

# XII.—MANUFACTURES.

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**In General.**—The great group of manufacturing industries, second in magnitude only to agriculture in the United States, employed during the census year a capital of \$2,790,272,606.\* The number of establishments was

253,852, and of hands employed, 2,732,595; the value of materials used was \$3,396,823,549, and the value of products, \$5,369,579,191. The total amount paid in wages was \$947,953,795, an average of \$346 per hand employed. The total increase in the value of the manufactured goods over that of all the materials used was \$1,972,755,642, an average of \$720 per hand.

With the increasing density of settlement of the country, the importance of this industry relative to agriculture has rapidly increased. In 1850 the capital invested in manufactures was but 8 per cent. of that in agriculture. In 1860 it was 13 per cent.; in 1870 it reached 19 per cent., and in 1880 it had become 23 per cent., or nearly one-fourth that of agriculture. In 1870 the value of the products of manu-

\*NOTE.—The census statistics relate only to those manufacturing establishments whose production during the census year amounted to \$500 or more, and are exclusive, also, of the following industries: Fisheries, quartz-milling, petroleum-refining, gas factories and manufacturing by steam railroad companies.

factures, less that of raw material, was 71 per cent. of the value of agricultural products, while in 1880 the proportion had risen to 89 per cent.

The following tables group the principal statistics of manufactures for the four census years mentioned:

CENSUS.	ESTABLISHMENTS.	CAPITAL.		
	Number.	Amount.	Per Capita of Population.	Average per Establishment.
1880.....	253,852	\$2,790,272,606	\$55.63	\$10,992
1870.....	252,148	2,118,208,769	54.94	8,400
1860.....	140,433	1,009,855,715	33.12	7,191
1850.....	123,025	533,245,351	22.99	4,334

CENSUS.	HANDS.		WAGES.	
	Number.	Average per Establishment.	Amount.	Average per Hand.
1880.....	2,732,595	10.8	\$947,953,795	\$346
1870.....	2,053,996	8.1	775,584,343	378
1860.....	1,311,246	9.3	378,878,966	289
1850.....	957,059	7.8	236,755,464	247

CENSUS.	MATERIALS.	PRODUCTS.		
	Value.	Value.	Excess over Value of Materials.	Excess per hand over Materials.
1880.....	\$3,396,823,549	\$5,369,579,191	\$1,972,755,642	\$720
1870.....	2,488,427,242	4,232,325,442	1,743,898,200	849
1860.....	1,031,605,092	1,885,861,676	854,256,584	651
1850.....	555,123,822	1,019,106,616	463,982,794	485

During the decade from 1870 to 1880, the number of manufacturing establishments increased only 0.7, while the increase in the number of hands was 33.3 per cent., slightly exceeding the rate of increase of population. This indicates an enlarging of previously existing establishments, and a reduction of their number by combinations and otherwise, to an extent which nearly counterbalanced the very considerable additions of new establishments.

In comparing the statistics of the last three censuses all the figures of values for 1870 should be reduced by about 20 per cent., to bring them to a gold basis. The following table presents the rate of increase in the several items relating to values, first in accordance with the census figures for 1870, or on the paper basis, and, secondly, after making the required reduction, or on the gold basis:

VALUE.	PERCENTAGE OF INCREASE ON PAPER BASIS.			PERCENTAGE OF INCREASE ON GOLD BASIS.		
	1870 TO 1880.	1860 TO 1870.	1850 TO 1860.	1870 TO 1880.	1860 TO 1870.	1850 TO 1860.
Capital.....	31.7	109.9	89.3	64.6	67.7	89.3
Materials.....	36.5	141.2	85.8	70.6	92.9	85.8
Products.....	26.9	124.4	85.0	58.6	79.6	85.0
Excess of products over materials.....	13.1	104.1	84.1	41.4	63.3	84.1

Taking the figures of the census of 1870 as the basis of comparison, it would appear, from the first column of the preceding table, that the amount of capital and value of materials and of products, increased in a ratio varying only slightly from the increase of population (30.08 per cent.). After making the proper equalization of values by reducing the figures of 1870 to a gold basis, the actual rate of increase, as shown in the fourth column of the same table, is found to be more than double that of population in the case of both capital and materials, and in the value of products nearly double that of population. A still greater increase in these ratios might justly be made, inasmuch as the purchasing power of gold was considerably greater in 1880 than in 1870, when the prices of all commodities were inflated, but the exact amount of this it is very difficult to fix.

A comparison of the last three columns of this table further shows that the rate of increase from 1850 to 1860 was notably greater than in either of the following decades in all the principal items affecting value of manufactures (except only the cost of materials in 1870).

