4		
Per cent of total horsepower.....	7.9	3.0	0.3						
Other power, horsepower.....	92,154	49,985	4,784	(2)	(2)	84.4	944.8		
Per cent of total horsepower.....	0.6	0.5	0.1						
Rented, total.....	632,905	319,475	88,571	(2)	(2)	98.1	260.7		
Per cent of total horsepower.....	4.3	3.0	1.5						
Electric, horsepower.....	441,592	182,562	(2)	(2)	(2)	141.9			
Other kind, horsepower.....	191,313	136,913	88,571	(2)	(2)	39.7			

<sup>1</sup> Decrease.

<sup>2</sup> Not reported.

<sup>3</sup> Average for all establishments.

<sup>4</sup> Includes 1,398 water motors with 5,934 horsepower in 1905.

The figures for the census of 1900 given in the table show that 133,456 establishments, or 64.3 per cent of the total number, reported the use of power, leaving 74,106, or 35.7 per cent, reporting no power.

At the census of 1905 the number of establishments, exclusive of all neighborhood and mechanical industries, reporting power was 134,544, a number greater than the total shown for 1900; the percentage, however, that this number constituted of the total number of establishments was 62.2, or 2.1 per cent less than the corresponding percentage for 1900.

In this table the statistics of power for 11,474 establishments that were engaged in industries excluded from the census of 1905 are included for the census of 1900. These establishments used a total of 157,125 horsepower. When they are omitted, the number reporting the use of power becomes 121,982, or 58.8 per cent of the total, the proportion thus being 3.4 per cent less than the corresponding proportion for the census of 1905. Exclusive of rented power the steam horsepower reported in 1900, according to these revised figures, was 8,026,022; the water horsepower, 1,449,460;

and the electric horsepower, 308,439; the increase in these particulars, as shown at the census of 1905, being 34.9, 13.7, and 273.1 per cent, respectively.

Certain establishments do not use power, although they are engaged in industries in which power is apparently necessary. For example, 4 establishments included in the classification "cotton goods" at the census of 1905 reported the use of hand looms exclusively; and the same was true of several establishments classified under woolen and worsted manufactures. A number of establishments engaged in the manufacture of hosiery and knit goods used hand knitting machines exclusively, and others made sweaters and fancy knit goods without the use of power; while several establishments included under "silk and silk goods" were engaged in the manufacture of certain silk small wares for which no power was required. The classification "lumber, planing mill products, including sash, doors, and blinds," includes a number of establishments that were engaged in the manufacture of window screens, ladders, novelties for house trimming, and similar products, in which none but hand labor was employed. A part of the difference between the total number of establishments and the number reporting power is doubtless due to the fact that at every census a few establishments neglect to answer the inquiry as to power; accordingly the total horsepower as reported is probably slightly less than the amount in actual use in the manufacturing industries of the country.

The increasing importance of motive power in the manufacturing industries of the country is indicated by the increase in the quantity of horsepower used. As shown in Table CXLIX, the largest increase, 4,454,970 horsepower, or 74.8 per cent, occurred during the decade ending with 1900. For the period of about four and a half years, which intervened between the censuses of 1900 and 1905, the absolute increase was almost as large, amounting to 4,231,919 horsepower, although the rate was only 40.7 per cent. The horsepower reported for the latter census is over six times greater than that reported for the census of 1870.

Table CL shows the percentage which each class of power formed of the total reported at each census from 1870 to 1905.

TABLE CL.—Percentage each class of power is of total horsepower: 1870 to 1905.

POWER.	1905	1900	1890	1880	1870
Total.....	100.0	100.0	100.0	100.0	100.0
Steam.....	73.9	78.2	76.9	64.1	51.8
Water.....	11.3	14.0	21.1	35.9	48.2
Gas and gasoline.....	2.0	1.3	0.1	(1)	(1)
Electric.....	10.9	4.7	2.0	(1)	(1)
All other.....	1.9	1.8	21.6	(1)	(1)

<sup>1</sup> Not reported.

<sup>2</sup> Rented electric power included with "all other."

While large increases are shown for all classes of power, steam continues to be the primary power of

greatest importance, constituting 73.9 per cent of the total horsepower at the census of 1905. Next to steam, water was the most important class of power, forming 11.3 per cent of the total horsepower. The statistics, however, do not show the true importance of waterpower, because an increasing quantity is electrically transmitted and is reported as electric power by the manufacturing establishments in which it is used, and to a certain extent the same is true of steam-power. For numerous large central electric stations that supply electric power to establishments included in the census of manufactures water is the primary power.

The decrease in the relative importance of steam and water power is due primarily to the increase in electric power. This class of power was first reported separately at the census of 1890, when the total amounted to 15,569 horsepower; including the rented electric power, the total had increased to 1,592,483 horsepower at the census of 1905. When electric power is generated by the manufacturer, the horsepower of the motors is a duplication, and allowance should be made for this fact in accepting the statistics.

The power reported for gas engines includes that for all internal combustion engines in which the propelling force is the explosion of gaseous or vaporous fuel in direct contact with a piston within a closed cylinder. Although this class of power has increased very rapidly since 1890, when it first appeared in Census statistics, it is still of comparatively minor importance.

The amount—283,467—of horsepower classed as "other power" and "all other horsepower rented" includes compressed air engines and other forms of power; also some rented steampower, which it is impossible to segregate.

Table CLI shows the average horsepower per establishment for all industries and for 11 of the principal power using industries, as computed from the reports for the censuses from 1880 to 1905, inclusive.

TABLE CLI.—Average horsepower per establishment in selected industries: 1880 to 1905.

INDUSTRY.	CENSUS.			
	1905	1900	1890	1880
All industries.....	108.8	78.0	59.1	39.7
Agricultural implements.....	181.0	129.7	66.3	34.9
Boots and shoes.....	56.1	39.4	22.5	15.6
Cotton goods <sup>1</sup> .....	904.8	781.6	527.1	288.2
Flour and grist mill products.....	77.9	70.9	41.0	31.8
Hosiery and knit goods.....	83.6	69.8	58.9	51.2
Iron and steel.....	4,522.4	2,508.3	1,156.3	508.6
Lumber and timber products.....	82.7	60.0	49.6	32.0
Paper and wood pulp.....	1,475.1	1,002.4	471.1	179.1
Silk and silk goods.....	129.8	129.3	77.2	44.7
Woolen goods.....	208.9	136.4	99.2	53.7
Worsted goods.....	580.5	526.4	410.9	216.3
All other industries.....	68.8	49.2	42.7	28.3

<sup>1</sup> Includes cotton small wares.

The statistics of power for industries are given in full in Tables 13 and 14.

The averages in Table CLI are based on the number of establishments reporting the use of power, and the

MANUFACTURES.

conditions attending the enumeration of such establishments previously explained should be considered in this connection. It is probable that in computing the average of horsepower per establishment for 1900 some establishments that did not use power were included in the divisor, and the average is somewhat smaller than it should be for an exact comparison with that for 1905. The increase of 30.8 horsepower per establishment is rather larger than the actual increase.

The average amount of horsepower per establishment for the majority of the important industries has increased largely since 1900. The largest average and the greatest increase are shown for the manufacture of iron and steel, which includes the blast furnaces and the rolling mills and steel works.

The statistics for power for the manufactures in each state and territory, as reported at each census from 1870 to 1905, inclusive, are given in Table CLII.

TABLE CLII.—AMOUNT OF EACH KIND OF POWER, BY STATES AND TERRITORIES: 1870 TO 1905.

[For 1900 the number of establishments reporting power, and the horsepower, include the hand trades and neighborhood industries, except custom gristmills, custom sawmills, and cotton ginning. Prior to 1900 the total number of establishments, the number reporting power, and the horsepower include all hand trades and neighborhood industries.]

STATE OR TERRITORY.	Census.	NUMBER OF ESTABLISHMENTS.		Total horsepower.	OWNED.								RENTED.		
		Total.	Reporting power.		Engines.				Water wheels. <sup>1</sup>		Electric motors.		Other power, horsepower.	Electric, horsepower.	Other kind, horsepower.
					Steam.		Gas and gasoline.		Number.	Horsepower.	Number.	Horsepower.			
					Number.	Horsepower.	Number.	Horsepower.							
United States...	1905	216,262	134,544	14,041,544	127,425	10,828,111	21,525	289,514	20,996	1,647,969	73,120	1,150,891	92,154	441,592	101,313
	1900	207,562	133,456	10,400,625	130,754	8,140,533	14,334	134,742	23,104	1,454,220	16,902	310,661	49,985	182,502	136,013
	1890	355,415	100,735	5,954,655	91,410	4,581,695	( <sup>2</sup> )	8,930	30,008	1,255,206	( <sup>2</sup> )	15,500	4,784		88,571
	1880	253,852	85,923	3,410,837	56,483	2,185,458			55,404	1,225,379					
	1870	252,148	( <sup>2</sup> )	2,346,142	( <sup>2</sup> )	1,215,711			( <sup>2</sup> )	1,130,431					
Alabama.....	1905	1,882	1,383	301,851	2,129	280,470	77	472	73	9,518	295	8,666	1,183	1,448	94
	1900	2,000	1,415	176,270	1,828	162,453	38	376	150	9,421	69	3,062	237	350	362
	1890	2,977	1,634	102,333	1,373	91,583	( <sup>2</sup> )	14	764	10,382	( <sup>2</sup> )	51	20		283
	1880	2,070	1,257	27,576	551	15,779			931	11,797					
	1870	2,188	( <sup>2</sup> )	18,751	( <sup>2</sup> )	7,740			( <sup>2</sup> )	11,011					
Alaska.....	1905	82	63	2,951	158	2,763	10	91	4	80	1	5		3	
	1900	48	38	1,358	44	954			5	117	11	287			
	1890	10	9	461	7	200			3	161					
	1880														
	1870														
Arizona.....	1905	169	94	26,068	148	18,828	28	1,392	8	267	120	4,656	510	165	250
	1900	154	89	9,033	131	7,653	10	371	8	400	30	496	75	38	
	1890	76	21	826	16	457			8	329					40
	1880	66	21	530	14	370			8	160					
	1870	18	( <sup>2</sup> )	90	( <sup>2</sup> )	80			( <sup>2</sup> )	10					
Arkansas.....	1905	1,907	1,440	111,216	1,781	107,699	114	482	16	584	88	1,707	159	484	101
	1900	1,746	1,325	79,830	1,584	78,016	39	326	26	734	17	279	228	201	55
	1890	2,073	1,140	38,344	1,172	36,365	( <sup>2</sup> )	7	119	1,778	( <sup>2</sup> )	31	3		160
	1880	1,202	729	15,733	545	13,709			149	2,024					
	1870	1,079	( <sup>2</sup> )	7,646	( <sup>2</sup> )	6,101			( <sup>2</sup> )	1,545					
California.....	1905	6,839	4,206	220,571	2,408	153,178	989	6,292	216	7,200	658	10,212	1,744	30,363	2,522
	1900	4,997	3,054	133,091	2,158	105,190	545	3,244	171	4,080	281	6,138	1,009	9,624	2,006
	1890	7,923	1,614	73,324	1,481	64,864	( <sup>2</sup> )	361	190	5,091	( <sup>2</sup> )	393	22		2,593
	1880	5,885	1,000	32,921	779	28,071			205	4,860					
	1870	3,984	( <sup>2</sup> )	25,370	( <sup>2</sup> )	18,493			( <sup>2</sup> )	6,877					
Colorado.....	1905	1,606	882	136,872	873	117,539	78	317	108	2,094	550	11,965	1,121	3,765	71
	1900	1,323	779	44,143	783	30,400	81	519	55	1,493	40	709	483	1,187	352
	1890	1,518	399	32,734	457	30,641	( <sup>2</sup> )	36	47	1,723	( <sup>2</sup> )	58			276
	1880	599	181	5,802	152	3,953			52	1,849					
	1870	256	( <sup>2</sup> )	2,225	( <sup>2</sup> )	1,433			( <sup>2</sup> )	792					
Connecticut.....	1905	3,477	2,414	330,550	2,331	218,668	254	3,393	950	66,808	1,521	20,346	1,055	8,233	6,047
	1900	3,382	2,702	265,041	2,095	177,819	171	1,008	1,101	67,211	442	8,710	451	4,215	5,027
	1890	6,822	2,185	163,233	1,794	96,178	( <sup>2</sup> )	215	1,365	63,417	( <sup>2</sup> )	205	120		3,008
	1880	4,488	2,028	118,282	1,124	57,027			1,784	61,205					
	1870	5,128	( <sup>2</sup> )	80,374	( <sup>2</sup> )	25,979			( <sup>2</sup> )	54,395					
Dakota.....	1905														
	1900														
	1890														
	1880	251	79	2,224	55	1,421			36	808					
	1870	17	( <sup>2</sup> )	324	( <sup>2</sup> )	248			( <sup>2</sup> )	76					
Delaware.....	1905	631	477	54,162	598	42,081	41	412	145	5,280	333	4,672	511	1,092	164
	1900	633	495	41,399	646	32,598	35	315	129	5,399	137	1,265		605	917
	1890	1,093	311	26,516	393	21,556	( <sup>2</sup> )	80	163	4,671	( <sup>2</sup> )	104	1		104
	1880	746	317	15,428	254	10,643			232	4,785					
	1870	800	( <sup>2</sup> )	8,533	( <sup>2</sup> )	4,313			( <sup>2</sup> )	4,220					
District of Columbia...	1905	482	258	13,357	180	10,513	42	311	6	710	82	705	54	996	8
	1900	491	323	10,503	241	8,636	52	338	5	369	29	248	147	160	671
	1890	2,295	197	11,444	246	10,422	( <sup>2</sup> )	91	9	810	( <sup>2</sup> )	70			51
	1880	971	115	3,143	118	2,269			15	880					
	1870	952	( <sup>2</sup> )	1,889	( <sup>2</sup> )	789			( <sup>2</sup> )	1,100					

<sup>1</sup> Includes water motors in 1905.

<sup>2</sup> Not reported separately.

<sup>3</sup> Not reported.

<sup>4</sup> See North Dakota and South Dakota.

POWER EMPLOYED IN MANUFACTURES.

CCXXIII

TABLE CLIII.—AMOUNT OF EACH KIND OF POWER, BY STATES AND TERRITORIES: 1870 TO 1905—Continued.

[For 1900 the number of establishments reporting power, and the horsepower, include the hand trades and neighborhood industries, except custom gristmills, custom sawmills, and cotton ginning. Prior to 1900 the total number of establishments, the number reporting power, and the horsepower include all hand trades and neighborhood industries.]

STATE OR TERRITORY.	Census.	NUMBER OF ESTABLISHMENTS.		Total horsepower.	OWNED.								RENTED.		
		Total.	Reporting power.		Engines.				Water wheels. <sup>1</sup>		Electric motors.		Other power, horsepower.	Electric horsepower.	Other kind, horsepower.
					Steam.		Gas and gasoline.		Number.	Horsepower.	Number.	Horsepower.			
					Number.	Horsepower.	Number.	Horsepower.							
Florida	1905	1,413	508	45,373	702	41,975	59	320	10	118	45	1,960	801	1,000	
	1900	1,275	644	36,406	848	35,044	84	173	11	110	8	140	4	162	
	1880	805	368	10,058	480	15,473	( <sup>2</sup> )	63	45	496	( <sup>2</sup> )	3			13
	1880	426	244	7,147	193	6,208			70	989			4		
	1870	659	( <sup>3</sup> )	3,700	( <sup>3</sup> )	3,172			( <sup>3</sup> )	528					
Georgia	1905	3,210	2,129	229,511	2,510	183,369	118	632	202	28,304	284	9,092	352	6,464	1,298
	1900	3,015	1,960	137,529	2,187	110,973	45	365	249	22,729	45	1,030	493	1,668	272
	1880	4,285	2,002	84,221	1,565	55,082	( <sup>2</sup> )	119	1,121	28,380	( <sup>2</sup> )	157	26		457
	1880	3,503	2,074	51,169	799	21,102			1,917	30,067					
	1870	3,836	( <sup>3</sup> )	38,243	( <sup>3</sup> )	10,826			( <sup>3</sup> )	27,417					
Idaho	1905	364	229	18,152	212	15,145	27	127	29	1,078	71	1,165		537	100
	1900	287	182	5,640	141	4,010	6	28	57	1,005				6	
	1880	140	64	2,001	33	972			32	1,024	( <sup>2</sup> )	2	3		
	1880	162	67	1,682	22	540			48	1,136					
	1870	101	( <sup>3</sup> )	606	( <sup>3</sup> )	311			( <sup>3</sup> )	295					
Illinois	1905	14,921	8,429	864,842	6,201	651,578	1,447	12,319	240	15,030	8,285	123,287	9,109	41,978	11,541
	1900	14,374	8,263	506,111	6,787	507,471	1,293	8,758	263	11,614	1,839	36,764	4,408	12,471	14,625
	1880	20,482	4,913	286,666	4,907	261,865	( <sup>2</sup> )	708	440	15,992	( <sup>2</sup> )	939	409		6,753
	1880	14,549	3,722	144,288	3,445	126,843			751	17,445					
	1870	12,597	( <sup>3</sup> )	86,044	( <sup>3</sup> )	73,091			( <sup>2</sup> )	12,953					
Indian Territory	1905	466	241	12,028	187	12,104	76	283	4	59	9	47	30	85	20
	1900	179	111	5,253	100	5,053	15	45	6	155					
	1880	20	11	424	13	349			2	75					
	1880														
	1870														
Indiana	1905	7,044	4,863	405,258	4,760	336,932	1,134	21,171	247	9,685	1,779	24,500	1,921	9,082	1,067
	1900	7,128	5,369	331,058	5,657	296,926	804	12,295	323	11,964	378	5,139	280	2,704	1,680
	1880	12,354	4,292	190,898	4,523	172,506	( <sup>2</sup> )	170	698	16,181	( <sup>2</sup> )	323	34		1,678
	1880	11,108	4,006	131,770	3,634	109,960			1,143	21,810					1,680
	1870	11,847	( <sup>3</sup> )	100,369	( <sup>3</sup> )	76,851			( <sup>2</sup> )	23,518					
Iowa	1905	4,785	3,032	121,021	2,215	100,418	922	4,486	238	6,531	271	3,556	1,000	5,107	523
	1900	4,828	3,939	110,273	3,017	91,182	921	4,524	278	7,415	211	3,069	388	2,613	442
	1880	7,440	2,051	77,809	1,969	64,697	( <sup>2</sup> )	70	622	12,618	( <sup>2</sup> )	194	40		190
	1880	6,921	1,546	54,221	1,068	33,858			1,093	20,363					
	1870	6,566	( <sup>3</sup> )	39,647	( <sup>3</sup> )	25,298			( <sup>2</sup> )	14,249					
Kansas	1905	2,475	1,403	107,283	1,008	83,039	510	6,923	137	6,544	379	7,842	95	2,484	356
	1900	2,299	1,436	70,248	1,301	55,518	347	2,530	190	7,321	105	2,006	1,030	1,420	163
	1880	4,471	898	43,053	847	34,806	( <sup>2</sup> )	77	216	7,617	( <sup>2</sup> )	110	220		223
	1880	2,803	578	21,079	396	13,468			299	7,611					
	1870	1,477	( <sup>3</sup> )	8,149	( <sup>3</sup> )	6,300			( <sup>3</sup> )	1,789					
Kentucky	1905	3,734	2,561	181,441	2,842	162,829	249	1,938	170	4,603	514	6,816	890	3,874	491
	1900	3,048	2,533	145,854	2,830	130,122	135	1,096	178	4,247	114	1,093	250	1,722	718
	1880	7,745	1,780	82,508	1,806	75,513	( <sup>2</sup> )	223	337	6,271	( <sup>2</sup> )	100	77		324
	1880	5,328	1,767	54,029	1,404	45,917			653	9,012					
	1870	5,390	( <sup>3</sup> )	39,568	( <sup>3</sup> )	31,928			( <sup>3</sup> )	7,940					
Louisiana	1905	2,091	1,430	255,937	2,622	245,745	136	961	7	266	135	3,974	2,140	2,778	73
	1900	1,826	1,284	190,850	2,887	187,492	60	462	11	318	61	968	322	1,401	192
	1880	2,613	554	30,184	684	20,439	( <sup>2</sup> )	213	6	66	( <sup>2</sup> )	464	5		7
	1880	1,553	402	11,346	430	11,256			13	90					
	1870	2,557	( <sup>3</sup> )	25,066	( <sup>3</sup> )	24,024			( <sup>3</sup> )	142					
Maine	1905	3,145	2,240	362,153	1,720	126,818	246	3,063	1,782	203,094	264	18,526	470	8,061	2,121
	1900	2,878	2,125	261,319	1,633	89,257	106	2,178	1,876	158,788	97	2,087	220	7,572	1,217
	1880	5,010	2,022	150,598	965	42,796	( <sup>2</sup> )	10	2,306	104,602	( <sup>2</sup> )	191	39		2,870
	1880	4,481	1,918	100,476	511	29,759			2,887	79,717					
	1870	5,550	( <sup>3</sup> )	79,573	( <sup>3</sup> )	9,465			( <sup>2</sup> )	70,108					
Maryland	1905	3,852	2,177	180,963	2,121	142,006	388	4,377	271	10,777	802	15,514	3,531	3,309	1,359
	1900	3,886	2,074	135,493	2,153	115,500	332	3,139	323	10,415	229	3,441	625	733	1,650
	1880	7,485	1,518	73,547	1,287	56,545	( <sup>2</sup> )	175	583	15,633	( <sup>2</sup> )	212	3		979
	1880	6,787	1,532	51,259	914	33,216			1,004	18,043					
	1870	5,812	( <sup>3</sup> )	32,422	( <sup>3</sup> )	13,961			( <sup>2</sup> )	18,461					
Massachusetts	1905	10,723	7,356	1,001,046	5,855	690,467	654	7,487	1,940	183,427	3,697	63,939	3,688	27,073	25,565
	1900	10,929	8,316	815,480	6,439	576,525	468	4,074	2,089	181,907	823	10,416	1,561	13,409	18,585
	1880	26,023	7,207	517,897	5,084	340,774	( <sup>2</sup> )	289	2,622	158,932	( <sup>2</sup> )	2,327	268		16,907
	1880	14,352	5,173	309,759	3,096	171,397			3,046	138,362					
	1870	13,212	( <sup>3</sup> )	184,356	( <sup>3</sup> )	78,502			( <sup>3</sup> )	105,854					
Michigan	1905	7,446	5,023	468,449	4,978	376,000	954	10,534	684	39,342	1,826	27,559	108	12,411	2,405
	1900	7,310	5,343	376,321	5,220	318,835	586	5,603	730	36,820	288	7,824	1,145	4,264	2,121
	1880	12,127	4,414	256,608	4,475	214,748	( <sup>2</sup> )	237	1,218	38,986	( <sup>2</sup> )	577	77		1,983
	1880	8,873	3,581	164,747	3,085	130,352			1,746	34,395					
	1870	9,455	( <sup>3</sup> )	105,851	( <sup>3</sup> )	70,956			( <sup>2</sup> )	34,805					
Minnesota	1905	4,756	3,171	226,767	2,378	167,103	629	4,710	258	38,245	635	5,833	1,012	8,594	1,270
	1900	4,066	3,066	182,655	2,473	146,578	521	3,624	260	24,932	132	2,531	248	3,760	973
	1880	7,505	1,519	112,817	1,448	83,548	( <sup>2</sup> )	126	362	27,300	( <sup>2</sup> )	280	82		1,481
	1880	3,493	964	53,880	569	25,191			650	28,689					
	1870	2,270	( <sup>3</sup> )	20,139	( <sup>3</sup> )	7,085			( <sup>3</sup> )	13,054					

<sup>1</sup> Includes water motors in 1905.

<sup>2</sup> Not reported separately.

<sup>3</sup> Not reported.

MANUFACTURES.

TABLE CLII.—AMOUNT OF EACH KIND OF POWER, BY STATES AND TERRITORIES: 1870 TO 1905—Continued.

[For 1900 the number of establishments reporting power, and the horsepower, include the hand trades and neighborhood industries, except custom gristmills, custom sawmills, and cotton ginning. Prior to 1900 the total number of establishments, the number reporting power, and the horsepower include all hand trades and neighborhood industries.]