The following table shows the percentage of increase in the number of manufacturing establishments and in the number of hands employed, for each decade since 1850:

DECADE.	PERCENTAGE OF INCREASE.	
	NUMBER OF ESTABLISHMENTS.	NUMBER OF HANDS EMPLOYED.
1870 to 1880.....	00.7	33.3
1860 to 1870.....	79.5	56.6
1850 to 1860.....	14.1	37.0

The most striking feature of the above table is the very slight increase in the number of establishments between 1870 and 1880, in marked contrast with the prodigious increase, amounting to 79.5 per cent., in the preceding decade. The explanation is found in the fact that the period between the close of the Civil War and the financial panic of 1873, was one of the utmost activity in manufactures, and the multiplication of establishments, especially of small ones, was unprecedented. The census of 1870 was taken in the midst of this time of apparent prosperity. The severe financial depression ensuing, weeded out a large proportion of the smaller establishments, and the subsequent growth, following the well-known tendency of this industry, has been chiefly in the direction of an enlargement of the greater establishments. This tendency was especially noticeable during the decade from 1870 to 1880, when the average capital per establishment increased from \$6,720 (gold) to \$10,992, or no less than 61.1 per cent.

The increase between 1870 and 1880 of 33.3 per cent. in the total number of hands employed, taken in connection with the increase of 64.6 in the total amount of capital invested, and of 58.6 in the value of products, shows, moreover, that the tendency during the decade was toward an economy of labor by the employment of labor-saving machinery. The extent to which such economy increased is measured by the value, per hand, of the improvements effected on the materials employed. In 1870 the excess, per hand, in the value of the products over the value of the materials used, was \$679 (gold). In 1880 this had increased to \$720, the annual value of the work of each hand having increased \$41, or about 6 per cent. The amount of work done in 1880 by 2,732,595 hands, would have required, in 1870, 2,913,720 hands.

### Geographical Distribution.—

Manufactures are distributed very unequally throughout the country. The following table shows the percentage of the total population and of the total manufacturing capital of the country found in the several sections, with the percentage which the capital invested in manufactures forms of the value of farms in each section:

SECTION.	PERCENTAGE OF TOTAL POPULATION.	PERCENTAGE OF TOTAL MANUFACTURING CAPITAL.	RATIO OF MANUFACTURING CAPITAL TO VALUE OF FARMS.
North Atlantic.....	28.9	61.6	61.3
South Atlantic.....	15.2	6.1	18.9
Northern Central....	34.6	25.7	13.9
Southern Central....	17.8	3.7	10.6
Western.....	3.5	2.9	20.9

In the states and territories north of Mason and Dixon's line, the Ohio river and the south boundary of Missouri—comprising less than one-third of the area and about two-thirds of the population of the United States—is concentrated not less than 87.3 per cent. of the manufacturing capital of the country.

The North Atlantic section is far in the lead in the ratio of manufacturing capital to the value of farms. The Northern Central section, though holding the second place in the amount of capital invested in manufactures, is surpassed by both the Western and the South Atlantic sections in the ratio between the manufacturing and the agricultural interests. The explanation of this anomaly is found in the relatively low value of farms in the latter sections. Nearly one-half of the total manufacturing capital of the South Atlantic section is supplied by Maryland, or, in other words, by Baltimore and its vicinity.

The following table shows the total manufacturing capital of each state and territory, and the percentage which it forms of the value of farms, together with the percentage of urban population in each:

STATES.	TOTAL MANUFACTURING CAPITAL.	Amount of Manufacturing Capital to each \$100 in Value of Farms.	Ratio of Urban to Total Population (Per Cent.)
Rhode Island.....	\$75,575,943	\$292	77
Massachusetts.....	303,806,185	208	66
District of Columbia.....	5,552,526	153	90
Connecticut.....	120,480,275	100	54
New Hampshire.....	51,112,263	67	26
New Jersey.....	106,226,593	56	52
New York.....	514,246,575	49	54
Pennsylvania.....	474,510,993	49	39
Maine.....	49,988,171	49	21
Wyoming.....	364,673	44	..
Maryland.....	58,742,384	35	39
Montana.....	899,390	28	..
Nevada.....	1,323,300	25	39
Arizona.....	272,600	24	18
Delaware.....	15,655,822	24	29
Idaho.....	677,215	24	..
Washington.....	3,202,497	23	..
California.....	61,243,784	23	40
Vermont.....	23,265,224	22	11
Wisconsin.....	73,821,802	21	21
Louisiana.....	11,462,468	19	24
Michigan.....	92,930,959	19	22
Missouri.....	72,507,844	19	23
Utah.....	2,656,657	19	19
Georgia.....	20,672,410	18	8
Ohio.....	188,939,614	17	28
Colorado.....	4,311,714	17	31
Florida.....	3,210,680	16	9
Minnesota.....	31,004,811	16	17
South Carolina.....	11,205,894	16	7
Kentucky.....	45,813,039	15	14
Illinois.....	140,652,066	14	27
Virginia.....	26,968,990	13	12
Alabama.....	9,668,008	12	5
Oregon.....	6,312,056	11	10
West Virginia.....	13,883,390	10	8
Tennessee.....	20,092,845	10	7
North Carolina.....	13,045,639	10	3
Indiana.....	65,742,962	10	17
New Mexico.....	463,275	8	6
Iowa.....	33,987,886	6	12
Kansas.....	11,192,315	5	8
Mississippi.....	4,727,600	5	3
Nebraska.....	4,881,150	5	11
Texas.....	9,245,561	5	7
Arkansas.....	2,953,130	4	2
Dakota.....	771,428	3	..

The rank of states in the above list, as determined by the ratio of manufacturing capital to the value of farms, shows a general correspondence with the proportion of urban population.

Thus, Rhode Island, with much the largest urban element of any of the states, employs nearly three times as much capital in manufactures as in agriculture, and Massachusetts, with the next largest urban population, is second. The District of Columbia, although it owes its almost exclusively urban character to exceptional causes, nevertheless stands third. Connecticut, with a nearly even balance alike of urban and rural population and of manufacturing and agricultural interests, is fourth.

The surprisingly high position in this list of New Hampshire, Maine and Vermont, and of several Western territories, is due to the relatively low value of their farming lands (for

farm values, see page lxxxiii). For a like reason, and because also of their great lumbering interests, Wisconsin and Michigan precede Ohio, and Minnesota outranks Illinois in the ratio of manufacturing to agricultural capital.

The principal classes of manufactures, as grouped by the Census office, with the number of establishments, capital, value of materials and of products in 1880, are as follows:

CLASSES OF MANUFACTURES.	No. of Establishments.	Capital.	Value of Materials.	Value of Products.
Agricultural Implements.....	1,943	\$62,109,668	\$31,531,170	\$68,640,486
Boots and Shoes (a).....	1,959	42,994,028	102,442,442	166,050,354
Brick and Tile.....	5,631	27,673,616	9,774,834	32,833,587
Carpets (other than rag).....	195	21,468,587	18,984,877	31,792,802
Cheese and Butter.....	3,932	9,604,803	18,363,579	25,742,510
Chemical Products (b).....	1,349	85,394,211	77,494,425	117,377,324
Cotton Goods (Specific).....	756	208,280,346	102,206,347	192,090,110
Dyeing and Finishing Textiles	191	26,223,981	13,664,295	32,297,420
Felt Goods.....	26	1,958,254	2,530,710	3,619,652
Flouring and Grist-Mill Products.....	24,338	177,361,878	441,545,225	505,185,712
Glass.....	211	19,844,699	8,028,621	21,154,571
Hosiery and Knit Goods.....	359	15,579,591	15,210,951	29,167,227
Iron and Steel.....	1,005	230,971,884	191,271,150	296,557,685
Leather, Curried.....	2,319	16,878,520	59,306,509	71,351,297
Leather, Tanned.....	3,105	50,222,054	85,949,207	113,348,336
Lumber, Sawed.....	25,708	181,186,122	146,155,385	233,268,729
Mixed Textiles.....	470	37,996,057	37,227,741	66,221,703
Paper.....	692	46,241,202	33,951,297	55,109,914
Shipbuilding.....	2,188	20,979,874	19,736,358	36,800,327
Silk and Silk Goods.....	382	19,125,300	18,569,166	34,519,723
Slaughtering and Meat Packing	872	49,419,213	267,738,902	303,562,413
Woolen Goods.....	1,990	96,095,564	100,845,611	160,606,721
Worsted Goods.....	76	20,374,043	22,013,628	33,549,942

a. Not including custom work and repairing.  
 b. Including, besides "Drugs and Chemicals" (see Plate 118), other chemical products (cf. p. xciv).  
 c. Net value.

**Flouring and Grist-Mills.**—During the census year, 24,338 flouring and grist-mills were in operation, with a capital of \$177,361,878, an average of \$7,287 per establishment. They gave employment to 58,407 hands, who received in wages \$17,422,316, or an average of \$298 per hand for the year. The number of runs of stone was 59,612, and the daily capacity 4,730,106 bushels. The number of bushels of wheat supplied to these mills during the year was 304,775,737, valued at \$315,394,386; of other grain, 234,907,220 bushels, valued at \$112,372,071. The ratio between the total value of materials (\$441,545,225) and of the products (\$505,185,712) is about as 87 to 100.

A comparison with similar items from the census of 1870, shows that while the number of mills increased only 8 per cent. during the decade, the capital (reducing that of 1870 to gold) increased 46 per cent.; the number of hands diminished very slightly, while the amount of wages increased 49 per cent.; the amount of grain fed to the mills increased 47 per cent. These figures show a remarkably close correspondence between the increase of capital, wages and amount of grain milled.

The distribution of flouring and grist-mills is more uniform than is the case with any

other of the principal manufacturing industries. While Pennsylvania and New York have the largest amount of capital invested, they are approached closely by the great grain-growing states of Illinois, Ohio, Minnesota, Wisconsin, Michigan and Indiana. The greater proportion of the grain, exclusive of that exported, was ground not far from where it was raised. What slight movement there was to mill, was in an easterly direction. Thus, the North Atlantic section, which raised a little more than 34,000,000 bushels, ground 43,750,000 bushels. The Northern Central section, which raised 329,500,000, ground only a little over 206,000,000 of bushels. This difference, however, of 123,500,000 bushels consisted mainly of grain exported, which was supplied almost entirely by the Northern Central states and the Pacific coast.