STATE OR TERRITORY.	Cen- sus.	NUMBER OF ESTABLISH- MENTS.		Total horse- power.	OWNED.								RENTED.		
		Total.	Report- ing power.		Engines.				Water wheels. <sup>1</sup>		Electric motors.		Other power, horse- power.	Electric, horse- power.	Other kind, horse- power.
					Steam.		Gas and gasoline.		Num- ber.	Horse- power.	Num- ber.	Horse- power.			
					Num- ber.	Horse- power.	Num- ber.	Horse- power.							
Mississippi.....	1905	1,520	1,157	111,197	1,475	109,418	53	220	6	77	50	850	90	508	25
	1900	1,294	883	65,946	1,102	64,731	17	144	18	361	15	208	17	382	120
	1890	1,098	985	35,331	920	32,345	( <sup>2</sup> )	8	252	2,746	( <sup>2</sup> )	3			212
	1880	1,479	893	18,450	635	15,001			301	3,440					
	1870	1,731	( <sup>3</sup> )	12,472	( <sup>3</sup> )	10,019			( <sup>3</sup> )	2,453					
Missouri.....	1905	6,404	3,843	271,567	3,257	221,215	658	4,960	168	3,727	2,382	23,700	2,064	13,905	1,330
	1900	6,853	3,906	106,218	3,575	173,271	432	3,270	144	3,113	397	7,101	531	5,024	3,200
	1890	14,052	3,032	145,185	3,368	137,595	( <sup>2</sup> )	457	313	4,755	( <sup>2</sup> )	618	163		1,597
	1880	8,592	2,428	80,749	2,128	72,587			537	8,162					
	1870	11,871	( <sup>3</sup> )	55,062	( <sup>3</sup> )	48,418			( <sup>3</sup> )	6,644					
Montana.....	1905	382	215	50,817	203	32,350	19	74	55	10,315	100	4,081	85	3,808	8
	1900	395	262	45,667	421	32,008	19	85	40	9,717	78	1,088	610	1,100	63
	1890	289	94	2,848	72	2,105	( <sup>2</sup> )	17	23	666	( <sup>2</sup> )	43			17
	1880	196	63	1,408	31	544			30	954					
	1870	201	( <sup>3</sup> )	1,017	( <sup>3</sup> )	822			( <sup>3</sup> )	795					
Nebraska.....	1905	1,810	984	52,134	516	34,012	334	2,035	160	7,221	300	5,762	613	2,364	127
	1900	1,695	1,135	43,357	813	31,048	358	1,910	166	7,513	90	1,532	128	866	351
	1890	3,014	626	23,479	514	17,021	( <sup>2</sup> )	58	196	6,123	( <sup>2</sup> )	49	40		179
	1880	1,403	202	8,494	126	2,990			245	5,495					
	1870	670	( <sup>3</sup> )	3,311	( <sup>3</sup> )	1,865			( <sup>3</sup> )	1,446					
Nevada.....	1905	115	63	2,834	28	1,092	16	125	13	782				550	285
	1900	99	53	1,501	35	628	9	39	21	893				1	
	1890	95	20	372	17	318	( <sup>2</sup> )	48	2	6					
	1880	184	26	716	23	608			6	108					
	1870	330	( <sup>3</sup> )	8,545	( <sup>3</sup> )	6,007			( <sup>3</sup> )	2,538					
New Hampshire.....	1905	1,618	1,244	225,632	1,032	102,439	72	1,395	1,033	100,274	161	7,288	491	5,013	8,732
	1900	1,771	1,494	202,442	1,037	89,905	52	571	1,102	105,711	65	1,467	362	2,004	2,422
	1890	3,220	1,351	116,830	729	46,888	( <sup>2</sup> )	3	1,437	68,842	( <sup>2</sup> )	42	100		955
	1880	3,181	1,653	87,750	456	18,595			2,122	60,155					
	1870	3,342	( <sup>3</sup> )	77,078	( <sup>3</sup> )	8,787			( <sup>3</sup> )	68,201					
New Jersey.....	1905	7,010	4,271 <sup>1</sup>	494,972	4,876	386,770	677	9,070	537	18,197	4,673	58,698	3,325	10,603	8,309
	1900	6,415	4,176	334,234	4,794	281,306	420	3,284	524	20,161	804	11,731	7,650	4,120	5,076
	1890	9,225	2,734	180,529	3,073	158,718	( <sup>2</sup> )	135	639	17,543	( <sup>2</sup> )	487	84		3,502
	1880	7,128	2,226	99,858	1,619	72,792			1,213	27,066					
	1870	6,636	( <sup>3</sup> )	58,139	( <sup>3</sup> )	32,307			( <sup>3</sup> )	25,832					
New Mexico.....	1905	199	103	5,978	74	5,097	23	114	12	149	1	30	320	203	65
	1900	174	88	3,658	85	3,283	11	64	9	153			150	8	
	1890	127	50	1,825	46	1,492			18	323					10
	1880	144	78	1,359	19	427			60	932					
	1870	182	( <sup>3</sup> )	911	( <sup>3</sup> )	252			( <sup>3</sup> )	659					
New York.....	1905	37,194	18,410	1,643,419	12,215	850,497	2,928	44,288	3,889	440,134	8,422	126,827	4,778	95,284	75,611
	1900	35,957	18,289	1,129,701	13,346	659,792	1,944	16,221	4,409	335,411	2,323	29,830	6,058	47,768	34,771
	1890	65,840	13,395	776,820	10,372	513,590	( <sup>2</sup> )	1,900	6,439	231,959	( <sup>2</sup> )	2,447	1,141		25,723
	1880	42,739	11,776	454,143	6,672	234,795			9,752	219,348					
	1870	36,206	( <sup>3</sup> )	334,363	( <sup>3</sup> )	126,107			( <sup>3</sup> )	208,266					
North Carolina.....	1905	3,272	2,660	210,752	2,951	183,166	104	2,102	440	28,382	106	3,130	47	2,423	502
	1900	3,465	2,510	156,306	2,605	122,778	67	388	589	29,241	70	1,839	550	804	616
	1890	3,667	2,078	73,345	1,298	41,171	( <sup>2</sup> )	42	1,903	31,812	( <sup>2</sup> )	44	189		87
	1880	3,802	2,323	45,088	616	15,025			2,370	30,063					
	1870	3,042	( <sup>3</sup> )	33,152	( <sup>3</sup> )	6,941			( <sup>3</sup> )	20,211					
North Dakota.....	1905	507	287	10,069	147	8,619	136	645	7	322	14	106		281	6
	1900	337	265	7,395	128	5,930	127	759	16	506	6	44	2	127	27
	1890	382	98	3,589	87	2,985	( <sup>2</sup> )	12	16	540	( <sup>2</sup> )	2	23		27
	1880														
	1870														
Ohio.....	1905	13,785	9,318	1,238,240	9,063	1,028,665	2,004	35,101	531	18,149	8,668	121,308	6,115	23,150	5,743
	1900	13,868	8,460	817,054	9,789	732,006	1,203	14,230	556	17,848	1,721	33,380	2,067	8,768	7,846
	1890	28,673	7,216	418,783	7,703	382,301	( <sup>2</sup> )	1,183	1,134	27,342	( <sup>2</sup> )	1,705	372		5,880
	1880	20,699	6,684	261,143	6,215	222,502			2,080	38,641					
	1870	22,773	( <sup>3</sup> )	174,323	( <sup>3</sup> )	129,577			( <sup>3</sup> )	44,746					
Oklahoma.....	1905	657	316	17,293	184	15,593	138	706	1	50	34	266	26	512	140
	1900	316	136	6,331	112	6,098	33	155	1	1	3	12		65	
	1890	72	11	161	11	161									
	1880														
	1870														
Oregon.....	1905	1,602	1,091	81,844	1,008	55,512	58	371	252	20,660	31	496		4,727	78
	1900	1,406	978	60,452	883	37,986	36	195	205	19,263	27	447		2,243	318
	1890	1,523	664	32,545	590	22,430	( <sup>2</sup> )	2	276	9,280	( <sup>2</sup> )	37	306		490
	1880	1,080	443	13,589	176	4,334			373	9,255					
	1870	969	( <sup>3</sup> )	8,277	( <sup>3</sup> )	2,471			( <sup>3</sup> )	5,806					
Pennsylvania.....	1905	23,495	14,630	2,613,494	19,478	2,088,773	2,890	68,209	1,987	50,020	10,800	311,096	35,729	35,701	23,366
	1900	23,462	15,092	1,892,078	19,911	1,587,706	1,620	26,246	2,115	54,601	4,547	85,384	9,932	22,362	15,847
	1890	39,339	12,091	986,780	13,751	894,007	( <sup>2</sup> )	919	4,671	82,462	( <sup>2</sup> )	2,162	312		6,027
	1880	31,232	10,351	512,408	7,913	492,132			7,075	110,276					
	1870	37,200	( <sup>3</sup> )	363,918	( <sup>3</sup> )	221,936			( <sup>3</sup> )	141,982					

<sup>1</sup> Includes water motors in 1905.

<sup>2</sup> Not reported separately.

<sup>3</sup> Not reported.

<sup>4</sup> See Dakota.

POWER EMPLOYED IN MANUFACTURES.

CCXXV

TABLE CLII.—AMOUNT OF EACH KIND OF POWER, BY STATES AND TERRITORIES: 1870 TO 1905—Continued.

[For 1900 the number of establishments reporting power, and the horsepower, include the hand trades and neighborhood industries, except custom gristmills, custom sawmills, and cotton ginning. Prior to 1900 the total number of establishments, the number reporting power, and the horsepower include all hand trades and neighborhood industries.]

STATE OR TERRITORY.	Cen- sus.	NUMBER OF ESTABLISH- MENTS.		Total horse- power.	OWNED.								RENTED.		
		Total.	Report- ing power.		Engines.				Water wheels. <sup>1</sup>		Electric motors.		Other power, horse- power.	Electric, horse- power.	Other kind, horse- power.
					Steam.		Gas and gasoline.		Num- ber.	Horse- power.	Num- ber.	Horse- power.			
					Num- ber.	Horse- power.	Num- ber.	Horse- power.							
Rhode Island.....	1905	1,017	1,140	190,679	1,087	140,322	63	1,247	305	20,231	567	9,662	790	5,815	3,642
	1900	1,078	1,300	155,545	1,170	115,735	43	427	332	28,171	152	1,920	2,595	2,969	3,722
	1890	3,377	920	112,940	862	83,477	( <sup>2</sup> )	18	344	27,107	( <sup>2</sup> )	205	51		1,911
	1880	2,205	908	63,575	476	41,335			386	22,240					
	1870	1,850	( <sup>2</sup> )	42,027	( <sup>2</sup> )	23,546			( <sup>2</sup> )	18,481					
South Carolina.....	1905	1,309	1,076	221,190	1,399	157,432	55	239	124	31,097	268	23,711	180	8,451	80
	1900	1,309	973	118,573	1,174	80,913	29	323	130	27,586	124	5,376	370	185	3,820
	1890	2,382	1,149	45,081	864	29,043	( <sup>2</sup> )	97	611	16,399	( <sup>2</sup> )	8	60		74
	1880	2,078	1,259	26,898	509	11,995			1,057	13,873					
	1870	1,584	( <sup>2</sup> )	14,932	( <sup>2</sup> )	4,537			( <sup>2</sup> )	10,395					
South Dakota.....	1905	680	414	11,312	214	8,483	186	1,397	36	1,069	23	158	14	181	10
	1900	624	476	11,909	308	9,256	158	1,270	41	1,099	7	134	38	100	12
	1890	499	183	5,555	147	4,456	( <sup>2</sup> )	32	48	1,052	( <sup>2</sup> )	3	12		
	1870														
Tennessee.....	1905	3,175	2,475	180,136	2,756	161,019	128	1,084	321	9,995	186	4,356	125	2,230	427
	1900	3,110	2,415	131,141	2,449	116,715	68	593	401	11,078	46	823	38	1,370	524
	1890	4,559	2,243	84,379	1,577	68,537	( <sup>2</sup> )	54	1,152	15,451	( <sup>2</sup> )	106	14		217
	1880	4,325	2,108	51,952	967	33,388			1,382	18,564					
	1870	5,317	( <sup>2</sup> )	37,981	( <sup>2</sup> )	18,467			( <sup>2</sup> )	19,514					
Texas.....	1905	3,158	1,915	170,522	1,973	155,312	403	1,876	32	2,277	410	5,885	699	4,414	59
	1900	3,107	1,755	116,984	1,839	110,943	199	998	29	1,557	54	827	27	2,390	272
	1890	5,208	1,983	68,530	2,066	65,391	( <sup>2</sup> )	157	121	2,633	( <sup>2</sup> )	160	59		124
	1880	2,990	1,334	30,534	1,167	28,026			174	2,508					
	1870	2,399	( <sup>2</sup> )	13,044	( <sup>2</sup> )	11,214			( <sup>2</sup> )	1,830					
Utah.....	1905	603	375	20,728	250	12,162	11	59	95	3,252	60	1,331	983	2,941	
	1900	575	375	13,915	273	7,606	7	89	112	3,366	34	1,241	10	1,588	15
	1890	531	178	5,128	106	2,530	( <sup>2</sup> )	10	101	2,492	( <sup>2</sup> )	64			32
	1880	640	243	4,689	55	1,154			214	3,535					
	1870	533	( <sup>2</sup> )	2,500	( <sup>2</sup> )	331			( <sup>2</sup> )	2,169					
Vermont.....	1905	1,699	1,450	143,304	966	56,833	101	1,483	1,120	70,237	110	2,688	192	4,550	1,321
	1900	1,938	1,714	126,853	1,017	44,190	77	1,120	1,227	77,421	24	729	265	1,444	1,684
	1890	3,031	1,552	98,554	600	23,539	( <sup>2</sup> )	10	1,810	74,041	( <sup>2</sup> )	34	86		844
	1880	2,874	1,582	63,314	272	11,088			2,138	52,226					
	1870	3,270	( <sup>2</sup> )	51,322	( <sup>2</sup> )	6,425			( <sup>2</sup> )	44,897					
Virginia.....	1905	3,187	2,425	185,282	2,621	143,017	131	1,715	574	25,946	454	8,284	635	4,403	382
	1900	3,186	2,425	141,461	2,353	109,392	79	748	668	23,550	114	4,795	1,215	822	969
	1890	5,915	2,502	82,448	1,341	45,406	( <sup>2</sup> )	78	1,915	36,654	( <sup>2</sup> )	105	12		193
	1880	5,710	2,768	57,174	899	19,710			2,399	37,464					
	1870	5,933	( <sup>2</sup> )	49,612	( <sup>2</sup> )	8,410			( <sup>2</sup> )	41,202					
Washington.....	1905	2,751	1,817	171,982	2,038	150,312	72	493	147	4,642	274	3,640	486	11,650	769
	1900	1,923	1,200	88,176	1,441	77,749	31	189	156	6,853	36	575	72	2,562	176
	1890	1,543	578	42,642	644	37,659	( <sup>2</sup> )	3	111	4,851	( <sup>2</sup> )	63	50		16
	1880	261	70	4,365	61	3,210			46	1,185					
	1870	209	( <sup>2</sup> )	2,823	( <sup>2</sup> )	1,411			( <sup>2</sup> )	1,412					
West Virginia.....	1905	2,109	1,655	143,001	1,864	124,212	312	6,569	150	6,404	311	4,423	523	776	94
	1900	1,824	1,434	92,321	1,649	84,234	90	1,045	156	5,425	20	427	905	27	258
	1890	2,370	1,199	55,457	1,043	44,680	( <sup>2</sup> )	33	565	10,542	( <sup>2</sup> )	5	122		75
	1880	2,375	1,190	37,910	316	28,466			670	9,454					
	1870	2,444	( <sup>2</sup> )	27,331	( <sup>2</sup> )	17,136			( <sup>2</sup> )	10,195					
Wisconsin.....	1905	8,558	5,084	480,554	4,626	303,874	1,037	11,355	1,231	112,065	2,969	40,320	1,915	8,558	1,866
	1900	7,841	4,597	375,091	4,579	262,642	529	4,358	1,309	93,122	551	10,711	420	2,423	1,412
	1890	10,417	2,618	178,668	2,406	120,697	( <sup>2</sup> )	274	1,528	55,744	( <sup>2</sup> )	295	109		549
	1880	7,674	2,154	109,085	1,366	60,729			2,022	45,350					
	1870	7,013	( <sup>2</sup> )	64,223	( <sup>2</sup> )	30,509			( <sup>2</sup> )	33,714					
Wyoming.....	1905	169	93	3,690	69	2,712	24	88	16	382	11	86	376	46	
	1900	139	80	3,900	69	3,184	14	42	14	534	8	80	53	7	
	1890	190	41	1,829	52	1,608			9	210	( <sup>2</sup> )	5			
	1880	57	10	755	18	717			2	38					
	1870	32	( <sup>2</sup> )	344	( <sup>2</sup> )	310			( <sup>2</sup> )	34					

<sup>1</sup> Includes water motors in 1905.

<sup>2</sup> Not reported separately.

<sup>3</sup> Not reported.

<sup>4</sup> See Dakota.

Pennsylvania led in total horsepower in 1905 with 2,613,494, an increase of 45 per cent over 1900; New York was second with 1,643,419, an increase of 45.5 per cent; Ohio was third with 1,238,240, an increase of 51.5 per cent; Massachusetts was fourth with 1,001,946, an increase of 22.9 per cent; and Illinois was fifth with 864,842, an increase of 45.1 per cent. These are the positions held by these states at each of the censuses shown, except that Massachusetts had third instead of fourth place prior to the census of 1900, and Michigan held fifth place prior to 1890.

The motive power employed in the manufacturing industries, which are covered by the census, forms but a small proportion of the horsepower used in all the industries of the country. A large and increasing quantity of power is used in the operation of mines and quarries, of steam and electric railways and steam vessels, in the production of electric current for light and power, in the operation of elevators and hoisting and grading apparatus, and by stationary engines used for a multitude of purposes, not included in Census reports. The total quantity of power used in these various industries has never been ascertained and there is no authoritative information from which an estimate can be made. Table CLIII gives the total horsepower for some of the industries in

which power is used extensively. Some of the figures contain elements of estimate and the totals should not be accepted as showing the exact amount of horsepower used; they, however, convey an idea of the vast importance of the mechanical power used in the industrial operations of the country.

TABLE CLIII.—*Motive power in the United States.*

	Horse-power.
Total.....	53,686,878
Manufactures, census 1905.....	<sup>1</sup> 14,641,544
Idle manufacturing establishments, census 1905.....	<sup>1</sup> 344,671
Mines and quarries, census 1902.....	<sup>2</sup> 12,998,056
Street railways, census 1902.....	<sup>2</sup> 1,359,435
Electric light and power stations, census 1902.....	<sup>2</sup> 1,845,048
Telephones, telegraphs, and fire alarm systems, census 1902.....	<sup>2</sup> 3,148
Custom flour and grist, and custom saw mills, and industries entirely omitted from the census of 1905 but enumerated at the census of 1900.....	<sup>1</sup> 1,047,581
Naval vessels, January 1, 1905.....	<sup>3</sup> 777,598
Documented steam merchant vessels, June 30, 1905.....	<sup>4</sup> 2,608,270
Steam railroad locomotives, June 30, 1904.....	<sup>5</sup> 28,061,527

<sup>1</sup>Includes duplication caused by combination of primary power and electric motors.

<sup>2</sup>Horsepower of engines only. Does not include horsepower of dynamos or motors.

<sup>3</sup>Compiled from Annual Naval Register, Bureau of Navigation, United States Navy.

<sup>4</sup>Compiled from list of merchant vessels of the United States, thirty-seventh annual report, Bureau of Navigation, Department of Commerce and Labor. The total is incomplete in that it represents only the horsepower, when reported, of documented vessels.

<sup>5</sup>Reported by Interstate Commerce Commission in seventeenth annual report on statistics of railways as 1,052,307,261 tractive pounds for 46,146 locomotives. Reduced to estimated horsepower by multiplying by 10 and dividing by 375.

## CHAPTER XI.

### MANUFACTURES IN GOVERNMENTAL INSTITUTIONS.

The Federal, and many state, county, and city governments are engaged to some extent in manufacturing operations, primarily for the purpose of supplying various needs of the different governments. Some of these enterprises assume large proportions, as in the construction and repair of vessels for the United States Navy, the manufacture of ammunition and clothing for the Army, and the operations of the Government Printing Office and the Bureau of Engraving and Printing. But the majority of them are connected with the educational, eleemosynary, and penal institutions of state and city governments and produce articles solely for consumption in such institutions. A canvass of these industries was made at the Twelfth Census, and reports were secured from 138 governmental institutions and 383 enterprises conducted by educational, eleemosynary, and penal institutions. These establishments had not, as a rule, been included in previous censuses, and at the Twelfth Census their statistics were presented separately from those for establishments conducted under private ownership.

All enterprises of this character are conducted under conditions entirely different from those controlling establishments operated by private capital. They are not conducted for the purpose of profit. The operatives in many of them are inmates of the institution in connection with which the factory is operated, and are given employment as a feature of discipline. Such enterprises can not be considered as coming within the scope of a factory census, and no effort was made to secure returns for them at the census of 1905 other than for some of the most important establishments controlled by the Federal Government. The operations of these assume such large proportions and

give employment to so many persons in the District of Columbia that it was necessary to include some information concerning them in the report on the manufactures of the District. For the same reason the special report on shipbuilding contains statistics for the construction and repair of vessels by the United States, which form a very important feature of the shipbuilding industry. In all, reports were secured for 35 manufacturing enterprises conducted by the United States. The statistics for these are summarized in Table CLIV which, although not presenting all of the manufacturing enterprises operated by the Federal Government, covers the most important and illustrates the variety of products manufactured.

TABLE CLIV.—*Governmental establishments: 1905.*

INDUSTRY.	Number of establishments.	COST OF MATERIALS USED.			Value of products, including repair work.
		Total.	Principal materials, including mill supplies and freight.	Fuel and rent of power and heat.	
Total.....	35	\$16, 227, 015	\$15, 724, 227	\$702, 788	\$42, 742, 007
Ammunition.....	1	881, 325	866, 155	15, 170	1, 742, 588
Bookbinding and blank book making.....	2	869	842	27	10, 520
Clothing, men's.....	5	1, 204, 140	1, 204, 140	.....	1, 852, 252
Engraving, steel, including plate printing.....	4	621, 372	586, 543	34, 829	3, 409, 517
Explosives.....	2	384, 777	347, 174	37, 603	574, 832
Firearms.....	1	218, 581	183, 855	34, 726	1, 461, 020
Foundry and machine shop products.....	2	8, 739	6, 906	1, 833	41, 954
Instruments, professional and scientific.....	1	599	560	39	1, 679
Leather goods.....	1	54, 159	52, 461	1, 698	236, 190
Ordnance and ordnance stores.....	4	5, 064, 250	4, 864, 002	200, 248	10, 053, 861
Printing and publishing, book and job.....	3	1, 256, 264	1, 232, 177	24, 087	6, 003, 120
Shipbuilding, iron and steel.....	9	6, 731, 931	6, 379, 403	352, 528	17, 265, 469

## CHAPTER XII.

### THE LOCALIZATION OF INDUSTRIES.<sup>1</sup>

The subject of the localization or concentration of certain manufacturing industries in particular localities was treated at some length in the Twelfth Census Report on Manufactures.<sup>2</sup> Since this phase of the industrial organization of the United States possesses a continued and peculiar economic interest, the discussion is continued here along the same lines, with as little repetition as possible. Tabular statements are presented for the purpose of indicating the present extent of industrial concentration and showing whether, according to the statistics of the census of 1905, the conditions noted in 1900 have continued, and whether this tendency to localization has become more or less pronounced in the industries in which it appeared at that time. Other industries than those discussed at the Twelfth Census, are shown by the statistics to display a tendency to locate in particular places where the conditions necessary to their growth and success are favorable. Probably there are in other industries, also, decided examples of localization and specialization that are not disclosed in the general tables and consequently are not mentioned here.

The distribution, by states, of all industries which are shown separately is presented in Table 5, pages 74 to 465 of this volume. In this section, in connection with the discussion of each selected industry, tables are presented showing the localization of industries, by states and cities, and also the specialization of states and cities in the industries.

It will be noted that, as a rule, the tables showing localization include the statistics for three censuses—1890, 1900, and 1905—the figures for all periods

being comparable, while the tables showing specialization are for 1905 and 1900 only, for the reason that the statistics for the value of products for all industries are included in these tables, and these statistics for 1890 have not been reduced to a factory census basis and consequently are not comparable with the figures for 1900 and 1905. With certain exceptions, the tables for cities show only cities of 20,000 population or over in 1900; when cities of less population are included, a footnote to the table indicates the fact. It should be explained, that the tables for cities do not include every city of a population of at least 20,000 in which the industry appears, but only those in which the industry is localized or specialized to an unusual degree.

Occasionally the totals of a city for a certain industry represent only partially the industry in the locality, and in such cases the statistics for establishments situated outside the urban limits should be included in the table to show fully the extent of the centralization; this, however, is impracticable.

The geographic distribution of industries has little or no significance in connection with localization. What might be termed the gregarious tendency of industries is but little influenced by artificial geographic boundaries or state lines, nor has it any particular reference to city limits. The centralization of industries in localities is governed almost entirely by other considerations. However, the manner in which the statistics have been compiled makes a presentation by cities or states the only one practicable.

*Agricultural implements.*—Tables CLV to CLVIII show the localization of the manufacture of agricultural implements by states and cities and the specialization of states and cities in the industry.

<sup>1</sup> This chapter was prepared by Joseph D. Lewis, chief of division.  
<sup>2</sup> Twelfth Census, Manufactures, Part I, "The Localization of Industries," pages cxc ff.

TABLE CLV.—AGRICULTURAL IMPLEMENTS—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$112,007,344	\$101,207,428	\$81,271,651	100.0	100.0	100.0
Illinois.....	38,412,452	42,033,796	24,660,660	34.3	41.5	30.3
New York.....	13,045,891	10,537,254	11,680,802	11.6	10.4	14.4
Ohio.....	12,891,197	13,975,268	14,333,258	11.5	13.8	17.6
Wisconsin.....	10,076,760	7,886,303	5,015,512	9.0	7.8	6.2
Michigan.....	8,719,719	6,330,508	3,956,306	7.8	6.3	4.8
Indiana.....	8,060,575	6,415,081	5,756,131	7.2	6.3	7.1
Pennsylvania.....	5,016,679	3,198,471	2,682,718	4.5	3.2	3.3
All other states.....	16,784,071	10,821,687	13,238,224	14.1	10.7	16.3

LOCALIZATION OF INDUSTRIES.

TABLE CLVI.—AGRICULTURAL IMPLEMENTS—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$112,007,344	\$101,207,428	\$81,271,651	100.0	100.0	100.0
Chicago, Ill.....	(1)	24,848,649	11,883,976	.....	24.6	14.6
Moline, Ill. <sup>2</sup> .....	8,347,014	(1)	(1)	7.5	.....	.....
Racine, Wis.....	5,177,079	3,001,009	1,979,613	4.0	3.0	2.4
Springfield, Ohio.....	4,051,167	5,272,636	5,221,008	3.6	5.2	6.4
Auburn, N. Y.....	2,800,301	2,338,191	3,615,572	2.0	2.3	4.5
South Bend, Ind.....	2,744,001	2,432,083	2,423,442	2.4	2.4	3.0
Peoria, Ill.....	2,309,962	2,372,329	519,611	2.1	2.3	0.6
Richmond, Ind. <sup>2</sup> .....	2,153,161	(1)	(1)	1.9	.....	.....
Louisville, Ky.....	(1)	1,227,288	1,053,390	.....	1.2	1.3
All other cities and outside of cities.....	84,334,659	59,715,243	54,575,030	75.3	59.0	67.2

<sup>1</sup> Included in "all other cities and outside of cities" to avoid disclosing individual operations.  
<sup>2</sup> Less than 20,000 population in 1900.