**Iron and Steel.**—In manufactures of iron and steel, the United States ranks second only to Great Britain, and at the present rapid rate of progress in this industry will soon stand abreast of its only rival. The following table, compiled for the Tenth Census by Mr. James M. Swank, shows the position of the United States among the great iron and steel producing countries of the globe. Production is measured in tons of 2,240 pounds:

COUNTRIES.	PIG IRON.		STEEL.	
	YEAR.	TONS.	YEAR.	TONS.
Great Britain.....	1880	7,749,233	1880	1,415,382
United States.....	"	3,835,191	"	1,247,335
Germany.....	1879	2,397,818	"	776,500
France.....	1880	1,705,249	"	378,445
Belgium.....	"	586,051	1879	135,000
Austria and Hungary.....	"	448,197	1880	131,935
Russia.....	1879	429,865	1879	211,004
Sweden.....	"	336,992	"	28,118
Other Countries.....	1880	200,000	1880	20,000
Total.....		17,688,596		4,343,719

Iron was manufactured in this country to a small amount from early colonial times, and at the close of the War of Independence the domestic supply of nails and spikes nearly equaled the demand. The first general statistics of manufactures collected in 1810 for the third census, although confessedly very incomplete, showed a total iron product valued at \$14,364,524. As late as 1831 the annual product of steel was only 2,000 tons, none of which was of the best quality of crucible make.

The progress in production of pig iron is shown as follows:

YEAR.	TONS.	PER CENT. OF INCREASE.
1810.....	53,908	...
1840.....	315,000	484
1860.....	821,223	161
1870.....	2,052,821	150
1880.....	3,835,191	87

With this rapid progress in production, the improvement in quality of product has fully kept pace. The pig iron product of the United States is among the best in the world, and the Bessemer steel made here is now confessedly fully as good as the English. The only point in which Great Britain still excels is in the production of steel for fine cutlery.

The following summary presents the condition of the iron and steel industry in 1880 and in 1870, showing the percentage of increase during the decade:

IRON AND STEEL MANUFACTURES.	1880.	1870.	Per-centage of In-crease.
Number of establishments...	1,005	808	24.38
Capital.....	\$230,971,884	\$121,772,074	89.68
Value of materials.....	\$191,271,150	\$135,526,132	41.13
Value of products.....	\$296,557,685	\$207,208,696	43.12
Weight of products (tons)...	7,265,140	3,655,215	98.76
Number of hands employed..	140,978	77,555	81.78
Wages paid.....	\$55,476,785	\$40,514,981	36.93

All money values of the Census of 1870 should be diminished by one-fifth in order to reduce them to the gold standard—a reduction which must be made in all comparisons of the values of 1880 and 1870. After making this allowance, the increase in capital is seen to amount to 137.1 per cent., in materials to 76.42, of products to 78.9, and in wages to 71.16 per cent. Taken in connection with the large increase in these items, the relatively small increase in the number of establishments indicates a prevailing tendency to the enlargement of existing works, rather than to the creation of new establishments.

The following table shows the number and capacity of iron and steel works of different classes in 1880:

Blast furnaces (completed stacks).....	681
Rolling-mill establishments.....	324
Single puddling furnaces (excluding puddling machines)..	4,319
Hammers in iron rolling-mills.....	239
Heating furnaces.....	2,105
Trains of rolls in iron rolling-mills.....	1,206
Nail machines.....	3,775
Steel works.....	73
Bessemer converters.....	24
Open hearth steel furnaces.....	37
Pot holes for crucible steel.....	2,691
Trains of rolls in steel works.....	136
Hammers in steel works.....	219
Forges and bloomaries.....	118
Forge and bloomary fires.....	495
Siemens rotator.....	1
Hammers in forges and bloomaries.....	141
Daily capacity of blast furnaces (tons).....	19,248
“ “ of iron rolling-mills (tons).....	16,430
“ “ of Bessemer converters (tons).....	4,467
“ “ of open hearth steel furnaces (tons).....	827
“ “ of Bessemer and open hearth steel roll- ing-mills (tons).....	5,223
Daily capacity of crucible steel works (tons).....	445
“ “ of forges and bloomaries (tons).....	520

The following table shows the principal classes of the products of iron manufacture, in tons:

Pig iron and castings from furnace.....	3,781,021
All products of iron rolling-mills.....	2,353,248
Bessemer steel finished products.....	889,896
Open hearth steel “ “.....	93,143
Crucible steel “ “.....	70,319
Blister and other steel.....	4,956
Products of forges and bloomaries.....	72,557
TOTAL.....	7,265,140

In the following table are presented the leading items of materials used, in tons:

Iron ore.....	7,709,708
Limestone.....	3,169,149
Anthracite coal.....	3,322,498
Bituminous coal.....	5,659,055
Coke.....	2,277,555

Of the total amount of capital invested in iron and steel works in the country, 46 per cent. was in Pennsylvania. Then followed Ohio with 11 per cent., and New York with 9 per cent.; Missouri and New Jersey had each 4 per cent., while in no other state was the capital over 3 per cent. of the total capital employed in the iron and steel works of the country.

For more than a century, Pennsylvania has been the leading iron manufacturing state. In 1870 its product was slightly over 50 per cent. of the whole product of the country, and in 1880 only a trifle less than this proportion. Ohio stood second in 1870 and 1880, and New York third, although during the past decade its increase was much less than the average of the whole country.