TABLE CLVII.—AGRICULTURAL IMPLEMENTS—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH AGRICULTURAL IMPLEMENTS FORMS OF ALL INDUSTRIES.	
	All industries.		Agricultural implements.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$112,007,344	\$101,207,428	0.8	0.9
Illinois.....	1,410,342,129	1,120,868,308	38,412,452	42,033,796	2.7	3.7
Wisconsin.....	411,139,681	326,752,878	10,076,700	7,886,363	2.5	2.4
Indiana.....	393,954,405	337,071,630	8,000,575	6,415,081	2.0	1.9
Michigan.....	429,120,060	319,091,856	8,719,719	6,339,568	2.0	2.0
Ohio.....	660,811,857	748,670,855	12,891,197	13,076,268	1.3	1.9
New York.....	2,488,345,579	1,871,830,872	13,045,891	10,537,254	0.5	0.6
Pennsylvania.....	1,955,651,332	1,649,882,380	5,010,679	3,188,471	0.3	0.2
All other states.....	6,752,882,044	5,036,352,343	15,784,071	10,821,687	0.2	0.2

TABLE CLVIII.—AGRICULTURAL IMPLEMENTS—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH AGRICULTURAL IMPLEMENTS FORMS OF ALL INDUSTRIES.	
	All industries.		Agricultural implements.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$112,007,344	\$101,207,428	0.8	0.9
Moline, Ill. <sup>1</sup> .....	13,158,429	9,302,054	8,347,014	(1)	63.4	.....
Richmond, Ind.....	6,731,740	4,753,546	2,153,161	(2)	32.0	.....
Racine, Wis.....	16,458,965	11,676,150	5,177,079	3,001,009	31.5	25.7
Springfield, Ohio.....	13,654,423	12,115,941	4,051,167	5,272,636	29.7	43.5
Auburn, N. Y.....	13,420,863	9,575,000	2,800,301	2,338,191	21.5	24.4
South Bend, Ind.....	15,321,151	12,959,866	2,744,001	2,432,083	17.9	18.8
Peoria, Ill.....	60,920,411	44,509,371	2,309,962	2,372,329	3.8	5.3
Louisville, Ky.....	83,204,125	66,110,474	(3)	1,227,288	.....	1.9
Chicago, Ill.....	955,036,277	797,879,141	(3)	24,848,649	.....	3.1
All other cities and outside of cities.....	13,624,240,703	10,442,179,579	84,334,659	59,715,243	0.6	0.6

<sup>1</sup> Less than 20,000 population in 1900.  
<sup>2</sup> Not reported separately.  
<sup>3</sup> Included in "all other cities and outside of cities" to avoid disclosing individual operations.

The 4 leading states in this industry in 1900 and 1905 were Illinois, New York, Ohio, and Wisconsin. The relative rank of the several states shown in Table CLV was the same at the two censuses except for the interchange of rank for Ohio and New York. A noticeable feature of the statistics is the reduction in the value of the products shown for Illinois and Ohio in 1905 as compared with 1900. It should not be assumed in all cases, when such changes occur from one

census to another, that the causes are of a permanent character; in this particular instance the reduction is explained by the fact that a large quantity of goods was carried over at the close of 1903 by the largest company in the industry, and this caused a decrease in the production reported at the census of 1905.

As explained in the report on this subject at the Twelfth Census,<sup>1</sup> "the manufacture is forced to es-

<sup>1</sup> Twelfth Census, Manufactures, Part I, page exci.

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." It was further pointed out that, with the exception of New York, the leading states in the industry are favored by the fact, that they contain or are in close proximity to the largest body of hard wood timber in North America, and are favorably located with reference to their supply of iron.

Table CLVI shows the localization of the industry by cities. It was found necessary, in order to avoid the disclosure of individual operations, to include the figures for 1905 for Chicago in the total for the group of "all other cities and outside of cities." It is true, however, that in 1905, as in 1900 and 1890, Chicago occupied first place in the industry, although its product was considerably reduced in value and there was a corresponding reduction in its proportion of the whole. This was brought about by conditions which it is believed were entirely temporary in their character.

Prior to this census the statistics for Moline, Ill., were not reported separately, although for a long time the city has been especially noted for the manufacture of agricultural implements. This city was second in importance in 1905, with 7.5 per cent of the value of all the agricultural implements manufactured in the United States.

Tables CLVII and CLVIII show the value of the agricultural implements manufactured in each of the leading states and cities in comparison with the value of products in all industries. There is no notable instance of specialization in the states presented in Table CLVII. In Table CLVIII the figures for Moline, Ill., Richmond, Ind., Racine, Wis., Springfield, Ohio, Auburn, N. Y., and South Bend, Ind., present striking examples of specialization in the industry.

*Artificial feathers and flowers.*—Table CLIX shows the localization of the manufacture of artificial flowers,

feathers, fruits, etc., in the cities of New York and Philadelphia.

TABLE CLIX.—*Artificial feathers and flowers—localization by cities: 1905, 1900, and 1890.*

(Cities of 20,000 population and over in 1900.)

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$5,246,822	\$6,293,235	\$9,078,083	100.0	100.0	100.0
New York.....	3,965,753	4,197,191	8,020,219	75.8	79.4	88.4
Philadelphia.....	721,940	948,763	619,485	13.8	15.1	6.8
All other cities and outside of cities.....	559,129	347,278	438,982	10.6	5.5	4.8

This industry displays a more marked localization in a small number of localities than almost any other that can be selected. Nearly the entire production in the United States, 89.4 per cent of the total value of products in 1905, was manufactured in New York and Philadelphia. However, the statistics seem to indicate that the industry is gradually becoming more widely distributed, the percentage of the total production reported outside of New York and Philadelphia showing an increase at each census. Nearness to the market for the finished goods seems to be the principal factor in determining the location of establishments engaged in this industry, and New York is the principal center, since it is the headquarters of the American millinery trade, and also of the theatrical business of the country, which require most of the goods of this class. Another reason for the large preponderance of New York in the manufacture of these products is that the workers in the trade are almost entirely persons of foreign birth or parentage. The foreigners upon their arrival in this country find remunerative employment in this branch of manufacture and naturally locate permanently in New York city, with the result that a great many persons skilled in the various processes of the artistic craft are gathered in the city, and this is an advantage unavailable elsewhere in anything like the same degree.

*Boots and shoes.*—Tables CLX to CLXIII show the localization of the manufacture of boots and shoes by states and cities, and the specialization of states and cities in the industry.

TABLE CLX.—BOOTS AND SHOES—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$320,107,458	\$258,969,580	\$220,640,358	100.0	100.0	100.0
Massachusetts.....	144,291,426	117,115,243	116,387,900	45.1	45.2	52.8
New York.....	34,137,049	25,585,631	23,661,204	10.7	9.9	10.7
Ohio.....	25,140,229	17,920,854	8,489,728	7.8	6.9	3.8
Missouri.....	23,493,552	11,253,202	4,841,004	7.3	4.3	2.2
New Hampshire.....	22,425,700	23,405,558	11,986,003	7.0	9.0	5.4
Pennsylvania.....	14,607,867	13,235,933	10,354,850	4.6	5.1	4.7
Maine.....	12,351,203	12,295,847	10,335,342	3.9	4.8	4.7
Illinois.....	9,026,238	9,375,842	8,756,824	2.8	3.6	4.0
New Jersey.....	6,977,300	6,978,043	7,255,409	2.2	2.7	3.3
Wisconsin.....	6,513,563	4,791,684	2,072,233	2.0	1.9	1.3
All other states.....	21,143,250	17,011,743	15,608,861	6.6	6.6	7.1

# LOCALIZATION OF INDUSTRIES.

CCXXXI

TABLE CLXI.—BOOTS AND SHOES—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$320,107,458	\$258,969,580	\$220,649,858	100.0	100.0	100.0
Brockton, Mass.....	30,073,014	10,844,397	16,171,624	9.4	7.6	7.3
Lynn, Mass.....	25,952,571	10,830,733	20,190,985	8.1	6.5	9.2
St. Louis, Mo.....	10,101,100	8,280,156	4,250,900	6.0	3.2	1.9
Haverhill, Mass.....	15,257,899	15,231,440	10,137,852	4.8	5.9	7.3
New York, N. Y.....	11,905,374	9,124,495	7,796,295	3.7	3.5	3.5
Cincinnati, Ohio.....	10,506,928	8,788,424	6,024,454	3.3	3.4	2.7
Rochester, N. Y.....	8,620,011	6,933,111	6,489,382	2.7	2.7	3.0
Marlboro, Mass. <sup>1</sup> .....	0,020,455	3,852,931	(?)	2.1	1.5	.....
Manchester, N. H.....	0,567,903	4,052,204	(?)	2.1	1.6	.....
Chicago, Ill.....	5,592,684	5,723,126	7,257,034	1.7	2.2	3.3
Boston, Mass.....	6,575,927	3,882,655	1,508,607	1.7	1.5	0.7
Columbus, Ohio.....	5,425,087	3,505,126	359,000	1.7	1.3	0.2
Philadelphia, Pa.....	5,171,859	5,931,045	6,851,834	1.6	2.3	3.1
Auburn, Me. <sup>1</sup> .....	4,263,162	4,176,826	(?)	1.3	1.6	.....
Portsmouth, Ohio <sup>1</sup> .....	4,258,855	3,043,016	(?)	1.3	1.2	.....
All other cities and outside of cities.....	155,124,563	139,762,995	127,612,030	48.5	54.0	57.8

<sup>1</sup> Less than 20,000 population in 1900.

<sup>2</sup> Not reported separately.

TABLE CLXII.—BOOTS AND SHOES—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH BOOTS AND SHOES FORMS OF ALL INDUSTRIES.	
	All industries.		Boots and shoes.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$320,107,458	\$258,969,580	2.2	2.3
New Hampshire.....	123,610,904	107,590,803	22,425,700	23,405,558	18.1	21.8
Massachusetts.....	1,124,092,051	907,626,439	144,291,426	117,115,243	12.8	12.0
Maine.....	144,020,197	112,959,098	12,351,293	12,295,847	8.6	10.9
Missouri.....	439,548,957	316,304,095	23,493,552	11,253,202	5.3	3.6
Ohio.....	960,811,857	748,670,855	25,140,220	17,920,854	2.6	2.4
Wisconsin.....	411,139,681	326,752,878	6,513,593	4,791,684	1.6	1.5
New York.....	2,488,345,579	1,871,830,872	34,137,040	25,585,631	1.4	1.4
New Jersey.....	774,399,025	553,005,684	6,977,300	6,978,043	0.9	1.3
Pennsylvania.....	1,955,551,332	1,649,882,380	14,607,867	13,235,933	0.7	0.8
Illinois.....	1,410,342,129	1,120,868,308	9,026,238	9,375,842	0.6	0.8
All other states.....	4,970,315,375	3,695,629,710	21,143,250	17,011,743	0.4	0.5

TABLE CLXIII.—BOOTS AND SHOES—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH BOOTS AND SHOES FORMS OF ALL INDUSTRIES.	
	All industries.		Boots and shoes.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$320,107,458	\$258,969,580	2.2	2.3
Marlboro, Mass. <sup>1</sup> .....	7,468,849	4,498,385	6,620,455	3,852,931	88.0	85.7
Brockton, Mass.....	37,790,982	24,855,302	30,073,014	19,844,397	79.0	79.8
Auburn, Me. <sup>1</sup> .....	6,407,157	5,905,633	4,263,162	4,176,826	66.5	70.0
Haverhill, Mass.....	24,446,594	25,418,700	15,257,899	15,231,440	62.4	65.0
Portsmouth, Ohio <sup>1</sup> .....	7,970,674	6,658,441	4,258,855	3,043,916	53.4	45.7
Lynn, Mass.....	55,008,023	39,347,493	25,952,571	16,830,733	47.2	42.8
Manchester, N. H.....	30,696,926	24,628,345	6,567,903	4,052,204	21.4	16.5
Columbus, Ohio.....	40,435,531	34,748,433	5,425,087	3,505,126	13.4	10.1
Rochester, N. Y.....	82,747,370	59,668,959	8,620,011	6,933,111	10.4	11.6
St. Louis, Mo.....	267,307,038	193,732,788	19,101,166	8,286,156	7.1	4.3
Cincinnati, Ohio.....	166,059,050	141,677,997	10,506,928	8,788,424	6.4	6.2
Boston, Mass.....	184,351,163	162,704,523	5,575,927	3,882,655	3.0	2.4
Philadelphia, Pa.....	501,388,078	519,981,812	5,171,859	5,931,045	0.9	1.1
New York, N. Y.....	1,526,523,006	1,172,870,261	11,905,374	9,124,495	0.8	0.8
Chicago, Ill.....	955,036,277	797,879,141	5,592,684	5,723,126	0.6	0.7
All other cities and outside of cities.....	10,818,515,369	8,198,424,759	155,124,563	139,762,995	1.4	1.7

<sup>1</sup> Less than 20,000 population in 1900.

As indicated by the statistics in Table CLX, the changes that occurred in the localization of boot and shoe factories between 1900 and 1905 are comparatively

unimportant as regards the relative proportions of the value of products manufactured in the several states. Massachusetts led in 1905 with 45.1 per cent of the

total value of the boots and shoes manufactured in the United States. The actual increase in the value of such goods produced in the state was \$27,176,183, but the proportion of the value of the total production decreased one-tenth of 1 per cent. The states of New York, Ohio, and Missouri show large increases in the value of their output. Both New Hampshire and Maine show little change in the value of products reported, but the percentage of the total for each to the total for the United States decreased.

The development and localization of the industry in Massachusetts were discussed in the Twelfth Census report on the subject, and it was pointed out that the present flourishing condition of the manufacture of boots and shoes in that state is attributable very largely to the momentum of an early start.

Table CLXI shows the localization of boot and shoe manufacture by cities and indicates a strong tendency for this branch of manufacture to localize in those cities that have for some time been distinguished for prominence in the industry. Brockton and Lynn, Mass., and St. Louis, Mo., are notable examples, the value of products for each having made large absolute increases and also increases in their proportion to the total for the United States. In addition to the cities given in the table there are many other cities and towns in the industrial life of which this industry assumed chief or sole importance, but for which the statistics can not be shown without disclosing the operations of individual establishments, since for each there were less than 3 establishments reported. Among these are Spencer, Webster, Bridgewater, Milford, and Stoughton, Mass.; Auburn, Lestershire, and Endicott, N. Y.; Nashua, Derry, and Exeter, N. H.; and Petersburg, Virginia.

The degree of specialization by states, as indicated by the statistics in Table CLXII showing the value of the boots and shoes manufactured in comparison with the value of products in all industries, was about the same at this census as at the census of 1900. The percentage that the value of boots and shoes formed of the value of all manufactured products remained practically unchanged for Massachusetts, New York, and Ohio, while reductions are shown for New Hampshire and Maine, and an increase for Missouri. The degree of specialization in cities is shown by the order in which they appear in Table CLXIII and their rank in this respect is indicated by the percentages. In the special report on the manufacture of boots and shoes at the present census the following statement appears concerning the tendency to centralization in cities displayed in this industry:

The proportion which the aggregate production of these cities formed of the total for the United States at each census was not materially changed from 1890 to 1900; but the large increase in this proportion at the census of 1905 indicates that the boot and shoe industry is being strongly affected by the tendency to centralization which is characteristic of modern commercial activity.

This centralization is further emphasized by the fact that 6 of the 13 cities produced more than \$10,000,000 worth of shoes each in 1905; and their aggregate production amounted to \$112,886,952, or 35.3 per cent of the total for the United States and 72.2 per cent of the total for the 13 cities. In 1900 the value of products reported for the same cities was \$78,105,645, or 30.2 per cent of the total for the country and 69.7 per cent of the total for the 13 cities.

*Carpets and rugs.*—Table CLXIV shows the localization of the manufacture of carpets and rugs by states, and Tables CLXV and CLXVI show the localization and specialization of the industry in Philadelphia.

TABLE CLXIV.—CARPETS AND RUGS—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$61,586,433	\$48,192,351	\$47,770,193	100.0	100.0	100.0
Pennsylvania.....	27,120,311	23,113,058	22,886,416	44.0	48.0	47.9
New York.....	19,404,133	15,029,218	14,606,116	31.5	31.2	30.6
Massachusetts.....	9,713,978	6,966,237	7,275,009	15.8	14.4	15.2
All other states.....	5,348,011	3,083,838	3,002,652	8.7	6.4	6.3

TABLE CLXV.—CARPETS AND RUGS—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$61,586,433	\$48,192,351	\$47,770,193	100.0	100.0	100.0
Philadelphia.....	25,232,510	21,986,002	22,000,681	41.0	45.6	46.1
All other cities and outside of cities.....	36,353,923	26,206,289	25,769,512	59.0	54.4	53.9

# LOCALIZATION OF INDUSTRIES.

ccxxxiii

TABLE CLXVI.—CARPETS AND RUGS—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH CARPETS AND RUGS FORMS OF ALL INDUSTRIES.	
	All industries.		Carpets and rugs.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$61,586,433	\$48,192,351	0.4	0.4
Philadelphia.....	591,388,078	519,981,812	25,232,510	21,986,062	4.3	4.2
All other cities and outside of cities.....	14,210,759,009	10,891,139,310	36,353,923	26,206,289	0.3	0.2

The manufacture of carpets and rugs has its principal development, as shown by Table CLXIV, in Pennsylvania, New York, and Massachusetts. In this industry is shown, as well perhaps as in any other that could be named, the advantage of long establishment and the consequent control of the market resulting from tried and proven methods of manufacture and the availability of skilled operatives. In this industry, too, a much larger investment of capital than the average is required, and this tends very strongly to lend stability to manufacturing industries. The three states shown manufactured in 1890, 1900, and 1905, respectively, 93.7, 93.6, and 91.3 per cent of the entire value of carpets and rugs manufactured in the United States. The proportion manufactured by each state was practically the same at the three censuses. Connecticut and New Jersey are also of some prominence in the industry.

Table CLXV indicates the extent of the localization of this manufacture in Philadelphia, where in 1905, 41

per cent of the value of the product manufactured in the United States, and practically all of that made in Pennsylvania, was manufactured. The principal kinds of goods made there are ingrain carpets and Smyrna rugs. The growth of carpet manufacture in Philadelphia has been steady and consistent almost from the earliest days of the Federal Government. As early as 1791 a factory was engaged in making Turkish and Axminster carpets. In 1850 Pennsylvania ranked third in the industry, with products valued at 21 per cent of the total for the United States, and in 1870 the state was first, with 44.8 per cent of the total.

*Clothing.*—Tables CLXVII to CLXX show the localization of the clothing industry by states and cities and the specialization of states and cities in the industry. The statistics are a combination of those for the three industries known in the Census classification as "clothing, men's," "clothing, women's," and "clothing, men's, buttonholes."

TABLE CLXVII.—CLOTHING—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$604,158,280	\$436,881,648	\$319,967,683	100.0	100.0	100.0
New York.....	341,144,717	233,721,652	142,511,977	56.5	53.5	44.6
Illinois.....	67,485,644	47,185,980	40,657,092	11.2	10.8	12.5
Pennsylvania.....	37,830,621	35,185,804	30,778,048	6.2	8.0	9.6
Ohio.....	31,366,566	24,400,863	24,983,867	5.2	5.6	7.8
Maryland.....	22,904,712	20,039,783	15,903,605	3.8	4.6	5.0
Massachusetts.....	21,724,056	15,040,648	23,137,789	3.6	3.4	7.2
Missouri.....	12,195,391	12,064,101	8,655,746	2.0	2.8	2.7
New Jersey.....	8,612,037	5,663,533	3,937,000	1.4	1.3	1.2
All other states.....	60,894,545	43,519,284	30,002,559	10.1	10.0	9.4

<sup>1</sup> Does not include value of products for 2 establishments reported as "clothing, men's, factory product, buttonholes."  
<sup>2</sup> Exclusive of 1 establishment reporting "clothing, men's, buttonholes."

TABLE CLXVIII.—CLOTHING—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$604,158,280	\$436,881,648	\$319,967,683	100.0	100.0	100.0
New York, N. Y.....	305,898,981	200,231,336	119,004,399	50.6	47.2	37.2
Chicago, Ill.....	64,013,281	45,335,253	38,947,877	10.8	10.4	12.2
Philadelphia, Pa.....	31,031,882	28,357,077	27,968,068	5.1	6.5	8.7
Baltimore, Md.....	22,684,650	19,823,861	15,903,605	3.8	4.5	5.0
Cincinnati, Ohio.....	16,972,484	14,030,971	20,204,758	2.8	3.2	6.3
Boston, Mass.....	16,951,474	11,807,958	21,178,616	2.8	2.7	6.6
Rochester, N. Y.....	15,130,353	11,352,101	9,572,037	2.5	2.6	3.0
Cleveland, Ohio.....	10,426,535	7,043,297	3,977,892	1.7	1.8	1.3
All other cities and outside of cities.....	120,148,043	92,170,794	63,150,431	19.9	21.1	19.7

<sup>1</sup> Does not include value of products for 2 establishments reported as "clothing, men's, factory product, buttonholes."  
<sup>2</sup> Exclusive of 1 establishment reporting "clothing, men's, buttonholes."

TABLE CLXIX.—CLOTHING—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH CLOTHING FORMS OF ALL INDUSTRIES.	
	All industries.		Clothing.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$604,158,280	\$436,881,648	4.1	3.8
New York.....	2,488,345,579	1,871,830,872	341,144,717	233,721,652	13.7	12.5
Maryland.....	243,376,096	214,076,143	22,004,712	20,030,783	9.4	9.5
Illinois.....	1,410,342,120	1,120,868,308	67,485,644	47,185,080	4.8	4.2
Ohio.....	960,811,857	748,670,855	31,365,566	24,660,863	3.3	3.3
Missouri.....	439,548,657	316,304,095	12,195,391	12,064,101	2.8	3.3
Pennsylvania.....	1,955,551,332	1,640,882,380	37,830,621	35,185,804	1.9	2.1
Massachusetts.....	1,124,092,051	907,626,439	121,724,056	15,040,648	1.9	1.7
New Jersey.....	774,369,025	553,005,684	8,612,037	5,663,533	1.1	1.0
All other states.....	5,405,710,161	4,031,856,346	60,894,545	43,519,284	1.1	1.1

<sup>1</sup> Exclusive of 1 establishment reporting "clothing, men's, buttonholes."

TABLE CLXX.—CLOTHING—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH CLOTHING FORMS OF ALL INDUSTRIES.	
	All industries.		Clothing.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$604,158,280	\$436,881,648	4.1	3.8
New York, N. Y.....	1,526,523,006	1,172,870,261	305,898,981	206,231,330	20.0	17.6
Rochester, N. Y.....	82,747,370	59,068,950	15,180,363	11,352,101	18.3	19.0
Baltimore, Md.....	151,546,580	135,107,626	22,684,656	19,823,801	15.0	14.7
Cincinnati, Ohio.....	106,059,650	141,077,697	16,972,484	14,060,971	10.2	10.0
Boston, Mass.....	184,351,163	162,764,523	116,951,474	11,807,958	6.2	7.3
Chicago, Ill.....	955,036,277	707,879,141	64,013,231	45,335,253	6.8	5.7
Cleveland, Ohio.....	172,115,101	126,156,830	16,423,535	7,643,207	6.1	6.1
Philadelphia, Pa.....	591,388,078	519,981,812	31,031,832	28,367,077	5.2	5.5
All other cities and outside of cities.....	10,972,380,462	8,295,013,964	120,148,645	92,170,794	1.1	1.1

<sup>1</sup> Exclusive of 1 establishment reporting "clothing, men's, buttonholes."

As indicated by the above tables, the factory manufacture of clothing for men and women is very largely an urban industry, and Table CLXVII shows that the industry is localized principally in those states with the largest urban population.

The manufacture of clothing in factories has developed from the small shop of the custom tailor and dressmaker to its present proportions almost entirely during the last fifty or sixty years. The industry is largely an outgrowth of the invention of the sewing machine, but a strong impulse was given to the manufacture by the necessity arising at the time of the Civil War of supplying ready made clothing to the hundreds of thousands of soldiers on both sides of the conflict. From the beginning the tendency to centralization in large centers of population has manifested itself. Tables CLXVII and CLXIX, showing the localization and specialization of the industry by states, are but the reflection of conditions in the large cities within the states, and as such have no great significance.

Table CLXVIII, showing the localization of the manufacture of clothing in the cities, discloses a remarkable condition. From 1890 to 1905 a large proportion of the ready made clothing of the country was manufactured in New York city, and the percentage which the value of such clothing formed of the total for the United States, has increased steadily, growing from

37.2 in 1890 to 50.6 in 1905; the value itself increased from \$119,004,399 to \$305,898,981. For an industry of such magnitude this is an economic condition of considerable moment. Besides being the commercial center of the nation, New York is the principal port of entry for the thousands of immigrants who are constantly being added to our population, and this contributes in a large measure to the preeminence of the city in the industry. The statistics of population of the Twelfth Census show, in the tables of occupation, that of the persons classified as "tailors" and "tailresses" in New York city, 98 per cent were of foreign birth or parentage. It is also shown that the preponderance of foreign workers in the trade exists in the other cities to a somewhat smaller degree.

Table CLXX shows the value of clothing manufactured in each of the leading cities in comparison with the value of products in all industries in those cities. The highest degree of specialization is indicated for New York, with Rochester, Baltimore, and Cincinnati following.

*Coke.*—Tables CLXXI and CLXXII show the localization and specialization of the coke industry by states. City tables are omitted, having no significance in this industry, as the ovens as a rule are located at a distance from the large centers of population.

# LOCALIZATION OF INDUSTRIES.

CCXXXV

TABLE CLXXI.—COKE—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$51,728,647	\$35,585,445	\$16,408,345	100.0	100.0	100.0
Pennsylvania.....	28,924,229	22,282,358	10,415,628	55.9	62.0	63.1
Alabama.....	6,175,125	3,726,433	2,474,377	11.9	10.5	15.0
West Virginia.....	4,174,186	3,529,241	1,130,762	8.1	9.9	6.9
Virginia.....	1,884,570	1,072,684	(1)	3.7	3.0	-----
Colorado.....	1,723,276	1,213,561	673,479	3.3	3.4	4.1
All other states.....	8,847,260	3,761,168	1,804,090	17.1	10.6	10.9

(1) Not reported separately.

TABLE CLXXII.—COKE—SPECIALIZATION OF STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH COKE FORMS OF ALL INDUSTRIES.	
	All industries.		Coke.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$51,728,647	\$35,585,445	0.3	0.3
Alabama.....	109,169,922	72,100,929	6,175,126	3,726,433	5.7	5.2
West Virginia.....	99,040,676	67,006,822	4,174,186	3,529,241	4.2	5.3
Colorado.....	100,143,999	89,067,879	1,723,276	1,213,561	1.7	1.4
Pennsylvania.....	1,955,551,332	1,640,882,380	28,924,229	22,282,358	1.5	1.4
Virginia.....	148,856,525	108,644,150	1,884,570	1,072,684	1.3	1.0
All other states.....	12,389,384,633	9,424,409,062	8,847,260	3,761,168	0.1	(1)

(1) Less than one-tenth of 1 per cent.

As shown in Table CLXXI, Pennsylvania leads all the other states in the production of coke, and this has been the case since the commencement of the industry in this country. Next in importance to Pennsylvania are Alabama, West Virginia, Virginia, and Colorado, in the order named. The prime requisite for coke manufacture is a supply of good coking coal, and this is produced in abundance in the states shown in the table. It is of great importance, too, that iron and steel manufacturing establishments, the principal consumers of coke, be situated near the coke ovens, in order that the cost of shipment may not be too great. The development of the manufacture of coke in by-product ovens has somewhat changed the relation of coke oven to coal mine with respect to their nearness to each other. Many of these ovens have been and are being built in connection with iron and steel works at points far removed from the mines and the large fields of coke manufacture. The by-products recoverable by means of these improved processes frequently exceed in value the coke made, and the added value of these products—tar, ammonium sulphate, ammonia liquor, and gas—is more than sufficient to make up the difference between the freight charges on coal and coke. This accounts for the establishment of the industry in such states as Maryland, Massachusetts, Michigan, Minnesota, New Jersey, and New York, and places in other states many miles distant from the coal mines. Where this industry is localized, it is usually found to be centralized to a very great degree. In Pennsylvania, in what is known as the

Connellsville district, consisting of Fayette and Westmoreland counties, about one-third of the total value of coke manufactured in the United States is produced. Likewise, in Alabama and West Virginia the coke ovens are concentrated in certain districts in close proximity to the mines, this manufacture, with the attendant mining of coal, constituting in many instances almost the sole reason for the existence of many large and small communities.

Table CLXXII shows the value of the coke manufactured in each of the leading states in comparison with the value of products in all industries. No special significance can be claimed for the statistics as presented in this table. A comparison of this industry with manufacturing industries at large for the states does not show a sufficiently pronounced degree of specialization to have any particular interest. However, if the method of tabulating and compiling the statistics had been such as to make it practicable to present the figures by counties, it would be seen that in many localities coke manufacture and the necessary mining would be practically the only industrial pursuit.

*Collars and cuffs.*—Tables CLXXIII to CLXXV show the localization and specialization of the manufacture of collars and cuffs.

TABLE CLXXIII.—Collars and cuffs—localization by states: 1905.

STATE.	Value of products.	Per cent of total.
United States.....	\$12,587,277	100.0
New York.....	12,188,181	96.8
All other states.....	399,096	3.2

TABLE CLXXIV.—Collars and cuffs—localization by cities: 1905.

CITY.	Value of products.	Per cent of total.
United States .....	\$12,587,277	100.0
Troy, N. Y. ....	11,271,708	89.5
All other cities and outside of cities .....	1,315,569	10.5

TABLE CLXXV.—Collars and cuffs—specialization of cities: 1905.

CITY.	VALUE OF PRODUCTS.		Per cent which collars and cuffs forms of all industries.
	All industries.	Collars and cuffs.	
United States .....	\$14,802,147,087	\$12,587,277	0.1
Troy, N. Y. ....	31,860,829	11,271,708	35.4
All other cities and outside of cities .....	14,770,286,258	1,315,569	(1)

<sup>1</sup> Less than one-tenth of 1 per cent.

Troy, N. Y., is the center of the industry, as indicated by the above tables, 89.5 per cent of the total value of these goods being manufactured there; 96.8 per cent of the total for the United States was made in the state of New York. The localization of the manufacture of collars and cuffs was discussed in the report on the subject at the census of 1900. There was no separate classification for the manufacture of linen collars and cuffs at that time, the returns being included under one of the two classifications, "shirts" or "furnishing goods, men's," and it was necessary to make another tabulation of the schedules in order to show separate data. While the output of collars and cuffs in three cities of the state of New York—Glens Falls,

Albany, and New York—is considerable, it is not sufficient to justify their inclusion in tables showing the localization of the industry.

As stated in the report on this subject at the Twelfth Census, the chief cause of the marked localization of the industry in Troy is the early establishment of the industry there and the consequent development of a class of skilled employees.

The percentage which the value of collars and cuffs manufactured in Troy forms of the value of all manufactured products of the city shows that the industry is very highly specialized.

*Copper, smelting and refining.*—Tables CLXXVI and CLXXVII show the localization of copper smelting and refining by states; also the specialization of states in the industry. As this branch of manufacture is not, as a rule, an urban industry, there are no tables presenting localization and specialization by cities.

TABLE CLXXVI.—Copper, smelting and refining—localization by states: 1905 and 1900.

STATE.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1905	1900	1905	1900
United States .....	\$240,780,216	\$165,131,670	100.0	100.0
New Jersey .....	62,795,613	38,365,131	26.1	23.2
Montana .....	(1)	36,387,003	.....	22.0
Arizona .....	22,761,981	17,286,517	9.4	10.5
Michigan .....	21,222,217	17,340,041	8.8	10.5
Utah .....	8,498,956	(2)	3.5	.....
Colorado .....	(1)	3,803,034	.....	2.4
California .....	2,583,524	4,508,259	1.1	2.7
All other states .....	122,917,925	47,351,625	51.1	28.7

<sup>1</sup> Included in "all other states" to avoid disclosing individual operations.  
<sup>2</sup> Not reported separately.

TABLE CLXXVII.—COPPER, SMELTING AND REFINING—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH COPPER SMELTING AND REFINING FORMS OF ALL INDUSTRIES.	
	All industries.		Copper, smelting and refining.		1905	1900
	1905	1900	1905	1900		
United States .....	\$14,802,147,087	\$11,411,121,122	\$240,780,216	\$165,131,670	1.6	1.4
Arizona .....	28,083,192	20,438,987	22,761,981	17,286,517	81.1	84.6
Montana .....	66,415,452	52,744,997	(1)	36,387,003	.....	69.0
Utah .....	38,926,464	17,981,648	8,498,956	(2)	21.8	.....
New Jersey .....	774,369,025	553,005,684	62,795,613	38,365,131	8.1	6.9
Michigan .....	420,120,060	319,691,856	21,222,217	17,340,041	4.9	5.4
Colorado .....	100,143,999	80,067,879	(1)	3,803,034	.....	4.4
California .....	367,218,494	257,385,521	2,583,524	4,508,259	0.7	1.8
All other states .....	12,997,870,401	10,100,804,550	122,917,925	47,351,625	0.9	0.5

<sup>1</sup> Included in "all other states" to avoid disclosing individual operations.

<sup>2</sup> Not reported separately.

The industry of copper smelting is localized almost entirely with reference to the nearness of the mines which furnish a sufficient supply of raw material in the shape of crude ore or concentrates, while copper refineries are located principally in or near large centers of population to which the "blister" copper, or smelted metal can be conveniently shipped for refining and where the refined copper finds a ready market.

In the report on copper smelting and refining at the

Twelfth Census, the following statement concerning this subject is made:<sup>1</sup>

While the location of the establishments engaged in copper smelting is controlled very largely by the source of the ore, still, in many cases, the ore is transported to meet other materials or more favorable conditions for smelting. The products of the smelters are again transported to refineries, which are situated in localities more convenient for securing the materials used in the processes and are in closer touch with the market for the finished products.

<sup>1</sup> Twelfth Census, Manufactures, Part IV, page 139.

Table CLXXVI shows the localization of the industry by states. The establishments in New Jersey, which led in 1905 in the gross value of products with 26.1 per cent of the total, are engaged almost entirely in refining the smelted products of western smelters, as are the plants in Maryland, New York, and other Eastern states. While the statistics for the value of products for New York and Maryland do not appear in the table, there being less than three establishments in each, these states are prominent in this industry. In the production of smelted copper Montana, Arizona, Michigan, Utah, Colorado, and California occupy positions in the order named.

Table CLXXVII shows the degree of specialization of the industry in each of the states included. Arizona, Montana, and Utah present the greatest degree of specialization in copper smelting at the census of

1905, constituting 81.1 per cent of the total value of all manufactured products for Arizona, and 21.8 per cent for the state of Utah.

The localization of establishments engaged in lead and zinc smelting is likewise controlled principally by the nearness of the ore supplies. The states occupying the foremost places in the value of lead smelted, without reference to the subsequent refining, are Colorado, Missouri, Utah, Texas, Montana, Illinois, and Kansas. The leading states in zinc smelting are Missouri, Illinois, and Pennsylvania, in the order named.

*Cotton goods, including cotton small wares.*—Tables CLXXVIII to CLXXXI show the localization of the cotton industry by states and cities and the specialization of states and cities in the industry.

TABLE CLXXVIII.—COTTON GOODS, INCLUDING COTTON SMALL WARES—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$450,467,704	\$330,200,320	\$267,081,724	100.0	100.0	100.0
Massachusetts.....	130,008,982	111,125,175	100,202,882	28.9	32.7	37.4
South Carolina.....	49,437,644	20,723,919	9,800,798	11.0	8.8	3.7
North Carolina.....	47,254,054	28,372,798	9,503,443	10.5	8.4	3.6
Georgia.....	<sup>1</sup> 35,174,245	18,457,645	12,095,629	7.8	5.4	4.5
Rhode Island.....	34,573,450	26,435,675	27,310,499	7.7	7.8	10.2
New Hampshire.....	<sup>1</sup> 29,540,770	22,998,249	21,958,002	6.6	6.8	8.2
Pennsylvania.....	26,209,853	25,447,607	18,431,773	5.8	7.5	6.9
Connecticut.....	18,425,384	15,489,442	15,409,476	4.1	4.6	5.7
Alabama.....	16,760,332	8,153,136	2,190,771	3.7	2.4	0.8
Maine.....	15,405,823	14,631,086	15,316,909	3.4	4.3	5.7
New York.....	13,433,904	10,788,003	9,777,295	3.0	3.2	3.6
All other states.....	34,093,260	27,577,495	25,984,247	7.5	8.1	9.7

<sup>1</sup>Exclusive of 1 establishment reporting "cotton small wares" to avoid disclosing individual operations.

TABLE CLXXIX.—COTTON GOODS, INCLUDING COTTON SMALL WARES—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$450,467,704	\$330,200,320	\$267,081,724	100.0	100.0	100.0
Fall River, Mass.....	32,538,667	29,286,626	24,925,764	7.2	8.6	9.3
New Bedford, Mass.....	22,411,936	19,748,733	8,185,286	5.0	4.9	3.0
Lowell, Mass.....	19,383,873	17,038,576	19,789,111	4.3	5.0	7.4
Philadelphia, Pa.....	17,402,724	17,829,298	11,514,401	3.9	5.2	4.3
Manchester, N. H.....	14,806,061	11,723,508	10,957,219	3.2	3.5	4.1
Pawtucket, R. I.....	10,059,361	5,635,455	3,954,960	2.2	1.7	1.5
Taunton, Mass.....	6,141,598	4,593,466	2,747,816	1.4	1.3	1.0
Lawrence, Mass.....	2,745,611	18,146,594	6,046,014	1.3	2.4	2.3
Warwick, R. I.....	5,376,611	4,413,357	( <sup>3</sup> )	1.2	1.3	.....
Holyoke, Mass.....	5,019,817	3,764,848	4,302,722	1.1	1.1	1.6
Lewiston, Me.....	4,972,438	4,638,115	5,013,337	1.1	1.4	1.9
Adams, Mass. <sup>4</sup> .....	4,821,261	( <sup>3</sup> )	( <sup>3</sup> )	1.0	.....	.....
Utica, N. Y.....	4,287,658	( <sup>3</sup> )	2,160,247	0.9	.....	0.8
Columbus, Ga. <sup>4</sup> .....	2,759,081	( <sup>3</sup> )	( <sup>3</sup> )	0.6	.....	.....
All other cities and outside of cities.....	206,287,295	215,590,794	168,293,747	65.6	63.6	62.8

<sup>1</sup> Exclusive of 1 establishment reporting "cotton small wares" to avoid disclosing individual operations.

<sup>2</sup> Exclusive of 2 establishments reporting "cotton small wares" to avoid disclosing individual operations.

<sup>3</sup> Not reported separately.

<sup>4</sup> Less than 20,000 population.

TABLE CLXXX.—COTTON GOODS, INCLUDING COTTON SMALL WARES—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH COTTON GOODS, INCLUDING COTTON SMALL WARES, FORMS OF ALL INDUSTRIES.	
	All industries.		Cotton goods, including cotton small wares.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$450,467,704	\$339,200,320	3.0	3.0
South Carolina.....	79,376,262	53,335,811	49,437,644	20,723,919	62.3	55.7
North Carolina.....	142,520,776	85,274,083	47,254,054	28,372,798	33.2	33.3
New Hampshire.....	123,610,904	107,590,803	129,540,770	22,998,249	23.9	21.4
Georgia.....	151,040,455	94,532,368	135,174,248	18,457,045	23.3	19.5
Rhode Island.....	202,109,583	165,550,382	34,573,450	26,435,075	17.1	16.0
Alabama.....	109,169,922	72,109,920	16,760,332	8,153,130	15.4	11.3
Massachusetts.....	1,124,092,051	907,626,430	130,068,982	111,125,175	11.6	12.2
Maine.....	144,020,197	112,959,098	15,405,823	14,631,086	10.7	13.0
Connecticut.....	399,082,091	315,106,150	18,425,384	15,480,442	5.0	4.9
Pennsylvania.....	1,055,551,332	1,049,882,380	26,290,853	25,447,697	1.3	1.5
New York.....	2,488,345,579	1,871,830,872	13,433,904	10,788,003	0.5	0.6
All other states.....	7,913,227,935	5,975,322,807	34,003,200	27,677,495	0.4	0.5

<sup>1</sup> Exclusive of 1 establishment reporting "cotton small wares" to avoid disclosing individual operations.

TABLE CLXXXI.—COTTON GOODS, INCLUDING COTTON SMALL WARES—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH COTTON GOODS, INCLUDING COTTON SMALL WARES, FORMS OF ALL INDUSTRIES.	
	All industries.		Cotton goods, including cotton small wares.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$450,467,704	\$339,200,320	3.0	3.0
Adams, Mass. <sup>1</sup> .....	5,492,001	.....	4,021,261	( <sup>2</sup> )	84.1	.....
Warwick, R. I.....	7,051,971	6,019,989	5,370,318	4,413,357	76.2	73.3
New Bedford, Mass.....	29,469,349	23,397,491	22,411,030	16,748,783	70.1	71.0
Fall River, Mass.....	48,473,105	39,102,710	32,598,997	29,280,526	74.8	74.9
Lewiston, Me.....	8,527,649	7,778,941	4,072,438	4,038,115	58.3	59.0
Manchester, N. H.....	30,096,926	24,028,345	14,300,061	11,723,508	46.8	47.6
Taunton, Mass.....	13,644,586	11,544,150	6,141,593	4,593,466	45.0	39.8
Augusta, Ga.....	8,829,395	7,084,324	3,832,000	3,429,348	43.4	43.0
Lowell, Mass.....	46,870,212	41,202,984	19,383,878	17,038,576	41.3	41.4
Pawtucket, R. I.....	25,846,899	10,271,582	10,009,361	5,035,465	39.1	20.2
Columbus, Ga.....	7,079,702	.....	2,750,081	( <sup>2</sup> )	39.0	.....
Woonsocket, R. I.....	19,260,537	14,744,000	3,657,641	2,359,586	19.0	16.2
Utica, N. Y.....	22,880,317	.....	4,287,658	( <sup>2</sup> )	18.7	.....
Holyoke, Mass.....	30,731,332	24,092,610	5,019,817	3,764,848	16.3	15.6
Atlanta, Ga.....	25,745,050	14,418,834	3,607,093	1,938,228	14.0	13.4
Lawrence, Mass.....	48,036,593	41,741,080	45,745,611	8,146,594	12.0	13.5
Philadelphia, Pa.....	591,388,078	519,981,812	17,462,724	17,320,298	3.0	3.4
All other cities and outside of cities.....	13,837,113,875	10,615,210,470	284,190,552	207,833,032	2.1	2.0

<sup>1</sup> Less than 20,000 population in 1900.

<sup>2</sup> Not reported separately.

<sup>3</sup> Exclusive of value of products for 1 establishment reporting "cotton small wares" to avoid disclosing individual operations.

<sup>4</sup> Exclusive of value of products for 2 establishments reporting "cotton small wares" to avoid disclosing individual operations.

Table CLXXXVIII shows that the cotton industry is largely localized in the New England states and South Carolina, North Carolina, Georgia, and Alabama. The southward trend of the industry, as indicated by the percentages in the table, is evident, for the proportion of the total value of cotton goods manufactured in New England shows a continued decrease and that of the Southern states, a steady increase. Massachusetts, however, still occupies the first position in the industry. Among the favoring causes of the rapid development of the cotton industry in the South the reports of the Twelfth Census enumerated the accessibility of the raw material, the abundant water supply, and the low cost of living. The comparatively low wage cost is another strong factor in the increase of cotton manufacture in that section; one reason for

this is that the proportion of children employed in the industry is much larger in the South than in New England.

Table CLXXXIX shows the localization of the industry in cities, and the statistics indicate that there have been some changes in the relative rank of the several cities since the census of 1900. Fall River, Mass., which was first in cotton manufactures in 1890 and 1900, still maintained its ascendancy in 1905, while Philadelphia and Lowell, the cities formerly next in rank in value of product, have been passed by New Bedford, which now is second. The statistics show an actual decrease in the value of cotton manufactured in Philadelphia. The fact that only 32.8 per cent of the total value of products is reported for cities of 20,000 population or over indicates apparently that the conditions

# LOCALIZATION OF INDUSTRIES.

ccxxxix

for cotton manufactures are less favorable in large cities.

Tables CLXXX and CLXXXI show the value of cotton goods manufactured in states and cities in comparison with the value of products in all industries in 1900 and 1905. The highest degree of specialization in

cities is shown for Adams, Mass., where the value of cotton manufactured formed 84.1 per cent of the value of all products.

*Dyeing and finishing textiles.*—Tables CLXXXII to CLXXXV show the localization and specialization of this industry by states and cities.

TABLE CLXXXII.—DYEING AND FINISHING TEXTILES—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$50,849,545	\$44,963,331	\$28,900,560	100.0	100.0	100.0
New Jersey.....	11,979,947	10,488,963	6,183,397	23.6	23.3	21.4
Massachusetts.....	11,048,512	8,808,290	6,496,215	21.7	19.7	22.5
Rhode Island.....	9,981,457	8,494,878	4,748,561	19.0	18.9	16.4
Pennsylvania.....	6,786,263	7,038,012	5,240,701	13.3	15.0	18.1
New York.....	4,301,688	3,625,832	3,636,051	8.6	8.1	12.6
All other states.....	6,691,678	6,457,306	2,600,575	13.2	14.4	9.0

TABLE CLXXXIII.—DYEING AND FINISHING TEXTILES—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$50,849,545	\$44,963,331	\$28,900,560	100.0	100.0	100.0
Paterson, N. J.....	5,699,295	3,836,409	2,252,310	11.2	8.5	7.8
Philadelphia, Pa.....	4,371,006	5,562,099	4,356,272	8.6	12.4	15.1
Fall River, Mass.....	3,134,604	2,995,979	1,206,191	6.2	6.7	4.2
Providence, R. I.....	2,254,074	2,284,083	1,957,690	4.4	5.1	6.8
New York, N. Y.....	1,707,480	1,460,322	1,538,384	3.4	3.2	5.3
Pawtucket, R. I.....	1,644,548	1,600,916	1,417,971	3.2	3.6	4.9
Passaic, N. J.....	1,621,131	2,316,681	(1)	3.2	5.1	-----
Lawrence, Mass.....	1,428,174	239,017	1,159,722	2.8	0.5	4.0
Warwick, R. I.....	1,262,324	(1)	(1)	2.5	-----	-----
All other cities and outside of cities.....	27,726,900	24,667,825	15,012,014	54.5	54.9	51.9

1 Not reported separately.

TABLE CLXXXIV.—DYEING AND FINISHING TEXTILES—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH DYEING AND FINISHING TEXTILES FORMS OF ALL INDUSTRIES.	
	All industries.		Dyeing and finishing textiles.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$50,849,545	\$44,963,331	0.3	0.4
Rhode Island.....	202,109,583	165,550,382	9,981,457	8,494,878	4.9	5.1
New Jersey.....	774,369,025	553,005,684	11,979,947	10,488,963	1.5	1.9
Massachusetts.....	1,124,092,051	907,626,439	11,048,512	8,808,290	1.0	1.0
Pennsylvania.....	1,955,551,332	1,649,882,380	6,786,263	7,038,012	0.3	0.4
New York.....	2,488,345,579	1,871,830,872	4,301,688	3,625,832	0.2	0.2
All other states.....	8,257,679,517	6,263,225,365	6,691,678	6,457,306	0.1	0.1

TABLE CLXXXV.—DYEING AND FINISHING TEXTILES—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH DYEING AND FINISHING TEXTILES FORMS OF ALL INDUSTRIES.	
	All industries.		Dyeing and finishing textiles.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$50,849,545	\$44,963,331	0.3	0.4
Warwick, R. I.....	7,051,971	6,019,989	1,262,324	(1)	17.9	-----
Paterson, N. J.....	54,673,083	48,502,044	5,699,295	3,836,409	10.4	7.9
Fall River, Mass.....	43,473,105	39,102,710	3,134,604	2,995,979	7.2	7.7
Providence, R. I.....	22,782,725	12,804,805	1,621,131	2,316,681	7.1	18.1
Pawtucket, R. I.....	25,846,899	19,271,582	1,644,548	1,600,916	6.4	8.3
Lawrence, Mass.....	48,036,593	41,741,980	1,428,174	239,017	3.0	0.6
Providence, R. I.....	91,980,963	78,657,103	2,254,074	2,284,083	2.5	2.9
Philadelphia, Pa.....	591,388,078	519,981,812	4,371,006	5,562,099	0.7	1.1
New York, N. Y.....	1,526,523,006	1,172,870,261	1,707,480	1,460,322	0.1	0.1
All other cities and outside of cities.....	12,390,390,664	9,472,168,836	27,726,900	24,667,825	0.2	0.3

1 Not reported separately.

## MANUFACTURES.

Table CLXXXII shows that the industry is localized closely in 5 states. The greatest concentration appears in New Jersey, which in 1905 produced almost one-fourth of the total value of products for the United States. The dyeing and finishing industry represents establishments that treat fibers and fabrics of textile manufactures. The value of product reported represents the amount received for work done and not the value of the goods operated upon. This close relationship to the textile industry has caused the location of the dyeing and finishing mills in the leading textile states. The percentages do not reveal any great change in the location of the industry since 1890, although Massachusetts, Pennsylvania, and New York appear to have lost in relative importance between that year and 1905. An actual decrease in value of products from 1900 to 1905 is shown for Pennsylvania.

Table CLXXXIII shows that about half of the value of products of the industry was reported for cities. North Adams, Mass., the town of Lincoln, R. I., and Wilmington, Del., are also dyeing and finishing centers, but the statistics for them can not be published separately without disclosing figures for individual establishments. The value of products of these 3 centers aggregated \$6,716,655 in 1905, or 13.2 per cent of the total for the industry. If these 3 centers be considered in connection with the 9 cities shown in the table, the 12 urban centers produced products valued at \$29,839,300, or 58.7 per cent of the total for the United States. Paterson, N. J., which contributed 11.2 per cent of the total for the industry in 1905, has made a remarkable advance in the dyeing and finishing industry since the census of 1900, and has gained first rank over Philadelphia, Pa., which led in that year. Its value of product increased almost 50 per cent between the two censuses. Dyeing and finishing in Paterson is confined largely to "processing" silk goods, and the great increase apparently indicates that some of the work formerly done in silk mills is now done in independent plants.

Tables CLXXXIV and CLXXXV indicate the proportion which the dyeing and finishing of textiles formed of all

the manufactures in selected states and cities. Among the states, the greatest specialization is shown for Rhode Island, with a value of products for dyeing and finishing forming 4.9 per cent of the value of all products at the census of 1905; while among the cities, the most marked specialization is shown for Warwick, R. I., with a value of products for this industry constituting 17.9 per cent of the value of all manufactured products in the city. Paterson, N. J., and Fall River, Mass., ranked second and third, respectively. Philadelphia, Pa., Passaic, N. J., and Providence, R. I., show both an actual and a proportionate decrease in the dyeing and finishing industry between 1900 and 1905 in contrast to substantial increases in all industries.