A comparison of the rank of the twelve leading states in this industry in 1870 and 1880, shows great relative changes, as follows:

STATES.	RANK IN 1870.	RANK IN 1880.	PRODUCT IN 1880. (Tons.)
Pennsylvania.....	1	1	3,616,668
Ohio.....	2	2	930,141
New York.....	3	3	598,300
Illinois.....	15	4	417,967
New Jersey.....	4	5	243,860
Wisconsin.....	12	6	178,935
West Virginia.....	10	7	147,487
Michigan.....	8	8	142,716
Massachusetts.....	9	9	141,321
Missouri.....	6	10	125,758
Kentucky.....	7	11	123,751
Maryland.....	5	12	110,934

In 1870 iron and steel were manufactured in twenty-five states. In 1880 the number of iron manufacturing states was increased to thirty, besides the territory of Wyoming and the District of Columbia, and notwithstanding the fact that South Carolina dropped out of the number of producers meantime. The states in which production commenced between 1870 and 1880, were Colorado, Kansas, Nebraska, Oregon, Texas and New Hampshire.

The high per capita product of Wyoming (Plate 120) is explained by the smallness of its population.

### Specific Cotton Manufactures.—

Under this head are included by the Census all manufactures of cotton into fabrics known and sold as cotton goods, as distinguished from those of special mills, working raw cotton, waste, or cotton yarn into hose, webbing, tape, fancy fabrics or mixed goods.

The following table shows the condition of this industry in 1880 and in 1870, with the changes during the decade:

COTTON MANUFACTURES.	1880.	1870.	Per-cent. of In-crease.
Establishments.....	756	956	-21
Capital.....	\$208,280,346	\$140,706,291	47
Spindles.....	10,653,435	7,132,415	49
Looms.....	225,759	157,310	44
Operatives.....	172,544	135,369	28
Wages.....	\$42,040,510	\$39,044,132	8
Cotton consumed, bales.....	1,570,344	995,770	58
“ “ value.....	\$86,945,725	....	..
All materials, value.....	\$102,206,347	\$111,736,936	-9
Product, value.....	\$192,090,110	\$177,489,739	8

The minus sign indicates a decrease.

When the values in 1870, given in the above table, are reduced to a gold standard, it appears that capital increased 85 per cent., and wages 35 per cent., during the decade. Materials show, instead of a decrease, an increase of 14 per cent., and this in spite of the fact that raw cotton decreased in average price (gold) from 17½ to 12 cents per pound in the interval. The product shows an increase of 36 per cent., while, as in the case of raw cotton, the price, in gold, of cotton goods had fallen nearly 50 per cent.

With the great reduction in the number of establishments was associated an increase of 49 per cent. in the number of spindles and of 44 per cent. in that of looms, while the amount of cotton used increased in still greater ratio. Moreover, the increase in number of operatives by no means kept pace with that of spindles or looms, or of amount of cotton consumed, a fact which shows greater economy of labor.

The first cotton factory in the country was erected at Providence, Rhode Island, shortly after the close of the Revolution. The returns of the third census gave the number of factories in 1810 as 168, with 90,000 spindles. Of these Massachusetts had 54 with 19,448 spindles, Rhode Island 26 with 21,030 spindles, and Connecticut 14 with 11,883 spindles. At this period fully two-thirds of the cotton cloth used in the country was of household manufacture.

The progress of cotton manufactures from 1850 to 1860 is presented in the following table:

COTTON MANUFACTURES.	1860.	1850.
Establishments.....	1,091	1,074
Capital.....	\$98,585,269	\$76,032,578
Value of material.....	\$57,285,534	\$37,778,064
Value of products.....	\$115,681,774	\$65,501,687
Operatives.....	122,028	97,956
Wages.....	\$23,940,108	\$17,267,112

Massachusetts was then, as now, the leading state, followed by Rhode Island, Pennsylvania, New York and Connecticut, each of which states had, in 1850, over 100 establishments, and more than \$4,000,000 of capital.

The principal seat of the cotton manufacture is in New England. In 1880 these six states absorbed 75 per cent. of the capital invested in this industry in the United States, while the six remaining states of the North Atlantic section, furnished 12 per cent., the South Atlantic and Southern Central states, together, 11 per cent., leaving in the rest of the country only 2 per cent. of the capital engaged in cotton manufactures. The greatest amount in any one state is in Massachusetts, which has over \$72,000,000 invested, or nearly 35 per cent. of the total capital invested in cotton manufacturing in the country. The next in importance are Rhode Island, with over \$28,000,000, and Connecticut with more than \$20,000,000, while New Hampshire, Maine, New York and Pennsylvania follow in the order mentioned.

The large proportional amount in the Southern states will doubtless give surprise to many. More significant than this is the fact that this industry is increasing more rapidly in the South than in New England. Comparison of the figures of the censuses of 1870 and 1880, shows that in the North Atlantic section the capital engaged in this industry increased 44 per cent.; in the South 50 per cent., a relative gain for the Southern states.