*Felt hats.*—The localization and specialization of the industry in certain states and cities is presented in Tables CLXXXVI to CLXXXIX.

TABLE CLXXXVI.—*Felt hats—localization by states: 1905 and 1900.*

STATE.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1905	1900	1905	1900
United States.....	\$36,629,353	\$27,811,187	100.0	100.0
New Jersey.....	9,540,433	7,211,229	26.0	25.9
Connecticut.....	8,662,799	7,541,882	23.7	27.1
New York.....	7,739,774	5,602,458	21.1	20.1
Pennsylvania.....	7,350,311	4,243,352	20.1	15.3
Massachusetts.....	2,315,591	2,630,964	6.3	9.5
All other states.....	1,020,445	576,302	2.8	2.1

TABLE CLXXXVII.—*Felt hats—localization by cities: 1905 and 1900.*

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1905	1900	1905	1900
United States.....	\$36,629,353	\$27,811,187	100.0	100.0
Philadelphia, Pa.....	5,847,771	3,075,470	16.0	11.1
Danbury, Conn. <sup>1</sup> .....	5,798,107	5,007,095	15.8	18.0
Newark, N. J.....	4,586,040	3,453,619	12.5	12.4
New York, N. Y.....	3,899,495	2,241,347	10.7	8.1
Orange, N. J.....	2,311,614	2,246,404	6.3	8.0
All other cities and outside of cities.....	14,180,386	11,787,162	38.7	42.4

<sup>1</sup> Less than 20,000 population in 1900.

TABLE CLXXXVIII.—FELT HATS—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH FELT HATS FORMS OF ALL INDUSTRIES.	
	All industries.		Felt hats.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$36,629,353	\$27,811,187	0.2	0.2
Connecticut.....	369,082,091	315,106,150	8,662,799	7,546,882	2.3	2.4
New Jersey.....	774,369,025	553,005,684	9,540,433	7,211,229	1.2	1.3
Pennsylvania.....	1,955,551,332	1,649,882,380	7,350,311	4,243,352	0.4	0.3
New York.....	2,488,345,579	1,871,830,872	7,739,774	5,602,458	0.3	0.3
Massachusetts.....	1,124,092,051	907,626,439	2,315,591	2,630,964	0.2	0.3
All other states.....	8,090,707,009	6,113,669,597	1,020,445	576,302	( <sup>1</sup> )	( <sup>1</sup> )

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE CLXXXIX.—FELT HATS—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH FELT HATS FORMS OF ALL INDUSTRIES.	
	All industries.		Felt hats.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$36,029,359	\$27,811,187	0.2	0.2
Danbury, Conn. <sup>1</sup> .....	8,065,652	6,527,163	5,798,107	5,007,005	71.9	76.7
Orange, N. J.....	6,150,635	2,965,688	2,311,614	2,246,464	37.6	75.0
Newark, N. J.....	150,055,227	112,728,045	4,586,040	3,459,610	3.1	3.1
Philadelphia, Pa.....	591,388,078	519,981,812	5,847,771	3,075,470	1.0	0.6
New York, N. Y.....	1,526,323,006	1,172,870,261	3,809,435	2,241,347	0.3	0.2
All other cities and outside of cities.....	12,519,964,489	9,590,018,153	14,186,380	11,787,162	0.1	0.1

<sup>1</sup> Less than 20,000 population in 1900.

Felt hats did not appear separately in census statistics until 1900.

A marked localization is shown for the industry in New Jersey, Connecticut, New York, and Pennsylvania, these states producing 88.4 per cent in 1900 and 90.9 per cent in 1905 of the total value of products for the industry. For Connecticut, however, the percentage that the state formed of the total decreased 3.4 per cent, although the value of products increased \$1,115,917.

While New Jersey shows the greatest localization among the states, Philadelphia, Pa., was the leading city in the industry in 1905, followed closely by Danbury, Conn., the combined value of product of the two cities amounting to 29.1 per cent in 1900 and 31.8 per cent in 1905 of the total for the United States.

In 1900 Danbury, Conn., was the chief felt hat city, but by 1905 it was outstripped by Philadelphia, in which city the advance of the industry has been rapid. Yonkers, N. Y., Fall River, Mass., and Bethel, Conn.,

produced felt hats to the value of \$5,029,575 in 1905, but the statistics can not be shown separately.

Table CLXXXVIII shows that the greatest specialization of the industry was in Connecticut, where the value of the felt hats manufactured formed 2.4 per cent in 1900 and 2.3 per cent in 1905 of the total value of all manufactured products. In 1905 the relative importance of the industry was six times as great in New Jersey as in the United States, while the percentages for Massachusetts and the United States were equal.

Danbury, Conn., shows the most pronounced specialization of the cities given in Table CLXXXIX, the value of felt hats constituting 71.9 per cent of the total value of products for all industries in 1905. Orange, N. J., ranked second in 1905, with 37.6 per cent. In comparison with all industries the felt hat industry lost prestige in both of these cities between 1900 and 1905.

*Glass.*—Tables CXC to CXCH show the localization and specialization in the glass industry.

TABLE CXC.—GLASS—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$79,607,998	\$50,539,712	\$41,051,004	100.0	100.0	100.0
Pennsylvania.....	27,671,693	22,011,130	17,179,137	34.7	38.9	41.8
Indiana.....	14,706,929	14,757,883	2,095,409	18.5	28.1	7.3
Ohio.....	9,026,208	4,547,083	5,649,182	11.3	8.1	13.8
New Jersey.....	6,450,195	5,093,822	5,218,152	8.1	9.0	12.7
Illinois.....	5,619,740	2,834,398	2,372,011	7.1	5.0	5.8
West Virginia.....	4,598,563	1,871,795	945,234	5.8	3.3	2.3
All other states.....	11,534,070	5,423,601	6,691,879	14.5	9.6	16.3

MANUFACTURES.

TABLE CXCI.—GLASS—LOCALIZATION BY CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1905	1900	1905	1900
United States.....	\$70,607,998	\$50,539,712	100.0	100.0
Muncie, Ind.....	2,344,402	2,381,025	3.0	4.2
Millville, N. J. <sup>1</sup> .....	2,332,614	1,617,373	2.9	2.9
Washington, Pa. <sup>1</sup> .....	2,243,806	1,308,029	2.8	2.3
Pittsburg, Pa.....	2,130,540	2,420,680	2.7	4.3
Charloto, Pa. <sup>1</sup> .....	1,841,908	1,010,139	2.3	1.3
Terre Haute, Ind.....	1,207,100	( <sup>2</sup> )	1.6	.....
Philadelphia, Pa.....	1,204,244	1,347,011	1.6	2.4
Bridgeton, N. J. <sup>1</sup> .....	1,252,795	952,591	1.6	1.7
Brooklyn, N. Y.....	1,196,409	807,698	1.5	1.5
Tarantun, Pa. <sup>1</sup> .....	1,050,683	1,142,311	1.3	2.0
Marion, Ind. <sup>1</sup> .....	1,042,057	1,309,317	1.3	2.5
Gas City, Ind. <sup>1</sup> .....	1,000,497	1,021,280	1.3	1.8
St. Louis, Mo.....	900,870	( <sup>2</sup> )	1.1	.....
Kokomo, Ind. <sup>1</sup> .....	804,567	( <sup>2</sup> )	1.1	.....
Alexandria, Ind. <sup>1</sup> .....	( <sup>2</sup> )	1,015,689	.....	1.8
Elwood, Ind. <sup>1</sup> .....	223,766	1,011,803	.....	1.8
All other cities and outside of cities.....	58,586,280	39,035,760	73.0	69.0

<sup>1</sup> Less than 20,000 population in 1900.

<sup>2</sup> Not reported separately.

TABLE CXCII.—GLASS—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH GLASS FORMS OF ALL INDUSTRIES.	
	All industries.		Glass.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$70,607,998	\$50,539,712	0.5	0.5
West Virginia.....	99,040,676	67,006,822	4,598,563	1,871,795	4.6	2.8
Indiana.....	393,954,405	337,071,630	14,700,029	14,757,883	3.7	4.4
Pennsylvania.....	1,955,551,332	1,640,882,380	27,671,093	22,011,130	1.4	1.3
Ohio.....	990,811,857	748,670,855	9,026,208	4,547,083	0.9	0.6
New Jersey.....	774,360,025	553,005,084	0,450,195	5,063,822	0.8	0.9
Illinois.....	1,410,342,129	1,120,868,308	5,610,730	2,834,398	0.4	0.3
All other states.....	9,208,077,663	6,934,613,443	11,534,670	5,423,001	0.1	0.1

TABLE CXCIIL.—GLASS—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH GLASS FORMS OF ALL INDUSTRIES.	
	All industries.		Glass.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$70,607,998	\$50,539,712	0.5	0.5
Millville, N. J. <sup>1</sup> .....	3,719,417	2,513,433	2,332,614	1,617,373	62.7	64.3
Bridgeton, N. J. <sup>1</sup> .....	2,963,840	2,258,772	1,252,795	952,591	42.3	42.2
Muncie, Ind.....	6,476,267	7,041,676	2,344,462	2,381,025	36.2	33.8
Marion, Ind. <sup>1</sup> .....	4,200,166	4,592,022	1,042,057	1,309,317	24.3	30.5
Kokomo, Ind. <sup>1</sup> .....	3,651,105	2,062,156	864,567	( <sup>2</sup> )	23.7	.....
Terre Haute, Ind.....	20,201,654	26,295,629	1,207,100	( <sup>2</sup> )	4.4	.....
Elwood, Ind. <sup>1</sup> .....	6,111,083	9,433,513	223,766	1,011,803	3.7	10.7
Pittsburg, Pa.....	165,428,881	165,002,687	2,130,540	2,420,680	1.3	1.5
Brooklyn, N. Y.....	373,462,930	313,617,489	1,196,409	807,698	0.3	0.3
St. Louis, Mo.....	267,307,038	193,732,788	900,870	( <sup>2</sup> )	0.3	.....
Philadelphia, Pa.....	591,388,078	519,081,812	1,204,244	1,347,011	0.2	0.3
All other cities and outside of cities.....	13,348,056,628	10,164,588,245	64,728,574	44,533,208	0.5	0.4

<sup>1</sup> Less than 20,000 population in 1900.

<sup>2</sup> Not reported separately.

There appears to be no decided change in the localization of plants in this industry between the census of 1900 and the present census. The manufacture of glass was largely localized in the states of Pennsylvania and Indiana in 1905 as in 1900. However, the statistics indicate a slight decrease in the proportion of the total product for the United States manufactured in those two states. The availability of a cheap supply of fuel adapted to glass manufacture is,

as formerly, one of the main considerations, if not the principal one, in determining the location of the plants, and this continues to give Pennsylvania supremacy.

Table cxc shows that the pronounced movement of the industry into Indiana, which took place between 1890 and 1900 and was caused by the discovery of new supplies of natural gas, has been arrested. There was a decrease in the value of products of the

state from 1900 to 1905, while the industry in Ohio increased, although for this state there was a decrease between 1890 and 1900. A diminution of the natural gas supply has occurred at several places in Indiana, necessitating in many instances the pumping of gas to the points of consumption, and to this fact is attributed the failure to maintain the growth in the industry which took place between 1890 and 1900. The industry in New Jersey apparently has not been affected by those influences which in some of the other states cause a shifting of the plants from one place to another. Many of the plants in New Jersey are old establishments which by the momentum of an early start have secured control of certain markets, and this condition and the conservativeness which distinguishes them have prevented any change in their location.

The statistics of West Virginia show a large increase from 1900 to 1905 in the value of the glass produced, brought about chiefly by the remarkable increase in the output of natural gas in the state (which in 1904 held second place in that respect), and the consequent encouragement presented to glass manufacturers to locate there. It is probable that, if the supply of gas is maintained for any length of time, a further and more remarkable growth in glass making will result. The value of glass manufactures in Illinois at the census of 1905 was about double that at the census of 1900. A good supply of coal, from which "producer" gas is made, tends to localize the manufacture of glass at certain points in this state.

Table CXC I shows the localization of the industry in cities. Only an imperfect idea of the concentration of glass manufacture at particular places can be gained from this table. For example, Pittsburg, Pa., which in the table appears to hold fourth place in the list of cities, has in its immediate vicinity, barely outside the city limits, many other glass houses, and if it were practicable to present the statistics by counties, Allegheny county, of which Pittsburg is the county seat, would

show a large preeminence in the industry. This condition also exists, although in a less degree, in other cities shown in the table.

The changes in localization from 1900 to 1905 in respect to the cities included in the table are small and unimportant. Muncie, Ind., with a slight decrease in the value of the product, has displaced Pittsburg, Pa., from first place, the latter city having dropped to fourth. Millville, N. J., formerly third, and Washington, Pa., formerly fourth, also exceeded Pittsburg in the value of glass manufactured. The most important feature of the table is the large increase from \$39,035,760 to \$58,586,280 in the value of glass manufactured elsewhere than in the principal cities in the industry named in the table, which indicates that a process of decentralization is taking place in the industry and glass manufacturing is becoming more widely diffused.

Tables CXCII and CXCIII show the value of glass manufactured in the leading states and cities engaged in this industry compared with the value of products for all industries in those states and cities. This shows the extent of the specialization in glass manufacture of the states and cities. The greatest change in the specialization of states is shown for West Virginia, the percentage which glass formed of all products having increased from 2.8 in 1900 to 4.6 in 1905. The most specialized city in glass manufacture, according to the city table, is Millville, N. J., with the value of glass forming 62.7 per cent of the value of all its manufactures. There are certain cities for which the statistics have not been reported separately that would perhaps show a higher degree of specialization than the cities in the table if the facts could be presented. It can be stated, however, that glass houses are the leading industrial feature of Washington, Charleroi, and Tarentum, Pa., and of Alexandria and Gas City, Indiana.

*Hosiery and knit goods.*—The localization and specialization of the industry by states and cities is shown in Tables CXCIV to CXC VII.

TABLE CXCIV.—HOSIERY AND KNIT GOODS—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
* United States.....	\$136,558,139	\$95,482,566	\$67,241,013	100.0	100.0	100.0
New York.....	46,108,600	35,886,048	24,776,582	33.8	37.6	36.8
Pennsylvania.....	30,753,140	21,896,063	16,944,237	22.5	23.0	25.2
Massachusetts.....	10,081,852	6,620,257	5,082,087	7.4	6.9	7.6
Connecticut.....	5,371,452	4,043,977	3,771,567	3.9	4.2	5.6
Wisconsin.....	4,941,944	2,486,813	1,635,641	3.6	2.6	2.4
Ohio.....	3,997,047	1,576,285	1,635,948	2.9	1.7	2.4
New Hampshire.....	3,974,290	2,592,829	3,481,922	2.9	2.7	5.2
All other states.....	31,329,814	20,380,294	9,913,029	23.0	21.3	14.8

MANUFACTURES.

TABLE CXCIV.—HOSIERY AND KNIT GOODS—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$136,558,139	\$95,482,566	\$67,241,013	100.0	100.0	100.0
Philadelphia, Pa.....	15,770,873	13,040,905	14,932,981	11.5	13.7	22.2
Utica, N. Y.....	5,261,166	2,514,073	715,178	3.9	2.6	1.1
Amsterdam, N. Y.....	4,677,022	3,944,785	( <sup>1</sup> )	3.4	4.1	.....
Brooklyn borough, N. Y.....	4,132,470	2,112,510	887,386	3.0	2.2	1.3
Cohoes, N. Y.....	4,126,873	5,026,374	5,058,882	3.0	5.3	7.5
Lowell, Mass.....	3,816,964	3,148,110	731,413	2.8	3.3	1.1
Little Falls, N. Y. <sup>2</sup> .....	2,547,676	2,303,690	( <sup>1</sup> )	1.9	2.4	.....
Reading, Pa.....	2,540,105	1,326,397	( <sup>1</sup> )	1.9	1.4	.....
Rockford, Ill.....	2,133,078	1,540,056	1,026,221	1.6	1.6	1.5
All other cities and outside of cities.....	91,551,912	60,525,666	43,888,952	67.0	63.4	65.3

<sup>1</sup> Not reported separately.

<sup>2</sup> Less than 20,000 population in 1900.

TABLE CXCVI.—HOSIERY AND KNIT GOODS—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH HOSIERY AND KNIT GOODS FORMS OF ALL INDUSTRIES.	
	All industries.		Hosiery and knit goods.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$136,558,139	\$95,482,566	0.9	0.8
New Hampshire.....	123,610,904	107,590,803	3,974,200	2,502,829	3.2	2.4
New York.....	2,488,345,570	1,871,830,872	46,108,600	35,886,048	1.9	1.0
Pennsylvania.....	1,955,551,332	1,049,882,380	30,753,140	21,896,063	1.6	1.3
Connecticut.....	369,082,091	315,106,150	5,371,452	4,043,977	1.5	1.3
Wisconsin.....	411,139,681	326,752,878	4,941,044	2,486,813	1.2	0.8
Massachusetts.....	1,124,092,051	907,626,439	10,081,852	6,620,257	0.9	0.7
Ohio.....	900,811,857	748,670,855	3,997,047	1,576,285	0.4	0.2
All other states.....	7,369,513,592	5,483,660,745	31,329,814	20,380,294	0.4	0.4

TABLE CXCVII.—HOSIERY AND KNIT GOODS—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH HOSIERY AND KNIT GOODS FORMS OF ALL INDUSTRIES.	
	All industries.		Hosiery and knit goods.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$136,558,139	\$95,482,566	0.9	0.8
Little Falls, N. Y. <sup>1</sup> .....	4,471,080	4,070,596	2,547,676	2,303,690	57.0	56.6
Cohoes, N. Y.....	10,289,822	11,031,109	4,126,873	5,026,374	40.1	45.6
Amsterdam, N. Y.....	15,007,276	10,643,310	4,677,022	3,944,785	31.2	37.1
Utica, N. Y.....	22,880,317	16,479,327	5,261,166	2,514,073	23.0	15.3
Rockford, Ill.....	15,276,129	11,021,550	2,133,078	1,540,056	14.0	14.0
Reading, Pa.....	30,848,175	32,682,061	2,540,105	1,326,397	8.2	4.1
Lowell, Mass.....	40,879,212	41,202,984	3,816,964	3,148,110	8.1	7.0
Philadelphia, Pa.....	591,388,078	519,981,812	15,770,873	13,040,905	2.7	2.5
Brooklyn borough, N. Y.....	373,462,930	313,617,489	4,132,470	2,112,510	1.1	0.7
All other cities and outside of cities.....	13,691,644,068	10,450,390,824	91,551,912	60,525,666	0.7	0.6

<sup>1</sup> Less than 20,000 population in 1900.

The manufacture of hosiery and knit goods in the United States has made rapid strides during the last fifty-five years. In 1850 only 85 establishments were reported, with a value of product of \$1,028,102. At the census of 1905 the number of establishments had increased to 1,079 and the value of products to \$136,558,139. In 1860, the first census to give the geographic location, the total value of products was \$7,280,606, of which \$4,847,984 was produced in the Middle states and \$2,374,242 in New England, leaving

only \$58,380 for the balance of the country. The two divisions named still retain their relative ranks, but since 1900 the industry has found favor in other states and is now more widely distributed. New York and Pennsylvania, however, produced 56.3 per cent of the value of products for the entire country in 1905 while each of the states shown in Table cxciv reported an increased value of products in 1905 when compared with 1900, New York, Pennsylvania, and Connecticut were the only ones which lost in relative importance.

# LOCALIZATION OF INDUSTRIES.

ccxlv

Of the cities shown in Table cxcv, Philadelphia ranked first with a product at the census of 1905 of \$15,770,873, or 11.5 per cent of the total for the industry. The localization for the remaining cities is not so marked, ranging from 3.9 in Utica, N. Y., to 1.6 in Rockford, Illinois.

According to Table cxcvi, the highest specialization of the industry was in New Hampshire, where the products of hosiery and knit goods comprised 3.2 per cent of the total manufactures at the census of 1905 and 2.4 per cent in 1900, making a gain of eight-tenths of 1 per cent, the largest increase shown in the table. With the exception of Ohio the importance of the industry in each state at the census of 1905 was equal to or greater than the ratio of all hosiery and knit goods to all industries in the United States.

In relation to other industries in cities hosiery and

knit goods formed the greatest percentage in Little Falls, N. Y., where it represented 57 per cent of the value of all manufactured products in 1905, an increase of four-tenths of 1 per cent over 1900. Cohoes, in the same state, ranks second as a specialized center, hosiery and knit goods forming 40.1 per cent of the total for all industries.

An examination of the four tables shows that while the industry is becoming more widely distributed, it is still largely localized in New York and Pennsylvania, and highly specialized in certain cities of these states.

*Iron and steel.*—Tables cxcviii to ccc show the localization of the iron and steel industry by states and cities and the specialization of states and cities. The statistics are a combination of those for the two branches of the industry—blast furnaces, and steel works and rolling mills.

TABLE CXCVIII.—IRON AND STEEL—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$905,787,733	\$803,968,273	\$430,954,348	100.0	100.0	100.0
Pennsylvania.....	471,228,844	434,445,200	248,800,071	52.0	54.0	57.7
Ohio.....	152,859,124	138,935,258	57,134,110	16.9	17.3	13.3
Illinois.....	87,352,761	60,303,144	37,173,405	9.7	7.5	8.6
Alabama.....	24,687,350	17,392,483	12,544,227	2.7	2.2	2.9
New Jersey.....	23,667,483	24,381,699	8,139,321	2.6	3.0	1.9
West Virginia.....	(1)	16,514,212	7,490,934	.....	2.1	1.7
All other states.....	145,992,162	111,996,279	59,603,280	16.1	13.9	13.9

1 The combined statistics can not be shown.

TABLE CXCIX.—IRON AND STEEL—LOCALIZATION BY CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1905	1900	1905	1900
United States.....	\$905,787,733	\$803,968,273	100.0	100.0
Pittsburg, Pa.....	88,250,805	90,768,086	9.7	11.3
Chicago and Joliet, Ill.....	66,376,502	45,000,264	7.3	5.6
Youngstown, Ohio.....	40,175,654	28,203,856	4.4	3.5
Cleveland, Ohio.....	38,308,122	24,276,197	4.3	3.0
All other cities and outside of cities.....	672,586,650	615,689,870	74.3	76.6

TABLE CC.—IRON AND STEEL—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH IRON AND STEEL FORMS OF ALL INDUSTRIES.	
	All industries.		Iron and steel.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$905,787,733	\$803,968,273	6.1	7.0
Pennsylvania.....	1,955,551,332	1,649,882,380	471,228,844	434,445,200	24.1	26.3
Alabama.....	109,169,922	72,109,929	24,687,350	17,392,483	22.6	24.1
Ohio.....	960,811,857	748,670,855	152,859,124	138,935,256	15.9	18.6
Illinois.....	1,410,342,129	1,120,868,308	87,352,761	60,303,144	6.2	5.4
New Jersey.....	774,360,025	553,005,684	23,667,483	24,381,699	3.1	4.4
West Virginia.....	99,040,676	67,006,822	(1)	16,514,212	.....	24.6
All other states.....	9,492,862,146	7,199,577,144	145,992,162	111,996,279	1.5	1.6

1 Not reported separately.

TABLE CCI.—IRON AND STEEL—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH IRON AND STEEL FORMS OF ALL INDUSTRIES.	
	All industries.		Iron and steel.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$905,787,733	\$803,668,273	6.1	7.0
Youngstown, Ohio.....	48,126,885	33,908,459	40,175,654	28,203,856	83.5	83.2
Pittsburg, Pa.....	165,428,881	165,002,687	88,250,805	90,798,086	53.3	55.0
Cleveland, Ohio.....	172,115,101	126,156,839	38,398,122	24,276,197	22.3	19.2
Chicago and Joliet, Ill.....	988,824,977	824,010,766	66,376,502	45,000,264	6.7	5.5
All other cities and outside of cities.....	13,427,651,243	10,262,042,371	672,586,650	615,689,870	5.0	6.0

Table cxviii indicates that the localization of the industry by states has not changed materially since the census of 1900. Pennsylvania has maintained its overwhelming supremacy, although its proportion of the total for the United States has decreased slightly. The changes in the proportions of the whole for the other states, shown in Table ccviii, are slight. The great factors in determining localization in this industry are an abundant supply of good fuel and a favorable situation in relation to the iron ore mines. These conditions are present in each of the states and cities shown in the tables. The statistics for several important centers of the industry have not been presented, for it is impossible to give them without disclosing the operations of individual establishments. For the same reason the figures for Chicago and Joliet, Ill., have been combined. In the cities omitted the manu-

facture of iron and steel is practically the sole industry. Some of these cities are Johnstown, McKeesport, New-castle, Sharon, South Bethlehem, and Steelton, Pa. Pittsburg, Pa., held first place in the industry at both censuses, although there was a decrease in the value of products and in its percentage of the total for the industry in 1905 as compared with 1900. This decrease, it is believed, was only temporary in character, and was caused by a depressed condition of the iron and steel trade during the greater part of 1904.

Tables cc and cci indicate the degree of specialization in the states and cities, by showing the value of iron and steel manufactured in comparison with the value of products for all industries.

*Jewelry.*—The localization and specialization of this industry in certain states and cities is shown in Tables ccii to ccv.