**Woolen Goods.**—In the manufacture of woolen goods there was invested in 1880 a capital of \$96,095,564, divided among 1,990 establishments, affording employment to 86,504 persons, to whom was paid as wages the sum of \$25,836,392, an average of nearly \$300 per hand. The value of materials used was \$100,845,611, and of the products \$160,606,721, showing an increase in value of the products over materials of \$59,761,110, or 59.3 per cent.

The manufacture of woolen goods is confined mainly to the North Atlantic states. Massachusetts has about one-fourth, Pennsyl-

vania nearly one-fifth, and this group of states nearly seven-eighths of all the capital invested in this industry.

The growth of woolen manufactures since 1850 is shown in the following table:

WOOLEN MANUFACTURES.	1880.	1870.	1860.	1850.*
Establishments.....	1,990	2,891	1,260	1,817
Hands.....	86,504	80,953	28,050	34,895
Capital.....	\$96,095,564	\$98,824,531	\$30,862,654	\$26,671,542
Wages.....	\$25,836,392	\$26,877,575	\$9,808,254	\$7,167,900
Materials.....	\$100,845,611	\$96,432,601	\$36,586,887	\$24,912,455
Products.....	\$160,606,721	\$155,405,358	\$61,895,217	\$43,542,288

\* Including Worsted Goods.

The percentage of increase in the above-mentioned items, during the last two decades, reducing values of 1870 to gold, was as follows:

WOOLEN MANUFACTURES.	Percentage of Increase, 1870 to 1880.	Percentage of Increase, 1860 to 1870.
Establishments.....	-31.17	129.44
Hands.....	8.06	185.39
Capital.....	21.55	156.17
Wages.....	20.16	119.22
Materials.....	30.72	110.86
Products.....	28.38	100.86

The comparison, as extended to other items below, is especially significant:

WOOLEN MANUFACTURES.	Percentage of Increase, 1870 to 1880.	Percentage of Increase, 1860 to 1870.
Average capital per establishment.....	76.58	104.34
“ number of hands per establishment.....	58.04	24.39
“ annual wages per hand.....	11.15	-23.18
“ value per hand of products over materials.....	17.22	-34.68
Total value of products over materials.....	26.67	86.53

The minus sign indicates a decrease.

**Mixed Textiles.**—The manufacture of mixed textiles, or miscellaneous fabrics of wool, cotton and silk, is likewise confined almost entirely to the North Atlantic states. The states of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, Pennsylvania and Rhode Island, possessed in 1880 not less than 93 per cent. of the \$38,000,000 of capital in this industry, and furnished over 94 per cent. of the product. In this class of manufactures Pennsylvania leads, with a capital and product nearly one-third that of the country.

**Silk.**—Silk manufacture, both of raw material and of goods, is very limited in its range. The states of New York, New Jersey and Connecticut had in 1880 no less than 84 per cent. of all the capital in this industry. Of the remainder, which is distributed among twelve other states, Pennsylvania and Massachusetts together had seven-eighths.

In 1880 there were 382 establishments, having a total capital of \$19,125,300, employing 31,337 hands and disbursing annually \$9,146,705 in wages. The net value of the materials used was \$18,569,166, and of the products \$34,519,723.

**Worsted Goods.**—The manufacture of worsted goods, also, is confined almost entirely to the states of New Hampshire, Massachusetts, Rhode Island, New York and Pennsylvania, which jointly possess not less than 97 per cent. of the capital of the country, and furnish a similar proportion of the product. In this industry Massachusetts leads, followed by Pennsylvania and Rhode Island.

**Dyeing and Finishing of Textiles.**—The statistics of the Census do “not include establishments connected with cotton, woolen and silk factories, but only independent dye-works, bleacheries and print-works.” The values of products given are only the “values added to the fabrics by the processes of these establishments.”

In this class of manufactures was invested, in 1880, a capital of \$26,223,981, distributed among 191 establishments. The value of the materials used was \$13,664,295, and of the products \$32,297,420. The distribution of this industry follows closely that of cotton and woolen manufactures, the principal investment of capital being in Massachusetts, Rhode Island, Pennsylvania, New Hampshire and New York. Of the total capital, over 99 per cent. was located in the North Atlantic group of states.

**Hosiery and Knit Goods.**—The manufacture of hosiery and knit goods was carried on during 1880 in 359 establishments, having a capital of \$15,579,591. The employees numbered 28,885, to whom was paid as wages the sum of \$6,701,475. The total value of materials employed was \$15,210,951, and of all products \$29,167,227. The increase in value of products over materials was \$13,956,276, or nearly 92 per cent. of the latter.

Outside of New York, Pennsylvania, Connecticut, Massachusetts, New Hampshire and New Jersey, this industry is comparatively trifling.

**Carpets.**—In the manufacture of carpets (other than rag) there was invested in 1880 a capital of \$21,468,587, distributed among 195 establishments. The wholesale value of the products was \$31,792,802. Of two-ply ingrain 21,986,434-yards were made; of tapestry carpets, 9,441,195 yards; of Brussels, 4,077,190 yards, and of Venetian carpets, 1,984,201 yards.

In 1870, there were reported 215 establishments, having a capital of \$12,540,750, and an annual product of \$21,761,573. Notwithstanding a decided decrease of establishments, the capital nearly doubled and the product increased 83 per cent. in the decade.