TABLE CCII.—JEWELRY—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$53,225,681	\$46,128,659	\$34,761,458	100.0	100.0	100.0
Rhode Island.....	14,431,756	13,220,313	8,011,007	27.1	28.7	23.0
New York.....	12,356,865	10,244,624	7,385,130	23.2	22.2	21.3
Massachusetts.....	10,073,595	10,290,844	5,507,415	18.9	22.3	15.8
New Jersey.....	9,303,646	7,377,147	4,724,500	17.5	16.0	13.6
California.....	1,446,828	602,504	1,523,971	2.7	1.5	4.4
All other states.....	5,612,991	4,285,137	7,609,306	10.6	9.3	21.9

TABLE CCIII.—JEWELRY—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$53,225,681	\$46,128,659	\$34,761,458	100.0	100.0	100.0
Providence, R. I.....	14,317,050	12,627,817	7,801,003	26.9	27.4	22.4
Manhattan and Bronx boroughs, N. Y.....	11,253,179	9,172,849	5,646,734	21.1	19.9	16.3
Newark, N. J.....	9,258,095	7,364,247	4,631,500	17.4	15.9	13.3
Attleboro, Mass. <sup>1</sup> .....	5,544,285	5,700,177	( <sup>2</sup> )	10.4	12.3	.....
Chicago, Ill.....	1,745,875	1,601,308	873,000	3.3	3.5	2.5
San Francisco, Cal.....	1,263,503	631,394	1,512,571	2.4	1.4	4.4
All other cities and outside of cities.....	9,843,694	9,030,867	14,296,650	18.5	19.6	41.1

<sup>1</sup> Less than 20,000 population in 1900.<sup>2</sup> Not reported separately.

# LOCALIZATION OF INDUSTRIES.

TABLE CCIV.—JEWELRY—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH JEWELRY FORMS OF ALL INDUSTRIES.	
	All industries.		Jewelry.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$53,225,681	\$46,128,659	0.4	0.4
Rhode Island.....	202,109,583	165,550,382	14,431,756	13,229,313	7.1	8.0
New Jersey.....	774,369,025	553,005,684	9,303,646	7,377,147	1.2	1.3
Massachusetts.....	1,124,092,051	907,626,439	10,073,595	10,299,844	0.9	1.1
New York.....	2,488,345,579	1,871,830,872	12,356,865	10,244,624	0.5	0.5
California.....	367,218,494	257,385,521	1,446,828	692,594	0.4	0.3
All other states.....	9,846,012,355	7,655,722,224	5,612,991	4,285,337	0.1	0.1

TABLE CCV.—JEWELRY—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH JEWELRY FORMS OF ALL INDUSTRIES.	
	All industries.		Jewelry.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$53,225,681	\$46,128,659	0.4	0.4
Attleboro Mass. <sup>1</sup> .....	10,050,384	8,751,427	5,544,285	5,700,177	55.2	65.1
Providence, R. I.....	91,980,963	78,657,103	14,317,050	12,627,817	15.6	16.1
Newark, N. J.....	150,055,227	112,723,045	9,258,095	7,364,247	6.2	6.5
Manhattan and Bronx boroughs, N. Y.....	1,043,251,923	810,807,975	11,253,179	9,172,849	1.1	1.1
San Francisco, Cal.....	137,788,233	107,027,567	1,263,503	631,894	0.9	0.6
Chicago, Ill.....	955,036,277	797,879,141	1,745,875	1,001,808	0.2	0.2
All other cities and outside of cities.....	12,413,984,080	9,495,273,864	9,843,694	9,030,807	0.1	0.1

<sup>1</sup> Less than 20,000 population in 1900.

According to Table ccii, the manufacture is confined largely to the states of Rhode Island, New York, Massachusetts, and New Jersey. The combined value of products for the 4 states represented 73.7 per cent of the total product for the United States in 1890, 89.2 per cent in 1900, and 86.7 per cent in 1905. While the concentration in these states increased between 1890 and 1900 it has decreased from 1900 to 1905. The jewelry manufactured in Illinois is produced almost entirely by Chicago manufacturers, but this state has not as yet assumed large proportions in the industry compared with the states shown separately in Table ccii. In 1900 the jewelry product of Chicago represented only 3.5 per cent of the total for the United States, and it had decreased to 3.3 per cent at the census of 1905. The value of product is not always a true index of the magnitude of an industry in different localities, especially such an industry as jewelry, where a marked refinement in the class of goods manufactured may be made by certain cities. This was referred to in the report of the Twelfth Census as follows:

\* \* \* 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.<sup>1</sup>

That the jewelry industry is localized closely in a few urban centers is shown clearly by a comparison of Tables ccii and cciii. Of the total for Rhode Island in 1905, \$14,431,756, Providence produced \$14,317,050. Newark, N. J., produced \$9,258,095 of the state total of \$9,303,646, and Manhattan and Bronx boroughs produced \$11,253,179 of the \$12,356,865 for the entire state of New York.

Table cciv does not show a very high degree of specialization of the industry in states, Rhode Island being the most prominent, with the value of jewelry forming 7.1 per cent of the total value of all products for the state. Among the cities a very marked specialization is found in Attleboro, Mass. The value of jewelry constituted over one-half of the value of production for all industries in this city at the census of 1905. Providence, R. I., ranked second in this respect, with jewelry forming 15.6 per cent of all the products. The jewelry industry appears to be keeping pace with other manufactures in San Francisco, Cal., while the other cities shown in Table ccv have remained stationary or show a decreased proportion of jewelry to all manufactures in 1905 as compared with 1900.

<sup>1</sup> Twelfth Census, Manufactures, Part I, page cxc.

*Leather gloves and mittens.*—Tables CCVI to CCIX present statistics showing the localization and specialization of the industry, by states and cities.

TABLE CCVI.—*Leather gloves and mittens—localization by states: 1905 and 1900.*

STATE.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1905	1900	1905	1900
United States.....	\$17,740,385.	\$16,721,234	100.0	100.0
New York.....	9,946,443	10,854,221	56.1	64.9
Wisconsin.....	2,208,705	507,405	12.5	3.0
Illinois.....	1,090,804	2,454,252	9.5	14.7
California.....	910,596	920,624	5.1	5.5
All other states.....	2,983,837	1,984,642	16.8	11.9

TABLE CCVII.—*Leather gloves and mittens—localization by cities: 1905 and 1900.*

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.		PER CENT OF TOTAL.	
	1905	1900	1905	1900
United States.....	\$17,740,385	\$16,721,234	100.0	100.0
Gloversville, N. Y. 1.....	5,302,196	6,487,227	29.9	38.8
Johnstown, N. Y. 1.....	2,581,274	2,576,048	14.6	15.4
Chicago, Ill.....	1,511,086	2,209,529	8.5	13.2
Milwaukee, Wis.....	1,207,633	252,182	6.8	1.5
All other cities and outside of cities.....	7,138,196	5,196,248	40.2	31.1

<sup>1</sup> Less than 20,000 population in 1900.

TABLE CCVIII.—LEATHER GLOVES AND MITTENS—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH LEATHER GLOVES AND MITTENS FORMS OF ALL INDUSTRIES.	
	All Industries.		Leather gloves and mittens.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$17,740,385	\$16,721,234	0.1	0.1
Wisconsin.....	411,139,681	326,752,878	2,208,705	507,405	0.5	0.2
New York.....	2,488,345,579	1,871,830,872	9,946,443	10,854,221	0.4	0.6
California.....	307,218,494	257,385,521	910,596	920,624	0.2	0.4
Illinois.....	1,410,342,120	1,120,868,308	1,090,804	2,454,252	0.1	0.2
All other states.....	10,125,101,204	7,834,283,543	2,983,837	1,984,642	( <sup>1</sup> )	( <sup>1</sup> )

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE CCIX.—LEATHER GLOVES AND MITTENS—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH LEATHER GLOVES AND MITTENS FORMS OF ALL INDUSTRIES.	
	All Industries.		Leather gloves and mittens.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$17,740,385	\$16,721,234	0.1	0.1
Gloversville, N. Y. 1.....	9,340,768	9,070,520	5,302,196	6,487,227	56.8	71.5
Johnstown, N. Y. 1.....	4,543,272	5,127,370	2,581,274	2,576,048	59.8	50.3
Milwaukee, Wis.....	138,881,545	110,854,102	1,207,633	252,182	0.9	0.2
Chicago, Ill.....	955,036,277	797,879,141	1,511,086	2,209,529	0.2	0.3
All other cities and outside of cities.....	13,694,345,230	10,488,193,989	7,138,196	5,196,248	0.1	( <sup>2</sup> )

<sup>1</sup> Less than 20,000 population in 1900.

<sup>2</sup> Less than one-tenth of 1 per cent.

The statistics of leather gloves and mittens were not reported separately at the census of 1890. Comparisons are therefore limited to the census years 1905 and 1900. There was a decrease in relative importance in the industry for each state shown in Table CCVI, except Wisconsin, which gained 9.5 per cent at the census of 1905 over that of 1900. The greatest localization, however, was in New York, which produced 56.1 per cent of the total value in 1905 and 64.9 per cent in 1900. New York and Wisconsin combined reported 68.6 per cent of the total product for the industry in the United States in 1905.

That there is a decided tendency toward a wider distribution of the industry appears from the statistics shown in Tables CCVI and CCVII.

The industry was first established in the locality of Gloversville and Johnstown, N. Y., which remained practically the only important manufacturing center up to about 1900. The increasing demand for leather gloves and mittens in the Western states created a promising field for the establishment of plants. Chicago engaged in the industry quite extensively between the censuses of 1890 and 1900. The industry, however, does not appear to have prospered there, as the value of production decreased from \$2,209,529 in 1900 to \$1,511,086 in 1905. Milwaukee, Wis., and the state of Wisconsin increased in value of production over fourfold between 1900 and 1905. The immense quantities of tanned and finished leather produced in Milwaukee, which ranked as the second city in this indus-

LOCALIZATION OF INDUSTRIES.

try in 1905, has evidently attracted many manufacturers of leather gloves and mittens to the city, which now bids fair to become an important western center of production.

The specialization of the industry by states is not very marked, as is readily seen from Table ccviii. Table ccix, however, shows that the cities of Glov-

ersville and Johnstown, N. Y., are still largely given over to the manufacture of leather gloves and mittens.

*Leather, tanned, curried, and finished.*—The localization of the industry in selected states and cities at the censuses of 1890, 1900, and 1905 and the specialization in those states and cities at the censuses of 1900 and 1905 are shown in Tables ccx to ccxiii, inclusive.

TABLE CCX.—LEATHER, TANNED, CURRIED, AND FINISHED—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$252,620,986	\$204,038,127	\$172,136,092	100.0	100.0	100.0
Pennsylvania.....	60,427,852	55,615,009	49,931,716	27.5	27.3	29.0
Massachusetts.....	33,352,900	26,067,714	28,044,815	13.2	12.8	16.3
Wisconsin.....	25,845,123	20,074,373	11,161,850	10.2	9.8	6.5
New Jersey.....	21,405,329	13,747,155	11,069,487	8.5	6.7	6.4
Delaware.....	10,250,842	9,400,504	4,106,894	4.1	4.6	2.4
Michigan.....	9,340,349	6,015,590	1,743,760	3.7	3.0	1.0
California.....	8,072,257	7,405,981	5,729,278	3.2	3.6	3.3
All other states.....	74,836,235	65,711,801	60,348,312	29.6	32.2	35.1

TABLE CCXI.—LEATHER, TANNED, CURRIED, AND FINISHED—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$252,620,986	\$204,038,127	\$172,136,092	100.0	100.0	100.0
Philadelphia, Pa.....	23,903,239	18,187,231	12,082,297	9.5	8.9	7.4
Milwaukee, Wis.....	14,074,397	10,267,836	8,429,814	5.6	5.0	4.9
Newark, N. J.....	13,577,719	10,857,192	8,309,667	5.4	5.3	4.8
Wilmington, Del.....	10,250,842	9,379,504	4,016,694	4.0	4.6	2.3
Chicago, Ill.....	9,420,426	6,079,289	7,395,371	3.7	3.4	4.3
Peabody, Mass. <sup>1</sup> .....	7,919,370	4,400,738	(2)	3.1	2.2	.....
Camden, N. J.....	6,364,928	1,515,935	(2)	2.5	0.8	.....
All other cities and outside of cities.....	167,110,065	142,390,403	131,303,240	66.2	69.8	76.3

<sup>1</sup> Less than 20,000 population in 1900.

<sup>2</sup> Not reported separately.

TABLE CCXII.—LEATHER, TANNED, CURRIED, AND FINISHED—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH LEATHER, TANNED, CURRIED, AND FINISHED FORMS OF ALL INDUSTRIES.	
	All industries.		Leather, tanned, curried, and finished.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$252,620,986	\$204,038,127	1.7	1.8
Delaware.....	41,160,276	41,321,061	10,250,842	9,400,504	24.0	22.7
Wisconsin.....	411,139,681	326,752,878	25,845,123	20,074,373	6.3	6.1
Pennsylvania.....	1,055,551,332	1,040,882,380	69,427,852	55,615,009	3.6	3.4
Massachusetts.....	1,124,092,051	907,626,439	33,352,909	26,067,714	3.0	2.9
New Jersey.....	774,369,025	553,005,684	21,405,329	13,747,155	2.8	2.5
Michigan.....	429,120,060	319,601,856	9,340,349	6,015,590	2.2	1.9
California.....	367,218,494	257,385,521	8,072,257	7,405,981	2.2	2.0
All other states.....	9,699,496,168	7,355,455,303	74,836,235	65,711,801	0.8	0.9

MANUFACTURES.

TABLE CCXIII.—LEATHER, TANNED, CURRIED, AND FINISHED—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH LEATHER, TANNED, CURRIED, AND FINISHED FORMS OF ALL INDUSTRIES.	
	All industries.		Leather, tanned, curried, and finished.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$252,020,086	\$204,038,127	1.7	1.8
Peabody, Mass. <sup>1</sup> .....	10,236,069	6,943,736	7,919,370	4,460,738	77.4	64.2
Wilmington, Del.....	30,390,039	30,586,810	10,250,842	9,379,504	33.7	30.7
Camden, N. J.....	33,587,273	17,969,954	6,364,928	1,515,935	19.0	8.4
Milwaukee, Wis.....	138,881,545	110,854,102	14,074,397	10,267,835	10.1	9.3
Newark, N. J.....	150,055,227	112,728,045	13,577,719	10,857,192	9.0	9.0
Philadelphia, Pa.....	591,388,078	519,081,812	23,003,230	18,187,231	4.0	3.5
Chicago, Ill.....	955,036,277	797,879,141	9,420,426	6,979,289	1.0	0.9
All other cities and outside of cities.....	12,892,571,970	9,814,177,522	167,110,065	142,390,403	1.3	1.5

<sup>1</sup> Less than 20,000 population in 1900.

At each of the three census periods presented in Table ccx the greatest concentration is shown for Pennsylvania. The product for the state amounted to more than one-fourth of the total for the United States. Massachusetts was second and Wisconsin third at each census. The value of the products of the 3 states formed 50.9 per cent of the total value for the United States in 1905, 49.9 per cent in 1900, and 51.8 per cent in 1890.

The value of the leather manufactured in Philadelphia exceeded that of any other city, and its proportion of the total value of leather increased from 7.4 per cent in 1890 to 9.5 per cent in 1905. The combined value of product for the first six cities shown in Table ccxi amounted to 31.3 per cent of the total product of the industry in 1905, 29.4 per cent in 1900, and 23.7 per cent in 1890.

A comparison of Tables ccx and ccxi shows that, although Massachusetts was the second state at the census of 1905 in value of product, Peabody, the city showing the largest value in the state, was sixth among the cities. While Wisconsin was third among the states, Milwaukee was the second city in the value of products in the industry. Although Illinois does not appear in the table, Chicago was fifth in importance among the cities engaged in the industry.

From Tables ccxii and ccxiii it appears that the

proportion which the leather industry formed of all industries was greatest for the state of Delaware and the city of Peabody, Massachusetts.

The value of the leather manufactured in Delaware was 22.7 and 24.9 per cent in 1900 and 1905, respectively, of the total value of manufactures for the state, and the corresponding percentages for Peabody were 64.2 and 77.4.

An increase of \$666,276 in value of product is shown for California, but the relative importance of the leather industry in the state decreased seven-tenths of 1 per cent. In Delaware the leather industry showed an increase, in value of products, of \$850,338 and increased its relative importance by 2.2 per cent. The growth in Delaware during the five years between the censuses of 1900 and 1905 was considerably less in proportion than that shown for the industry during the decade ending in 1900.

A striking feature of the industry, as indicated by the statistics, is its increasing relative importance in the cities. This is caused probably by the increased production of the finer leathers, most of which are made in cities.

*Pottery, terra cotta, and fire clay products.*—The localization and specialization of the industry in certain states and cities are shown in Tables ccxiv to ccxvii.

TABLE CCXIV.—POTTERY, TERRA COTTA, AND FIRE CLAY PRODUCTS—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$64,200,792	\$44,263,386	\$22,057,090	100.0	100.0	100.0
Ohio.....	18,550,840	11,851,225	5,047,501	28.9	26.8	22.9
New Jersey.....	11,717,103	8,940,723	5,165,537	18.2	20.2	23.4
Pennsylvania.....	10,759,272	8,127,420	1,739,953	16.8	18.4	7.9
New York.....	3,288,891	2,389,449	2,122,744	5.1	5.4	9.6
Illinois.....	3,256,312	2,143,521	1,556,560	5.1	4.8	7.1
Missouri.....	3,083,406	1,662,150	1,278,713	4.8	3.7	5.8
All other states.....	13,544,068	9,148,889	5,146,052	21.1	20.7	23.3

# LOCALIZATION OF INDUSTRIES.

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TABLE CCXV.—POTTERY, TERRA COTTA, AND FIRE CLAY PRODUCTS—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$64,200,792	\$44,263,386	\$22,057,090	100.0	100.0	100.0
Trenton, N. J.....	5,882,701	4,785,142	4,631,202	9.2	10.8	21.0
East Liverpool, Ohio <sup>1</sup> .....	5,373,852	4,105,200	(?)	8.4	0.3	.....
St. Louis, Mo.....	2,316,236	1,257,572	899,855	3.6	2.8	4.1
Akron, Ohio.....	1,718,033	867,116	587,850	2.7	2.0	2.7
Perth Amboy, N. J.....	1,439,138	812,188	(?)	2.2	1.8	.....
Zanesville, Ohio.....	1,144,384	1,245,262	362,822	1.8	2.8	1.6
All other cities and outside of cities.....	46,326,448	31,190,906	15,575,361	72.1	70.5	70.6

<sup>1</sup> Less than 20,000 population in 1900.

<sup>2</sup> Not reported separately.

TABLE CCXVI.—POTTERY, TERRA COTTA, AND FIRE CLAY PRODUCTS—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH POTTERY, TERRA COTTA, AND FIRE CLAY PRODUCTS FORMS OF ALL INDUSTRIES.	
	All industries.		Pottery, terra cotta, and fire clay products.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$64,200,792	\$44,263,386	0.4	0.4
Ohio.....	990,811,857	748,070,855	18,550,840	11,851,225	1.9	1.6
New Jersey.....	774,369,025	553,005,684	11,717,103	8,940,723	1.5	1.6
Missouri.....	490,548,957	316,304,095	3,083,406	1,662,150	0.7	0.5
Pennsylvania.....	1,955,551,332	1,649,882,380	10,759,272	8,127,429	0.6	0.5
Illinois.....	1,410,342,129	1,120,868,308	3,256,312	2,143,521	0.2	0.2
New York.....	2,488,345,579	1,871,830,872	3,288,891	2,389,440	0.1	0.1
All other states.....	6,773,178,208	5,150,558,928	13,544,968	9,148,889	0.2	0.2

TABLE CCXVII.—POTTERY, TERRA COTTA, AND FIRE CLAY PRODUCTS—SPECIALIZATION OF CITIES: 1905 AND 1900.

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH POTTERY, TERRA COTTA, AND FIRE CLAY PRODUCTS FORMS OF ALL INDUSTRIES.	
	All industries.		Pottery, terra cotta, and fire clay products.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$64,200,792	\$44,263,386	0.4	0.4
East Liverpool, Ohio <sup>1</sup> .....	6,437,090	4,740,165	5,373,852	4,105,200	83.5	86.4
Trenton, N. J.....	32,719,945	28,458,068	5,882,701	4,785,142	18.0	16.8
Zanesville, Ohio.....	7,047,637	5,708,137	1,144,384	1,245,262	16.2	21.8
Akron, Ohio.....	34,004,243	22,015,643	1,718,033	867,116	5.1	3.9
Perth Amboy, N. J.....	34,800,402	14,061,072	1,439,138	812,188	4.1	5.8
St. Louis, Mo.....	267,307,038	193,732,788	2,316,236	1,257,572	0.9	0.6
All other cities and outside of cities.....	14,419,830,732	11,142,396,249	46,326,448	31,190,906	0.3	0.3

<sup>1</sup> Less than 20,000 population in 1900.

A marked localization of the industry increasing with each census is shown for Ohio, while considerable concentration is shown for New Jersey and Pennsylvania. In 1905 the three states reported 63.9 per cent of the total value of products for the industry. In the decade ending in 1900 Pennsylvania shows the greatest percentage of gain and the industry continued to increase during the succeeding five years, but the proportion which the value of products of the state formed of the total products was greater in 1900 than in 1905.

Trenton, N. J., shows a slightly decreased proportion of the product, but in 1905 as in 1900 it was the first city in this industry in value of products. East Liverpool, Ohio, followed closely in 1905 with a product of \$5,373,852, or 8.4 per cent of the total for the industry.

From Table CCXVI it appears that in 1900 the greatest specialization of the industry is shown in the states of Ohio and New Jersey where the value of products for this industry in each state constituted 1.6 per cent of the total value of all products. In 1905 Ohio led in this respect with 1.9 per cent and New Jersey stood second with 1.5 per cent of the total production.

A remarkable specialization of the industry is shown for East Liverpool, Ohio; although the proportion was less in 1905 than in 1900, the value for this industry in 1905 formed 83.5 per cent of the total for all industries in the city. A decided specialization, though not nearly so marked, is shown for Trenton, N. J. and Zanesville, Ohio, for which cities the industry formed 18 per cent and 16.2 per cent, respectively, of the total value of product for all industries.

MANUFACTURES.

*Silk and silk goods.*—Tables CCXVIII to CCXXI | silk goods and the specialization of states and cities show the localization of the manufacture of silk and | in the industry.

TABLE CCXVIII.—SILK AND SILK GOODS—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$133,288,072	\$107,250,258	\$87,298,454	100.0	100.0	100.0
New Jersey.....	42,802,907	39,906,662	30,700,371	32.2	37.3	35.2
Pennsylvania.....	39,333,520	31,072,926	19,357,546	29.5	29.0	22.2
New York.....	20,181,212	12,705,246	19,417,796	15.1	11.8	22.2
Connecticut.....	15,023,693	12,378,981	9,788,951	11.7	11.5	11.2
Massachusetts.....	7,012,062	5,957,532	5,557,569	5.3	5.6	6.4
All other states.....	8,274,678	5,173,911	2,416,221	6.2	4.8	2.8

TABLE CCXIX.—SILK AND SILK GOODS—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$133,288,072	\$107,250,258	\$87,298,454	100.0	100.0	100.0
Paterson, N. J.....	25,433,245	26,000,156	22,058,024	19.1	24.2	25.3
Manhattan and Bronx boroughs, N. Y.....	7,887,214	6,757,544	13,579,462	5.9	6.3	15.6
Philadelphia, Pa.....	5,079,103	4,531,794	8,059,604	3.8	4.2	9.2
Scranton, Pa.....	4,426,635	3,616,885	2,055,200	3.3	3.4	2.4
West Hoboken, N. J.....	4,211,018	3,961,054	(1)	3.2	3.7	.....
Allentown, Pa.....	3,901,249	3,467,792	1,694,342	2.9	3.2	1.9
Brooklyn borough, N. Y.....	2,741,959	1,042,199	1,049,475	2.1	1.0	1.2
Easton, Pa.....	2,290,598	(1)	(1)	1.7	.....	.....
York, Pa.....	1,602,480	(1)	(1)	1.3	.....	.....
Jersey City, N. J.....	1,465,753	1,274,550	1,066,000	1.1	1.2	1.2
Wilkesbarre, Pa.....	1,054,863	(1)	(1)	0.8	.....	.....
All other cities and outside of cities.....	73,103,865	56,598,284	37,735,747	54.8	52.8	43.2

<sup>1</sup>Not reported separately.

TABLE CCXX.—SILK AND SILK GOODS—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH SILK AND SILK GOODS FORMS OF ALL INDUSTRIES.	
	All industries.		Silk and silk goods.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$133,288,072	\$107,250,258	0.9	0.9
New Jersey.....	774,360,025	553,005,684	42,802,907	30,966,662	5.5	7.2
Connecticut.....	360,082,091	315,106,150	15,623,693	12,378,981	4.2	3.9
Pennsylvania.....	1,955,551,332	1,649,882,380	30,333,520	31,072,926	2.0	1.9
New York.....	2,488,345,570	1,871,830,872	20,181,212	12,706,246	0.8	0.7
Massachusetts.....	1,124,092,051	907,626,439	7,012,062	5,957,532	0.6	0.7
All other states.....	8,090,707,009	6,113,669,597	8,274,678	5,173,911	0.1	0.1

TABLE CCXXI.—SILK AND SILK GOODS—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH SILK AND SILK GOODS FORMS OF ALL INDUSTRIES.	
	All industries.		Silk and silk goods.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$133,288,072	\$107,250,258	0.9	0.9
West Hoboken, N. J.....	5,947,267	4,769,436	4,211,018	3,961,054	70.8	83.1
Paterson, N. J.....	54,673,083	48,502,044	25,433,245	26,000,156	46.5	53.0
Easton, Pa.....	5,054,594	5,424,668	2,290,598	(1)	40.5	.....
Allentown, Pa.....	16,966,550	14,900,437	3,901,249	3,467,792	23.0	23.1
Scranton, Pa.....	20,453,285	24,741,837	4,426,635	3,616,885	21.6	14.6
York, Pa.....	14,258,606	10,559,780	1,602,480	(1)	11.9	.....
Wilkesbarre, Pa.....	11,240,893	8,616,765	1,054,863	(1)	9.4	.....
Jersey City, N. J.....	75,740,934	72,929,690	1,465,753	1,274,550	1.9	1.7
Philadelphia, Pa.....	591,388,078	519,981,812	5,079,193	4,531,794	0.9	0.9
Manhattan and Bronx boroughs, N. Y.....	1,043,251,923	810,807,975	7,887,214	6,757,544	0.8	0.8
Brooklyn borough, N. Y.....	373,462,930	313,617,489	2,741,959	1,042,199	0.7	0.3
All other cities and outside of cities.....	12,589,108,854	9,576,170,189	73,103,865	56,598,284	0.6	0.6

<sup>1</sup>Not reported separately.

The silk industry at the present census, as in 1900, is localized largely in New Jersey and Pennsylvania. The localization in the former state appears to be in and adjacent to Paterson, and in the latter state in Philadelphia and certain eastern counties. The strongest three influences governing the localization of plants in this industry appear to be, in the first place, the availability of a supply of operatives who are skilled in the various processes of the manufacture, and who at the same time will work for moderate wages, women and children forming a large proportion of these wage-earners; secondly, abundant power, either in the form of waterpower or cheap fuel; and thirdly, their proximity to the principal wholesale markets for the products. These conditions are present wholly or in part wherever the manufacture of silk and silk goods is carried on to any extent. As indicated in Table ccxviii, while New Jersey still led in the industry in 1905, its proportion of the whole is smaller than that at the census of 1900. The value of the products in this state increased only \$2,896,245, while in Pennsylvania the increase amounted to \$8,260,594, the proportion of the entire value of product for the United States manufactured in the latter state being 29.5 per cent and in New Jersey 32.2 per cent. It is evident, therefore, that Pennsylvania is

maintaining its steady movement forward in the manufacture of silk products. The industry is localized considerably in New York city and parts of Connecticut and Massachusetts.

Table ccxix shows that Paterson, N. J., remains, as it has been for many years, the leading city in the manufacture of silk. The growth of silk manufacture in several of the cities of eastern Pennsylvania, noted at the census of 1900, still continues.

Tables ccxx and ccxxi show the degree of specialization in states and cities by a comparison of the value of the silk manufactured with that of all manufactured products. The most highly specialized city is West Hoboken, N. J., with 70.8 per cent of the total value of products representing silk manufacture. Paterson, N. J., Easton, Allentown, and Scranton, Pa., follow in respective order.

*Slaughtering and meat packing.*—In Tables ccxxii to ccxxv the two census classifications—"slaughtering and meat packing, wholesale," and "slaughtering, wholesale, not including meat packing"—have been combined, so that the localization and specialization is shown for the entire industry. In Nebraska at the census of 1905, there were but 2 establishments in one of the industries, and the combined value could not be given without disclosing individual operations.

TABLE CCXXII.—SLAUGHTERING AND MEAT PACKING—LOCALIZATION BY STATES: 1905, 1900, AND 1890.

STATE.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$913,914,624	\$783,779,191	\$561,611,668	100.0	100.0	100.0
Illinois.....	317,206,082	287,922,277	212,201,382	34.7	36.7	37.8
Kansas.....	96,375,630	77,411,883	44,696,077	10.5	9.9	7.9
Nebraska.....	(1)	71,280,366	<sup>2</sup> 24,026,876	.....	9.1	4.3
Missouri.....	60,031,133	43,040,885	18,320,193	6.6	5.5	3.3
Massachusetts.....	37,098,502	31,633,483	20,221,046	4.1	4.0	3.6
Iowa.....	30,074,070	25,695,044	23,425,576	3.3	3.3	4.2
Indiana.....	29,352,593	43,802,273	27,913,840	3.2	5.6	5.0
California.....	21,795,694	15,717,712	9,768,858	2.4	2.0	1.7
Minnesota.....	17,526,707	7,810,555	2,510,431	1.9	1.0	0.4
New Jersey.....	17,238,076	14,046,217	17,813,166	1.9	1.8	3.2
All other states.....	287,216,128	165,358,496	160,623,624	31.4	21.1	28.6

<sup>1</sup> The combined statistics can not be shown.

<sup>2</sup> One establishment reported as "slaughtering, wholesale, not including meat packing," included in all other states.

TABLE CCXXIII.—SLAUGHTERING AND MEAT PACKING—LOCALIZATION BY CITIES: 1905, 1900, AND 1890.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.			PER CENT OF TOTAL.		
	1905	1900	1890	1905	1900	1890
United States.....	\$913,914,624	\$783,779,191	\$561,611,668	100.0	100.0	100.0
Chicago, Ill.....	269,581,485	256,527,940	203,606,402	29.5	32.7	36.3
Kansas City, Kans.....	<sup>1</sup> 88,446,141	73,787,771	<sup>2</sup> 39,927,192	9.7	9.4	7.1
South Omaha, Nebr.....	<sup>2</sup> 65,530,935	67,880,749	(3)	7.2	8.7	.....
Manhattan and Bronx boroughs, N. Y.....	46,477,324	38,752,586	50,251,504	5.1	4.9	9.0
Indianapolis, Ind.....	24,458,810	18,781,442	6,295,975	2.7	2.4	1.1
St. Louis, Mo.....	17,485,393	12,943,376	12,048,114	1.9	1.6	2.1
Buffalo, N. Y.....	16,139,373	11,601,167	9,951,044	1.7	1.5	1.8
Milwaukee, Wis.....	15,394,168	13,045,979	9,704,966	1.7	1.7	1.7
Cincinnati, Ohio.....	13,446,202	10,370,177	9,511,188	1.5	1.3	1.7
Cleveland, Ohio.....	10,317,494	7,514,470	5,582,666	1.1	1.0	1.0
San Francisco, Cal.....	8,994,992	7,496,968	6,670,474	1.0	1.3	1.2
All other cities and outside of cities.....	337,645,306	265,067,567	208,062,143	36.9	33.5	37.0

<sup>1</sup> Two establishments reported as "slaughtering, wholesale, not including meat packing," included in all other cities and outside of cities.

<sup>2</sup> One establishment reported as "slaughtering, wholesale, not including meat packing," included in all other cities and outside of cities.

<sup>3</sup> Not reported separately.

<sup>4</sup> Includes Cudahy, Wis., in 1905 and 1900.

TABLE CCXXIV.—SLAUGHTERING AND MEAT PACKING—SPECIALIZATION OF STATES: 1905 AND 1900.

STATE.	VALUE OF PRODUCTS.				PER CENT WHICH SLAUGHTERING AND MEAT PACKING FORMS OF ALL INDUSTRIES.	
	All industries.		Slaughtering and meat packing.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$913,914,624	\$783,770,191	6.2	6.9
Kansas.....	198,244,992	154,008,544	96,375,639	77,411,883	48.6	50.3
Nebraska.....	154,918,220	130,302,453	(1)	71,280,366	.....	54.7
Illinois.....	1,410,342,120	1,120,868,308	317,206,082	287,922,277	22.5	25.7
Iowa.....	160,572,313	132,870,865	30,074,070	25,695,044	18.7	19.3
Missouri.....	439,548,957	316,304,095	60,031,133	43,040,885	13.7	13.6
Indiana.....	393,954,405	337,071,630	29,352,593	43,862,273	7.5	13.0
California.....	367,218,494	257,385,521	21,795,694	15,717,712	5.9	6.1
Minnesota.....	307,858,073	223,692,922	17,526,707	7,810,555	5.7	3.5
Massachusetts.....	1,124,092,051	907,626,439	37,098,502	31,633,483	3.3	3.5
New Jersey.....	774,369,025	553,005,684	17,238,076	14,046,217	2.2	2.5
All other states.....	9,471,028,428	7,277,984,661	287,216,128	165,358,496	3.0	2.3

<sup>1</sup>The combined statistics can not be shown.

TABLE CCXXV.—SLAUGHTERING AND MEAT PACKING—SPECIALIZATION OF CITIES: 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

CITY.	VALUE OF PRODUCTS.				PER CENT WHICH SLAUGHTERING AND MEAT PACKING FORMS OF ALL INDUSTRIES.	
	All industries.		Slaughtering and meat packing.		1905	1900
	1905	1900	1905	1900		
United States.....	\$14,802,147,087	\$11,411,121,122	\$913,914,624	\$783,770,191	6.2	6.9
South Omaha, Nebr.....	67,415,177	69,508,899	<sup>1</sup> 65,530,935	67,880,749	97.2	97.7
Kansas City, Kans.....	96,473,050	80,023,107	<sup>2</sup> 88,446,141	73,787,771	91.7	92.2
Indianapolis, Ind.....	82,327,950	59,322,234	24,458,810	18,781,442	29.7	31.7
Chicago, Ill.....	955,036,277	797,879,141	269,581,486	256,527,940	28.2	32.2
Buffalo, N. Y.....	147,377,873	105,627,182	16,136,373	11,601,167	10.9	11.0
Cincinnati, Ohio.....	166,059,050	141,677,997	13,446,202	10,370,177	8.1	7.3
St. Louis, Mo.....	267,307,038	193,732,788	17,485,363	12,943,376	6.5	6.7
San Francisco, Cal.....	137,788,233	107,023,567	8,994,962	7,496,958	6.5	6.3
Cleveland, Ohio.....	172,115,101	126,156,839	10,317,494	7,514,470	6.0	6.0
Manhattan and Bronx boroughs, N. Y.....	1,043,251,923	810,807,975	46,477,324	38,752,586	4.5	4.8
All other cities and outside of cities.....	11,667,095,415	8,919,361,303	353,039,474	278,113,546	3.0	3.1

<sup>1</sup>One establishment reported as "slaughtering, wholesale, not including meat packing," included in all other cities and outside of cities.  
<sup>2</sup>Two establishments reported as "slaughtering, wholesale, not including meat packing," included in all other cities and outside of cities.

Table CCXXII shows a decided localization of the industry in Illinois; this state alone has produced more than one-third of the value of products for the entire industry at each of the last three census periods. Kansas is the next largest producer of meat products. The proportion for this state has increased from 7.9 per cent in 1890 to 9.9 per cent in 1900, and to 10.5 per cent in 1905. On the other hand, Illinois has lost some of its prestige, as shown by a decreasing percentage, since 1890. The combined value of products for these 2 states aggregated 45.2 per cent of the total product for the United States at the census of 1905. The largest relative increase among the states of Table CCXXII is shown for Missouri, which produced 3.3 per cent of the entire product in 1890, 5.5 per cent in 1900, and 6.6 per cent in 1905. Indiana shows a great falling off in production from 1900 to 1905 and also in relative position, due to the removal from the state of one of its largest meat packing plants.

From Table CCXXIII it appears that Chicago, Ill., is preeminently the leading slaughtering and meat packing center. Although an actual increase is reported in the value of products for the city at each census

period since 1890, it has been insufficient to overcome the increase in other localities, as revealed in the decreasing relative percentages. With the exceptions of Chicago, Ill., South Omaha, Nebr., San Francisco, Cal., and Milwaukee, including Cudahy, Wis., each city shows a slightly increased proportion in 1905 compared with 1900. This indicates a more general distribution of slaughtering and meat packing establishments than obtained formerly.

The relation of slaughtering and meat packing to all industries in the leading states is shown in Table CCXXIV. The industry forms a considerable proportion of all industries in the states of Kansas, Nebraska, Illinois, Iowa, and Missouri. Kansas stands first in this respect at the census of 1905, with 48.6 per cent. In 1900 Nebraska held first place, and while the percentage can not be given for 1905, it has dropped below that of Kansas because of 1 large establishment being idle during the census year.

South Omaha, Nebr., and Kansas City, Kans., are almost entirely engaged in the preparation and sale of meat products. The value of all other manufactured articles in 1905 formed only 2.8 per cent of the value

of all manufactured products in the former city and only 6.7 per cent in the latter. The industry is also important in Indianapolis, Ind., Buffalo, N. Y., and Cincinnati, Ohio.

#### OTHER EXAMPLES OF LOCALIZATION.

In addition to the examples of localization and specialization presented in the foregoing tables, there are many other industries in the United States confined largely or almost entirely to certain localities by natural limitations or by other conditions essential to their success. It will suffice simply to mention these and to point out the controlling causes in each case. Reference to the several volumes of the Census reports will enable those interested to obtain the statistics and more detailed information concerning the industries in which this feature of industrial development appears. The statistics for such industries are presented in detail in Table 5, pages 74 to 465 of this volume.

Ammunition is manufactured principally in Connecticut, 77.2 per cent of the total product, according to value, having been manufactured in that state during the census year 1905. The chief localizing cause in this industry appears to be the fact that the center of the brass and copper manufacturing industry of the country is also in Connecticut, and therefore, sheet brass and copper, the principal materials used in the manufacture of cartridges and shells for small arms, are immediately available. The fact that a large portion of the small arms—rifles, shotguns and revolvers—are made in the state explains in part the preeminence of Connecticut in the manufacture of ammunition. The plants as a rule, have been in operation there for many years, and this has resulted in the education and training of a sufficient supply of hands for the work. The establishments, too, are large and have considerable money invested in plants and materials and appear to be fully equipped for supplying the demand, and these causes, with those before mentioned, have combined to give the industry, so far as the fixity of the location of the plants is concerned, an uncommon degree of stability.

The production of beet sugar seems to be controlled absolutely by the availability of a sufficient supply of sugar beets. At the census of 1905 beet sugar factories were in operation in the following states: California, Colorado, Idaho, Michigan, Minnesota, Nebraska, New York, Ohio, Oregon, Utah, Washington, and Wisconsin. The leading states in production are Colorado, Michigan, California, and Utah, in the order given. The factories are, without exception, located in the neighborhood of the sugar beet farms, where there is a sufficient supply of unskilled labor available for harvesting the beets.

The manufacture of rubber boots and shoes in the United States is practically monopolized by New England, since nearly 90 per cent of the total value of products for the United States was reported in 1905 as the value of these goods made in the 3 states, Massachusetts, Connecticut, and Rhode Island, and from the commencement of the manufacture this preponderance

has prevailed. This can be regarded as a comparatively new industry, for it was impossible to manufacture these and many other rubber articles with any success before the discovery of the vulcanizing process about 1844. As the industry was first established in New England and the trade controlled from that section, the plants being steadily enlarged to keep pace with the increasing demands of the market, the bulk of the product has continued to come from there. Most of the companies have very large investments of capital, and successful competition elsewhere would require similar outlays. It is probable, too, that from long experience, knowledge of certain secret processes has been acquired without which it would be useless to attempt to manufacture goods possessing the same qualities.

The manufacture of brass goods in their various forms, shown in the Census reports under the classifications "brass and copper rolled," "brass castings and brass finishing," and "brassware," is and has been for many years, according to the statistics, an industry controlled largely by Connecticut manufacturers. The value of this class of goods in 1890 was \$46,341,078 for the United States, and \$22,309,894, or 48.1 per cent of the whole, for Connecticut; in 1900, \$85,019,444 for the United States, and \$48,526,868, or 57.1 per cent, for Connecticut; and in 1905, \$99,083,837 for the United States, and \$53,916,445, or 54.4 per cent, for Connecticut. The industry in Connecticut is localized principally in Waterbury, Bridgeport, and Meriden; specialization of the manufacture of certain brass goods being carried on to a marked degree in Waterbury and Bridgeport. The preeminence of Connecticut in this manufacture has resulted logically from the early establishment of the industry in the state. It has been long renowned as the home of the "Yankee notion." More clocks, bells, lamps, pins, hooks and eyes, eyelets, and similar articles, wholly or partly of brass, are made there than in any other state, and in some instances more than in all the other states combined. The leading position held by Connecticut in the manufacture of ammunition—an industry which calls for large quantities of sheet brass and copper—also goes far to explain the supremacy of the state in the industry under consideration. The manufacture of brass goods at an early date necessitated the establishment of plants for producing sheet brass and brass wire, and thus these two branches of the industry have acted and reacted upon each other, an increase in one requiring corresponding expansion in the other, until Connecticut has reached its present commanding status in the production of brass goods, a position which in all probability will be maintained for some time to come. The prominence of Waterbury, the principal seat of the industry, has been ascribed to the early establishment of the metal button business, which led to brass making on a large scale.

The manufacture of clocks is another industry in

which Connecticut appears to be preeminent. The value of clocks manufactured in the United States at this census is reported as \$8,868,000, and the value for Connecticut as \$6,158,034, or 69.3 per cent of the total. The statistics of prior censuses indicate a similar pre-eminence of the state in this manufacture, as follows: Census of 1900—United States, \$7,157,856, Connecticut, \$4,545,047, or 63.5 per cent; 1890—United States, \$4,228,846; Connecticut, \$3,117,186, or 73.7 per cent; 1880—United States, \$4,110,267; Connecticut, \$3,016,717, or 73.4 per cent; 1870—United States, \$2,509,643; Connecticut, \$2,245,043, or 89.5 per cent; 1860—United States, \$1,187,550; Connecticut, \$1,085,250, or 91.4 per cent; 1850—United States, \$1,181,500; Connecticut, \$1,103,200, or 93.4 per cent. There is no decided localization of clock manufacture in any city of Connecticut, the factories being scattered through several counties of the state: Waterbury and New Haven each has an important factory which turns out a large proportion of the product. The localization in Connecticut of such a preponderating share of the manufacture of the clocks of the country, and its specialization in this line, is mainly to be attributed to the momentum necessarily gathered with the growth of an industry established early in the industrial life of the nation, and managed in a manner to insure success. The large scale on which clocks have for years been manufactured in Connecticut has had its share in the upbuilding of the brass goods industry in which the state leads, and this branch of manufacture, by making immediately available the sheet and plate brass required so largely in the manufacture of clocks, has had in turn a stimulating effect upon that business.

The location of plants in the canning industry is determined entirely by the availability of the raw materials, with but little reference to the nearness of the market. By reference to Table 5, pages 130 to 134 of this volume, it will be seen that over three-fourths of the value of the canned and preserved fish was reported from Alaska, Maine, Massachusetts, Oregon, and Washington. Practically all of the salmon canned in the United States is put up in Alaska, Washington, and Oregon. The sardine canneries on the coast of Maine reported over three-fourths of that product, the quantity canned in other states being inconsiderable in comparison. The preparation of smoked and salted fish is localized chiefly in Massachusetts. The center of the industry in that state is Gloucester, although the output of Boston is quite large. Inasmuch as a number of establishments which are included in the classifications "canning and preserving, fruits and vegetables," and "canning and preserving, fish," produced canned oysters as a secondary product, the statistics contained in Table 5 for this branch of the canning and preserving industry are incomplete and do not indicate accurately

either the extent of the production of canned oysters or the distribution of the industry among the states. In the bulletin on canning and preserving<sup>1</sup> this defect was remedied to some extent by tabulating apart from all other products of the general industry the quantity and value of canned oysters produced in each state. By this method the leading position occupied by Mississippi in the value of canned oysters produced, as shown by Table 5, was verified, but it was discovered that Maryland ranked second instead of fifth, as Table 5 would seem to indicate, and that South Carolina stood third instead of second. While oyster beds are cultivated in abundance elsewhere than in Chesapeake bay and the bays and inlets of the Gulf on the coast of Mississippi, the product is not canned in large quantities except at those localities. The leading states in the canning and preserving of fruits and vegetables are California, Maryland, and New York. The industry is localized very largely in those 3 states, considerably more than 50 per cent of the value of these products being prepared there.

The manufacture of cordage and twine, according to the reports which have been received, is localized largely in New York, Massachusetts, Illinois, and Pennsylvania. The products are rope, lines, and twine from hemp, flax, cotton, or other fiber. The total value of the products for the United States at the census of 1905 was \$48,017,139, of which New York contributed \$13,296,838, or 27.7 per cent; Massachusetts, \$11,173,521, or 23.3 per cent; Illinois, \$8,748,560, or 18.2 per cent; and Pennsylvania, \$4,481,818, or 9.3 per cent. As a large proportion of the demand for cordage is in the shipping trade, ropewalks are located principally in or near the larger ports—New York, Boston, Chicago, Philadelphia, etc. The fact that the cities mentioned are the chief centers of the wholesale trade in twines of the various kinds is the cause of the localization of the plants in those neighborhoods. The manufacture of cordage and twine is not a "local" industry and can hardly ever become such. The investment of capital which is required is large, the average per plant for 1905 being \$363,829. Moreover, the demands of the market are too limited to call for a wide distribution of plants.

The manufacture of grindstones, although comparatively insignificant in the volume of its operations, affords an interesting example of an industry whose location is controlled almost absolutely by the presence of the peculiar sandstone required. With the exception of 2 factories—1 in Boston and 1 in Philadelphia—the plants are located at the quarries. There is a sandstone called the Berea grit, found in certain counties in Ohio, which is especially adapted for grindstones, and on this account the manufacture

<sup>1</sup> Bureau of the Census, Bulletin 61.

is localized largely in that section. The value of grindstones manufactured as reported at the census of 1905 is \$788,049, and of this amount \$517,069, or 65.6 per cent, was reported for Ohio.

The statistics of hardware manufacture, under which are classed such articles as locks, hinges, casters, carriage hardware, and a multitude of other small metal articles, illustrates the preeminence of Connecticut over all other states in the production of these and similar goods, generally termed "notions." The total value of the products for the United States and Connecticut, with the percentages that the total for the state was of the total for the country at the last four censuses, are as follows: 1905—United States, \$45,770,171, Connecticut, \$21,480,652, or 46.9 per cent; 1900—United States, \$35,846,656, Connecticut, \$16,301,198, or 45.4 per cent; 1890—United States, \$26,726,463, Connecticut, \$11,995,023, or 44.9 per cent; 1880—United States, \$22,653,693, Connecticut, \$10,374,293, or 45.8 per cent. These figures indicate that while the actual increase in the industry is commensurate with that in many other lines of manufacture, the percentage that the product of the state forms of that for the United States has changed but little from one census to another. The states that followed Connecticut in respect to value of products at the census of 1905—Pennsylvania, Illinois, New York, and Ohio, in the order named—had scarcely more than a fair share of the industry when their population and markets are considered. The principal seat of the industry in Connecticut is New Britain, for which was reported in 1905 a product amounting to \$7,537,625, or 35.1 per cent of the total for the state and 16.5 per cent of that for the whole country. New Haven, also, has several important establishments. The localization of the manufacture of hardware in Connecticut is undoubtedly due largely to the impetus received from an early start. The administrative efficiency of the proprietors has also contributed its share to the maintenance and prosperity of the industry. The materials required are readily available. Many of the products included in the classification under discussion are ingenious devices, which have been and are protected by patent right and their manufacture thus monopolized. The formation of a combination of manufacturers has of late exercised an influence toward the concentration of the industry in certain sections of Connecticut.

Lapidary work—cutting and polishing of gems and precious stones—can not be said to have any existence in this country outside of Greater New York. The total value of this work in the United States at the census of 1905 was \$7,646,814, of which \$7,379,974, or 96.5 per cent, was reported for Greater New York. At the census of 1900 the production for the United States was valued at \$5,786,281, of which \$5,500,861, or 95.1 per cent, was contributed by Greater New York. According to the statistics of previous censuses, the industry had not assumed much importance. The

great increase between 1890 and 1900 is ascribed to certain modifications of the tariff on precious stones, which permitted the importation of rough or uncut stones free of duty, the duty of 10 per cent on cut stones being retained. Later a tax of 10 per cent was imposed on uncut stones and 25 per cent on cut stones. As the United States is considered the best diamond market in the world, the attention of importers was at once attracted to the great advantage of purchasing the stones in the rough and cutting and polishing them in this country. Accordingly the industry was established and has since flourished, concentrating in New York city, which is the headquarters of the diamond trade in the United States.

The manufacture of wine—Census classification "liquors, vinous"—is localized chiefly in California, although the industry is of considerable importance in New York and Ohio. The statistics of the census of 1905 show that 60.3 per cent of the value of wine produced in the United States was made in California, and the proportion was about the same in 1900 and in 1890. The leading position of California in wine manufacture is attributed to the natural advantages of the climate and soil, which are extremely favorable to viniculture.

The manufacture of cottonseed oil, it is obvious, can not be conducted successfully at a great distance from the cotton field. While there are a few isolated instances of plants located where cotton is not grown, they are as a rule engaged not in manufacturing oil from the seed, but in refining the crude product. The statistics indicate that the relative rank of the states in the manufacture of crude cottonseed oil and in the production of cotton coincide very closely in several instances.

There are other industries which are localized near to the raw material, notable examples of which are rice cleaning and polishing, and the manufacture of salt, and turpentine and rosin. Rice cleaning is carried on as a manufacturing industry almost entirely in the states where rice is grown. Louisiana reported 65.8 per cent of the value of the product and Texas 28.5 per cent, the proportion for these two states being 94.3 per cent. The leading states in salt manufacture are New York, Michigan, Ohio, and Kansas. The plants are located in all cases at the places of the mineral deposits, the crude rock salt or brine from wells being the raw material used. Turpentine and rosin establishments are located in the forests of long leaf pine, from which the crude gum is obtained. As the more accessible portions of the forests of long leaf pine have become exhausted in one locality, the center of the industry has gradually shifted to more favored districts in the pine belt of the South. As early as 1850 almost the entire product was reported from North Carolina. In 1860 and 1870 North Carolina was still foremost, with South Carolina second. In 1880 the states ranked as follows in respect to value of products: South Carolina, North Carolina, Georgia,

Alabama, and Florida. In 1890 Georgia had taken first place, with North Carolina, South Carolina, Mississippi, and Florida following. In 1900 Georgia was still first, but Florida had passed the other states in the value of products and was second. The southward trend of the industry continued between 1900 and 1905, and at the later census the states ranked in production as follows: Florida, Georgia, Alabama, Mississippi, North Carolina, South Carolina, and Louisiana.

*Summary of localized industries.*—Tables cccxvi and cccxvii are summaries, by states and cities, respectively, of the most pronounced examples of localization, with the percentage that the value of products of the specified industry in the state or city named forms of the total value for the United States. For purposes of comparison the corresponding percentages for 1900 are also included.