The leading state in this industry is Pennsylvania, where are located 172 out of the 195 establishments in the country. These represent, however, but one-third of the capital (\$7,210,483), while the ten establishments of New York represent nearly as great an investment (\$6,422,158). Massachusetts has seven establishments with a capital of \$4,637,646, and Connecticut two, with a capital of \$3,085,000, and there are small establishments in New Jersey, Maryland and Maine.

**Slaughtering and Meat-Packing.**

—This branch of industry, although of comparatively recent origin, has already grown to very large proportions. The following table shows its condition in 1880:

Number of establishments (wholesale).....	872
Capital.....	\$49,419,213
Hands employed.....	27,297
Wages.....	\$10,508,530
Beeves slaughtered.....	1,755,533
Average gross weight of beeves (pounds).....	1,100
Sheep slaughtered.....	2,233,701
Average gross weight of sheep (pounds).....	92
Hogs slaughtered.....	16,098,428
Average gross weight of hogs (pounds).....	248
Value of all materials.....	\$267,738,902
Value of all products.....	\$303,562,413

The great slaughtering and meat-packing establishments of Chicago place Illinois far in advance of all other states. The amount of capital invested in this state was \$12,019,980, or nearly one-fourth of the total capital of this industry in the country. Next in importance were Ohio, with a capital of \$5,487,682; New York, \$4,548,625; Indiana, \$3,974,000; Pennsylvania, \$2,938,625; Massachusetts, \$2,904,440; Missouri, \$2,327,500; Kentucky, \$2,229,500; California, \$2,130,200; Iowa, \$1,955,500; New Jersey, \$1,775,200, and Kansas, \$1,669,400. Other states had each less than \$1,000,000 invested.

These twelve states are arranged in the following table according to the value of their total product:

STATES.	Number of Establishments.	Average Capital per Establishment.	Total Product.	Average Product per Establishment.
Illinois.....	143	\$84,056	\$97,891,517	\$684,556
New York.....	128	35,497	43,096,138	336,689
Massachusetts.....	77	37,720	22,951,782	298,075
New Jersey.....	31	57,264	20,719,640	668,375
Ohio.....	93	59,007	19,231,297	206,788
Indiana.....	25	158,960	15,209,204	608,368
Missouri.....	65	35,808	14,628,630	225,056
Iowa.....	38	51,462	11,285,032	296,975
Pennsylvania.....	35	83,961	9,908,545	283,201
California.....	51	41,768	7,953,914	155,959
Kansas.....	14	119,243	5,618,714	401,336
Kentucky.....	31	71,919	4,538,888	146,416

It will be observed that Illinois, which stands first in respect to total capital, total product and average product per establishment,

yields both to Indiana and to Kansas in the average capital per establishment. The second state in the total product is New York, which ranks as second also in the number of establishments, and third in point of capital. With a comparatively insignificant capital, New Jersey ranks fourth in respect to total product and second in average product per establishment.

**Boots and Shoes.**—The maps and diagrams relating to this branch of manufactures, refer only to that class of establishments which may properly be considered as factories, inasmuch as these only were reported in detail by the Census. This excludes 16,013 custom and repair shops, the product of which was not reported separately. Upon Plate 118 is given the aggregate product of all boot and shoe establishments, including these retail establishments.

This branch of manufactures is one of the oldest in the country. More than a century ago, boots and shoes were made in considerable quantity in Massachusetts, which state has held its pre-eminence in this industry, having in 1880 an invested capital of over \$21,098,133, while New York, its nearest competitor, has \$6,227,537, or less than one-third of this amount. The product in Massachusetts during the census year was valued at \$95,900,510, and that of New York at \$18,979,259 or less than one-fifth as much. Pennsylvania ranked third, with a capital of \$3,627,840, and a product about half that of New York. In Illinois, New Hampshire, Maine, Ohio and California, also, there was a considerable investment in this industry, in each case exceeding \$1,000,000.

The returns of the last two censuses (1880 and 1870) show a decided increase in the amount of capital invested in this industry, accompanied by a very great concentration, the reduction in the number of establishments being nearly 38 per cent.

The following table shows the percentage of increase, after reducing the values of 1870 to a gold basis:

MANUFACTURE OF BOOTS AND SHOES.	1880.	1870.	Percentage of Increase.
Number of establishments.....	1,959	3,151	-37.83
Number of hands.....	111,152	91,702	21.21
Capital.....	\$42,994,028	\$37,519,019	43.23
Value of materials.....	\$102,442,442	\$80,502,718	59.07
Value of products.....	\$166,050,352	\$146,704,055	41.52

The minus sign indicates a decrease.

**Leather.**—The manufacture of leather, both tanned and curried, is very widely distributed. In thirty-nine out of the forty-seven states and territories, there were in 1880 establishments of

each class. In the currying of leather, were engaged 2,319 establishments, having a capital of \$16,878,520, employing 11,053 hands, to whom was paid as wages, during the year, \$4,845,413, an average of \$438 per hand. The materials used were valued at \$59,306,509 and the product at \$71,351,297. The ratio of materials to products was 83 per cent. The largest investment of capital in this industry was in Massachusetts, which had slightly more than one-fourth of the total capital. Next in importance are Pennsylvania, New Jersey, New York, Wisconsin and Ohio, each of which had more than \$1,000,000 invested in currying leather.