TABLE CCCCXVI.—LOCALIZATION OF SPECIFIED INDUSTRIES, BY STATES, WITH VALUE OF PRODUCTS FOR 1905, AND PERCENTAGES FOR 1905 AND 1900.

INDUSTRY.	Value of products in the United States.	State.	Value of products in the state named.	PER CENT OF THE UNITED STATES IN THE STATE NAMED.	
				1905	1900
Collars and cuffs.....	\$12,587,277	New York.....	\$12,188,181	96.8	99.6
Lapidary work.....	7,646,814	New York.....	7,379,974	96.5	95.1
Brass and copper, rolled.....	51,912,853	Connecticut.....	41,911,903	80.7	82.0
Ammunition.....	19,930,821	Connecticut.....	15,304,485	77.2	75.4
Artificial leathers and flowers.....	5,246,822	New York.....	3,996,603	76.2	79.7
Fur goods.....	37,123,120	New York.....	26,244,346	70.7	61.1
Clothing, women's.....	247,661,560	New York.....	173,548,385	70.1	67.1
Clocks.....	8,898,000	Connecticut.....	6,158,034	69.4	68.5
Cash registers and calculating machines.....	9,875,009	Ohio.....	6,669,533	67.5	95.4
Plated ware.....	12,138,880	Connecticut.....	8,125,881	66.9	75.0
Rice, cleaning and polishing.....	16,206,916	Louisiana.....	10,718,311	65.8	65.8
Liquors, vinous.....	11,097,853	California.....	6,688,620	60.3	60.1
Gloves and mittens, leather.....	17,740,385	New York.....	9,946,443	56.1	64.9
Coke.....	51,728,647	Pennsylvania.....	28,924,229	55.9	62.6
Iron and steel (combined).....	905,787,733	Pennsylvania.....	471,228,844	52.0	54.0
Brassware.....	17,499,056	Connecticut.....	9,022,427	51.6	53.2
Clothing, men's.....	355,796,571	New York.....	167,167,536	47.0	45.7
Hardware.....	45,770,171	Connecticut.....	21,480,452	46.9	45.5
Boots and shoes.....	320,107,458	Massachusetts.....	144,291,426	45.1	45.2
Carpets and rugs, other than rag.....	61,586,433	Pennsylvania.....	27,120,311	44.0	43.0
Sugar and molasses, refining.....	277,285,440	New York.....	116,438,838	42.0	37.8
Turpentine and rosin.....	23,937,024	Florida.....	9,901,905	41.4	31.8
Liquors, distilled.....	131,269,886	Illinois.....	54,101,805	41.2	39.5
Musical instruments, pianos.....	46,922,471	New York.....	17,954,219	38.3	(1)
Canning and preserving, oysters.....	3,086,239	Mississippi.....	1,502,497	37.7	45.4
Glass.....	79,607,998	Pennsylvania.....	27,671,663	34.8	38.9
Slaughtering and meat packing (combined).....	913,914,624	Illinois.....	317,206,082	34.7	36.7
Agricultural implements.....	112,007,344	Illinois.....	38,412,452	34.3	41.5
Hosiery and knit goods.....	136,558,139	New York.....	46,108,600	33.8	37.6
Salt.....	9,437,662	New York.....	3,167,270	33.6	33.9
Silk and silk goods.....	133,288,072	New Jersey.....	42,802,907	32.2	37.3
Woolen goods.....	142,196,658	Massachusetts.....	44,653,940	31.4	26.1
Worsted goods.....	165,745,052	Massachusetts.....	51,973,944	31.4	33.7
Chemicals.....	75,222,249	New York.....	23,021,705	30.6	(1)
Canning and preserving, fruits and vegetables.....	78,142,022	California.....	23,809,988	30.5	23.8
Beet sugar.....	24,393,794	Colorado.....	7,198,982	29.5	(1)
Canning and preserving, fish.....	26,377,210	Alaska.....	7,735,782	29.3	17.4
Cotton goods.....	442,451,218	Massachusetts.....	129,171,449	29.2	32.8
Pottery, terra cotta, and fire clay products.....	64,200,702	Ohio.....	18,550,840	28.9	26.8
Paints.....	67,277,910	New York.....	18,721,872	27.8	24.7
Cordage and twine.....	48,017,139	New York.....	13,296,838	27.7	25.0
Druggists' preparations.....	31,782,250	Michigan.....	8,797,911	27.7	21.7
Leather, tanned, curried, and finished.....	252,620,986	Pennsylvania.....	69,427,852	27.5	27.3
Jewelry.....	53,225,681	Rhode Island.....	14,431,756	27.1	28.7
Structural ironwork.....	90,944,697	Pennsylvania.....	23,705,503	26.1	.....
Hats, felt.....	36,629,353	New Jersey.....	9,540,433	26.0	25.0
Automobiles.....	26,645,064	Michigan.....	6,876,708	25.8	(1)
Silversmithing and silverware.....	20,700,703	Rhode Island.....	5,323,264	25.7	31.5
Rubber and elastic goods.....	62,995,909	Ohio.....	15,963,603	25.3	13.9
Electrical machinery, apparatus, and supplies.....	140,809,569	New York.....	35,348,276	25.1	24.6
Pickles, preserves, and sauces.....	29,696,287	Pennsylvania.....	7,224,100	24.3	22.3
Paper and wood pulp.....	188,715,189	New York.....	37,750,605	20.0	21.0

(1) Not reported separately.

# LOCALIZATION OF INDUSTRIES.

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TABLE CCXXVII.—LOCALIZATION OF SPECIFIED INDUSTRIES, BY CITIES, WITH VALUE OF PRODUCTS FOR 1905, AND PERCENTAGES FOR 1905 AND 1900.

[Cities of 20,000 population and over in 1900.]

INDUSTRY.	Value of products in the United States.	City.	Value of products in the city named.	PER CENT OF THE UNITED STATES IN THE CITY NAMED.	
				1905	1900
Lapidary work.....	\$7,640,814	New York, N. Y.....	\$7,370,974	96.5	95.1
Collars and cuffs.....	12,587,277	Troy, N. Y.....	11,271,708	89.5	85.4
Artificial feathers and flowers.....	5,246,822	Manhattan and Bronx boroughs, N. Y.....	3,900,205	74.3	78.7
Clothing, women's.....	247,661,560	Manhattan and Bronx boroughs, N. Y.....	104,723,000	66.5	62.4
Brassware.....	17,499,056	Waterbury, Conn.....	7,387,228	42.2	46.8
Furnishing goods, men's.....	36,444,305	Manhattan and Bronx boroughs, N. Y.....	14,985,804	41.1	.....
Carpets and rugs, other than rag.....	61,586,433	Philadelphia, Pa.....	25,232,510	41.0	45.6
Plated ware.....	12,138,886	Meriden, Conn.....	4,869,303	40.1	32.8
Clothing, men's.....	355,796,571	Manhattan and Bronx boroughs, N. Y.....	128,417,809	36.1	35.1
Liquors, distilled.....	131,269,886	Peoria, Ill.....	42,170,815	32.1	27.7
Gloves and mittens, leather.....	17,740,385	Gloversville, N. Y. <sup>1</sup> .....	5,302,196	29.9	38.8
Slaughtering and meat packing (combined).....	913,914,624	Johnstown, N. Y. <sup>1</sup> .....	2,581,274	14.6	15.4
		Chicago, Ill.....	269,581,486	29.5	32.7
		Kansas City, Kans.....	288,446,141	9.7	6.4
		South Omaha, Nebr.....	305,530,936	7.2	8.6
Jewelry.....	53,225,681	Providence, R. I.....	14,317,050	26.9	27.4
		Manhattan and Bronx boroughs, N. Y.....	11,253,179	21.1	19.9
Automobiles and automobile bodies and parts.....	30,033,536	Detroit, Mich.....	6,240,051	20.8	.....
		Cleveland, Ohio.....	4,624,080	15.4	.....
Druggists' preparations.....	31,782,250	Detroit, Mich.....	8,305,935	26.1	21.6
Silversmithing and silverware.....	20,700,703	Providence, R. I.....	5,323,264	25.7	31.5
		Manhattan and Bronx boroughs, N. Y.....	2,640,649	12.8	26.6
Tobacco, chewing and smoking, and snuff.....	116,767,630	St. Louis, Mo.....	27,703,258	23.7	23.5
Rubber and elastic goods.....	62,995,909	Akron, Ohio.....	13,396,974	21.3	10.5
Pickles, preserves, and sauces.....	29,696,287	Allegheny, Pa.....	6,216,778	20.9	18.9
Paints.....	67,277,910	Brooklyn borough, N. Y.....	13,375,519	19.9	15.4
Corsets.....	14,862,081	Bridgeport, Conn.....	2,954,418	19.9	22.3
Silk and silk goods.....	133,288,072	Paterson, N. J.....	25,433,245	19.1	24.2
Worsted goods.....	165,745,052	Lawrence, Mass.....	30,926,964	18.7	20.5
		Philadelphia, Pa.....	26,064,533	16.3	13.5
		Providence, R. I.....	21,020,892	12.7	13.8
Hardware.....	45,770,171	New Britain, Conn.....	7,537,625	16.5	16.2
Hats, felt.....	36,629,353	Philadelphia, Pa.....	5,847,771	16.0	11.1
		Danbury, Conn. <sup>1</sup> .....	5,798,107	15.8	18.0
		Newark, N. J.....	4,586,040	12.5	12.4
Agricultural implements.....	112,007,344	Chicago, Ill.....	(1)	.....	24.6
Sugar and molasses, refining.....	277,285,449	Philadelphia, Pa.....	37,182,504	13.4	15.1
		New Orleans, La.....	34,908,614	12.6	9.5
Hosiery and knit goods.....	136,558,139	Philadelphia, Pa.....	15,770,873	11.5	13.7
Chemicals.....	75,222,249	Philadelphia, Pa.....	8,451,835	11.2	(6)
Furniture.....	170,446,825	Chicago, Ill.....	17,488,257	10.3	9.9
Iron and steel (combined).....	905,787,733	Pittsburg, Pa.....	88,250,805	9.7	11.3
Leather, tanned, curried, and finished.....	252,620,986	Philadelphia, Pa.....	23,903,239	9.5	8.9
Boots and shoes.....	320,107,458	Brockton, Mass.....	30,073,014	9.4	7.7
		Lynn, Mass.....	25,952,571	8.1	6.5
Pottery, terra cotta, and fire clay products.....	64,209,792	Trenton, N. J.....	5,882,701	9.2	10.8
		East Liverpool, Ohio <sup>1</sup> .....	5,373,852	8.4	9.3
Woolen goods.....	142,196,658	Philadelphia, Pa.....	12,293,881	8.6	15.5
Food preparations.....	61,180,416	Battle Creek, Mich. <sup>1</sup> .....	5,191,655	8.5	3.3
Canning and preserving, fruits and vegetables.....	78,142,022	Baltimore, Md.....	5,981,541	7.7	15.0
Cotton goods.....	442,451,218	Fall River, Mass.....	32,307,977	7.3	8.6

<sup>1</sup> Less than 20,000 population in 1900.  
<sup>2</sup> Exclusive of 2 establishments reported as "slaughtering, wholesale, not including meat packing."  
<sup>3</sup> Exclusive of 1 establishment reported as "slaughtering, wholesale, not including meat packing."  
<sup>4</sup> Can not be shown separately without disclosing the operations of individual establishments.  
<sup>5</sup> Not reported separately in 1900.

Table CCXXVI shows that the states which were prominent in specified industries in 1900 retained that prominence at the census of 1905. The same industries showed the most marked localization in 1900 and in 1905. The greatest change is in "cash registers and calculating machines," a decrease for Ohio from 95.4 per cent of the total value of the products in 1900 to 67.5 per cent in 1905. In none of the other industries

are the changes in the proportion worthy of special mention. According to Table CCXXVII, the two most extreme examples of localization in cities are "lapidary work" in Greater New York and "collars and cuffs" in Troy, N. Y. While the table shows reductions and increases in the percentages of some of the cities in certain industries, all retain in 1905 the leading position held in 1900.

## MANUFACTURES.

*Summary of specialized cities.*—In Table CCXXVIII is presented the specialization of selected cities, taken from tables shown previously in this chapter, based on the average number of wage-earners employed.

TABLE CCXXVIII.—*Summary—specialization of cities, by specified industries: 1905.*

[Cities of 20,000 population and over in 1900.]

INDUSTRY.	Specialized centers.	AVERAGE NUMBER OF WAGE-EARNERS IN SPECIALIZED CENTERS.		
		All industries.	Specialized industry.	Per cent of specialization.
Iron and steel.....	Steelton, Pa. <sup>1</sup> .....	4,656	4,438	95.3
	McKeesport, Pa.....	8,848	8,016	90.6
	South Bethlehem, Pa. <sup>1</sup> .....	5,754	4,393	76.3
	Youngstown, Ohio.....	8,577	5,667	66.2
	Newcastle, Pa.....	5,729	3,149	55.0
Slaughtering and meat packing, (combined).	Pittsburg, Pa.....	56,229	25,407	45.2
	South Omaha, Nebr.....	5,662	5,340	94.3
	Kansas City, Kans.....	10,529	8,757	82.0
	East Liverpool, Ohio <sup>1</sup> .....	5,228	4,859	92.9
	Trenton, N. J.....	14,252	4,571	32.1
Pottery, terra cotta, and fire clay products.	New Bedford, Mass.....	17,855	14,545	81.5
	Fall River, Mass.....	26,836	21,604	80.5
	Lewiston, Me.....	6,167	4,379	71.0
	Manchester, N. H.....	17,579	9,884	56.2
	Lowell, Mass.....	20,303	12,936	64.1
Cotton goods.....	Brockton, Mass.....	13,889	11,188	80.6
	Haverhill, Mass.....	9,574	6,591	68.8
	Lynn, Mass.....	21,540	11,402	52.9
Boots and shoes.....	Danbury, Conn. <sup>1</sup> .....	4,515	3,391	75.1
	Orange, N. J.....	2,450	1,362	55.6
Hats, felt.....	Johnstown, N. Y. <sup>1</sup> .....	2,426	1,478	60.9
	Gloversville, N. Y. <sup>1</sup> .....	5,048	2,997	59.4
Gloves and mittens, leather.	Lawrence, Mass.....	21,910	12,216	55.8
	Providence, R. I.....	39,804	9,266	23.3
Worsted goods.....	Attleboro, Mass. <sup>1</sup> .....	5,044	2,763	54.8
	Providence, R. I.....	39,804	6,391	16.1
Jewelry.....	New Britain, Conn.....	10,073	5,178	51.4
	Paterson, N. J.....	28,509	14,624	51.3
Hardware.....	Troy, N. Y.....	19,114	9,423	49.3
	Akron, Ohio.....	9,817	3,750	38.2
Silk and silk goods.....	Pittsfield, Mass.....	4,455	1,646	36.9
	Cohoes, N. Y.....	6,910	2,545	36.8
Collars and cuffs.....	South Bend, Ind.....	9,015	2,701	30.0
	Waterbury, Conn.....	15,408	4,435	28.8
Rubber and elastic goods..	Meriden, Conn.....	7,281	2,092	28.7
	Springfield, Ohio.....	6,347	1,746	27.5
Woolen goods.....	Wilmington, Del.....	13,554	2,836	20.9
	Waterbury, Conn.....	15,408	4,435	28.8
Hosiery and knit goods....	Meriden, Conn.....	7,281	2,092	28.7
	Springfield, Ohio.....	6,347	1,746	27.5
Carriages and wagons.....	Waterbury, Conn.....	15,408	4,435	28.8
	Meriden, Conn.....	7,281	2,092	28.7
Brassware.....	Springfield, Ohio.....	6,347	1,746	27.5
	Wilmington, Del.....	13,554	2,836	20.9
Plated ware.....	Waterbury, Conn.....	15,408	4,435	28.8
	Meriden, Conn.....	7,281	2,092	28.7
Agricultural implements..	Springfield, Ohio.....	6,347	1,746	27.5
	Wilmington, Del.....	13,554	2,836	20.9
Leather, tanned, curried, and finished.	Waterbury, Conn.....	15,408	4,435	28.8
	Meriden, Conn.....	7,281	2,092	28.7

<sup>1</sup>Less than 20,000 population in 1900.

Steelton, Pa., in the iron and steel manufacture, and South Omaha, Nebr., in slaughtering and meat packing, show the highest percentage of specialization of the cities included in the table.

*Localization in foreign countries.*—Localization of industry is a feature of the industrial life of Europe, and in many localities it is perhaps more pronounced, than is the case in the United States. The silk manufacture in Europe is localized in France, a large part of it in and around Lyon; in Italy, in and near Milan; in Germany, at Krefeld; and in England, at Macclesfield. Woolens predominate over all other lines of manufacturing in Aix la Chapelle, Germany; Roubaix, France; and Bradford and Leeds, England. The following cities are noted for the manufacture of hosiery and underwear: Balbriggan, Ireland; Nottingham, Leicester, and Loughborough, England; Chemnitz, Germany; and Troyes, France. The linens of Dunfermline, Scotland; Belfast, Ireland; and Bielefeld, Sorau, and Zittau, in Germany, are marketed widely. The manufacture of gloves is made a specialty in Grenoble, France, and Zwickau, Germany. Sheffield, England,

and Solingen, Germany, are famous for cutlery, and Birmingham, England, and Elberfeld and Barmen, Germany, are famous for small wares. The localization of pottery manufacture is not more marked in this country than it is at certain places in Europe. Sevres and Limoges, France, and Dresden, Germany, are noted in this respect, while the famous district in Staffordshire, England, sometimes referred to as "The Potteries," is the greatest pottery district in the world. Whole communities in Thuringia, Germany, earn their living by toy making, and a similar condition exists with respect to wood carving in the Austrian and German Tyrol.

*The causes of localization.*—In the report on this subject at the last census of manufacturing establishments the special advantages which give rise to localization of manufacturing were stated to be as follows: "Nearness to materials, nearness to markets, water-power, a favorable climate, a supply of labor, capital available for investment in manufactures, the momentum of an early start, and the habit of industrial imitation." These advantages were described at length in the report<sup>1</sup> referred to, and need not be more than briefly discussed here.

Nearness to the source of the raw materials is perhaps the greatest controlling force in the localization of industries and in many cases it is the only consideration. Whenever the products of the farm, mine, or fisheries are used in their crude form as the principal material of the factory, it is a great advantage in the saving of freight on the bulky material to have the factory located at or near the place of production of the raw material. An important consideration, too, is the fact that some raw materials, such as fruits and vegetables and fish and oysters, are of a perishable character, and to avoid deterioration or waste it is essential that they be worked up into the finished product immediately at the place of production. Examples of this are the oyster canneries of Baltimore, Md., the salmon canneries of Washington and Alaska, and the fruit and vegetable preserving establishments of southern California. Other examples of the necessity of bringing the factory to the materials are found in the copper, lead, and zinc smelters, which are located generally where the mineral is produced; the cheese and butter factories of New York, Wisconsin, and other states in which dairy development has reached a high stage; the cottonseed-oil mills of the cotton producing states, these mills being operated successfully only where this important staple is produced; and establishments producing essential oils, since these oils can be distilled on anything like a large scale only in certain rural sections of New York, Michigan, and other states, where the required plants and herbs are produced in abundance, either naturally or by cultivation. Other important manufacturing in-

<sup>1</sup>Twelfth Census, Manufactures, Part I, page cex.

industries whose localization depends very largely upon a convenient supply of raw materials are the following: Coke, flour, glass, iron and steel, vinous liquors, lumber and timber, wood pulp, pottery and terracotta, brick and tile, and beet sugar. The list might be extended to include many additional commodities. The convenience of a supply of good fuel, which for manufacturing purposes is essentially a raw material, also exercises a strong influence in localizing certain industries.

Nearness and accessibility to markets is often a vital factor in many branches of manufacturing, and must in all cases be regarded as exercising a potent influence on the localization of industries. Freight on shipments, particularly on bulky commodities, is an important element in the cost account.

Waterpower, while an important factor in many lines of manufacturing, is becoming constantly of smaller significance, as is indicated plainly by the statistics. The percentages which waterpower formed of the total horsepower employed in manufactures at the various censuses from 1870 to the present are as follows: 1870, 48.2; 1880, 35.9; 1890, 21.1; 1900, 14; 1905, 11.3. The question of an adequate supply of water for steam producing purposes for industries using a large amount of power is by no means a negligible factor. Many large plants have been prevented from locating in certain neighborhoods, or have been compelled to move, because of excessive water rates. While the direct use of waterpower in manufacturing is becoming of smaller importance comparatively, its utilization in the generation of electric power is increasing rapidly. This power can in turn be applied to manufacturing uses at any distance within the limits of electric power transmission without excessive loss.

With certain exceptions it is difficult to measure the effect of climate upon manufacturing industries. Frequently it is impossible to determine whether it exercises a deterrent or an encouraging influence. There is no question but that extreme heat or cold in sections of the country at different seasons are unfavorable to particular industries.

Instances are very common where a plentiful supply of labor has been the means of attracting industries to certain sections. At the start this labor may even be unskilled, for as there is an increase in the specialization of manufacturing into many divisions of labor and in the application of machinery to operations formerly done by human hands, the ability to perform a single simple operation is acquired easily. The establishment of silk manufacture in the eastern section of Pennsylvania is a striking example of the localization of an industry near a plentiful supply of labor. At the census of 1870 there were in Pennsylvania only 10 silk factories, and all of them were in Philadelphia. At that time in the counties north of that city, particularly in the anthracite coal region, the principal wage-earning possibility for the mass of

people was for men and boys in connection with coal mining, and there was a great scarcity of employment for women and children. This made available a large number of women and children for any line of light manufacturing operations for which they might be fitted. Employment was especially needed for this class of workers, since poverty, in many cases extreme, was the lot of the average mining family. The silk manufacturers of New Jersey were among the first to recognize this condition and take advantage of the opportunity presented, by establishing in this district, during the seventies, silk throwing and weaving mills. The anticipation of the advantages to be derived from this abundant supply of labor—labor that was considerably cheaper than any that could be obtained in the older silk localities—was fully realized in the prosperity which has since attended silk manufacture in that locality. At the census of 1905 there were reported for Pennsylvania 168 silk factories, with a product valued at \$39,333,520. Another special advantage in this neighborhood, although one of considerably less weight, was the plentiful supply of cheap fuel.

That a supply of capital available for investment in industries gives to a city possessing it a great advantage over another less favored in that respect is self-evident. Available capital has contributed in a large measure not only to the establishment and maintenance of productive industry throughout the United States but also to the localization of industry indicated in the foregoing statistics.

In addition to the special advantages previously set forth there is one, of minor importance, probably, which should receive consideration. As the employees engaged in manufacturing become expert in the various processes, their attention is given to the implements and machinery used; this naturally leads to the invention of improved machines, which are protected by patents for a term of years. The use of such improved machinery, being under the control of the patentee, places him at a decided advantage in the trade in which he is engaged and his competitors at a corresponding disadvantage by the royalty which they are compelled to pay for the use of the invention, if they are permitted to use it at all.

Factory inspection laws, which are designed for the most part to protect employees by the improvement of sanitary conditions, by surrounding the work with various instrumentalities for protection against injury, etc., have frequently affected adversely the localization of industry in certain cities or states because of the burdens of expense which they sometimes impose upon the owners of establishments. The manufacture of clothing in factories in Massachusetts is an example of this. Between 1890 and 1900 several laws were passed in that state regulating the manufacture of clothing in tenement houses, and the effect of these laws upon the industry is indicated

clearly by the statistics. According to the census of 1890 there were in Massachusetts 221 establishments reporting the manufacture of men's clothing, valued at \$21,242,647, while at the census of 1900 there were only 194 such establishments, with products valued at \$9,830,954.

*Conclusion.*—If any definite conclusion can be gathered from the statistics, it is that where localization has been simply fortuitous, as sometimes is the case, a gradual process of decentralization takes place; but where localities offer special advantages for certain lines of manufacturing, these advantages are recognized quickly and concentration becomes more pronounced. In regard to some industries there appears to be room for doubt as to the direction in which the current runs the stronger, whether toward centralization or decentralization.

There is a force constantly opposed to the localization of industry—the national spirit of enterprise which is largely responsible for the diversified and widespread character of the manufactures of the country. The success of an enterprise in one location at once suggests the possibility of success elsewhere. New undertakings of this kind frequently receive liberal support from the people in the form of exemption from taxes for a term of years. Sometimes ground is donated, a certain amount of the necessary working capital is subscribed, and extensive and liberal credits are given. However, attempts to establish new industries frequently end in disaster by reason of failure to consider the disadvantages of the community for such industries. Often well-meant efforts are made by enthusiastic but ill-advised trade organizations to attract

and establish industry in towns where the conditions are wholly adverse and where certain factories which it is sought to secure could not possibly flourish.

There are branches of manufacture that can be regarded as essential to the life of all working communities in proportion to the needs of the supporting population; these might be termed community industries. They are principally the hand trades, such as blacksmithing and carpentering, which sometimes develop into machine shops and planing mills. These, with other small neighborhood shops, are necessary industrial features of all communities, however small. A printing shop, too, with its weekly newspaper, is indispensable. With the natural increase of population the avenues of employment also increase, and if the community is surrounded by a prosperous rural population for which it is the center of supply, its industrial activities are correspondingly quickened and enlarged. In this manner the manufacturing units are compelled to add to their productive capacity until they develop into factories. It may be that the town is advantageously situated with respect to means of transportation, either rail or water, by which the surplus product can be shipped to remote sections. If the town possesses, in addition, special advantages for one or more industries, such as waterpower or mineral deposits, either as raw material for manufactures or cheap and abundant coal of good quality, its future growth would seem to be assured. Thus communities increase in industrial importance in proportion as they supply their own needs and contribute to the necessities of others.