There were 3,105 tanning establishments, representing a capital of \$50,222,054. In this industry were employed 23,812 hands, whose wages during the year amounted to \$9,204,243, an average per hand of \$389. The value of materials was \$85,949,207 and of products, \$113,348,336. The ratio of materials to products was 76 per cent. The states of Pennsylvania and New York are greatly in advance of all others, having together more than one-half of the total capital of the country. Massachusetts, Maine, Illinois and Ohio each have more than \$2,000,000, and New Jersey, Wisconsin, Kentucky, California and Michigan each more than \$1,000,000 of capital in this industry.

**Lumber.**—The manufacture of sawed lumber is one of the largest industries of the country. The following table shows its condition in 1880, 1870, 1860 and 1850:

LUMBER MANUFACTURES.	1880.	1870.	1860.	1850.*
Mills.....	25,708	25,832	19,699	17,895
Capital.....	\$181,186,122	\$143,493,232	\$72,503,894	\$40,038,427
Hands.....	147,956	149,997	71,878	52,218
Wages.....	\$31,845,973	\$40,009,162	\$20,647,807	\$13,022,052
Average annual wages per hand.....	\$212	\$267	\$287	\$249
Logs (value).....	\$139,836,869	....	....	....
All material (value) ..	\$146,155,385	\$103,343,430	\$43,156,903	\$27,593,529
Products (value).....	\$233,268,729	\$210,159,327	\$93,338,606	\$58,520,966
Ratio of materials to products (per cent.)	63	49	46	47

\* The figures for 1850 include planed lumber, of which only a small quantity was manufactured.

The rate of increase in the several principal items for the last three decades, reducing the values of 1870 to gold, is as follows:

LUMBER MANUFACTURES.	PERCENTAGE OF INCREASE.		
	1870 to 1880.	1860 to 1870.	1850 to 1860.
Capital.....	59	58	81
Wages.....	-00.5	56	59
Materials.....	77	91	56
Products.....	39	80	60

The minus sign indicates a decrease.

The relatively small increase of 39 per cent. in the value of products, between 1870 and 1880, taken in connection with an absolute increase of 42 per cent. in the quantity of lumber manufactured, indicates a considerable shrinkage in value of lumber during the decade. The item of wages shows a slight decrease.

The principal seat of the lumber industry at present is in Michigan, where the capital invested is \$39,260,428, or more than one-fifth of the total investment of the country. The three states which rank next are Pennsylvania, with a capital of \$21,418,588, Wisconsin with \$19,824,059, and New York with \$13,230,934. In the Southern states there is invested a capital of only \$23,500,000, notwithstanding the fact that this section contains by far the largest areas of timber yet remaining in the United States.

An investigation made in connection with the tenth census, concerning the timber supply, developed the following facts as to the cut for the census year and amounts of timber estimated as standing in the three most important lumbering states:

STATES.	WHITE PINE.		HARD WOOD TIMBER.	
	Standing. (Feet.)	Cut for Census Year. (Feet.)	Standing. (Cords.)	Cut for Census Year. (Feet.)
Michigan . . . .	35,000,000,000	4,397,211,000	7,000,000,000	442,089,000
Wisconsin . . . .	41,000,000,000	2,097,299,000	.....	.....
Minnesota . . .	6,100,000,000	540,997,000	57,600,000	36,884,000

The above mentioned cut of hard wood is exclusive of fuel, railroad ties, etc., and of 36,000,000 staves and 3,330,000 sets of headings cut in Michigan, and 7,825,000 staves and 547,000 sets of headings cut in Minnesota. It is estimated that there remain standing, also, in Michigan 7,000,000,000 feet of hemlock, and 5,000,000 cords of white and yellow cedar.

In the Southern states the amounts of pine cut in 1880, and estimated as then standing, were as follows:

STATES.	LONG LEAVED PINE.		SHORT LEAVED PINE.	
	Standing. (Feet.)	Cut for census year. (Feet.)	Standing. (Feet.)	Cut for census year. (Feet.)
Texas . . . . .	20,508,200,000	66,450,000	26,093,200,000	146,420,000
Louisiana . . .	26,588,000,000	61,882,000	21,625,000,000	22,709,000
Arkansas . . . .	.....	.....	41,315,000,000	129,781,000
Mississippi . .	17,200,000,000	108,000,000	6,775,000,000	7,775,000
Alabama . . . .	18,885,000,000	245,396,000	2,307,000,000	.....
Georgia . . . . .	16,778,000,000	272,743,000	.....	.....
Florida . . . . .	6,615,000,000	208,054,000	.....	.....
S. Carolina . .	5,316,000,000	124,492,000	.....	.....
N. Carolina . .	5,229,000,000	108,411,000	.....	.....
Total . . . . .	117,119,200,000	1,195,428,000	98,115,200,000	306,685,000

In most of these states there are enormous quantities of valuable hard woods, concerning which no full statistics are yet accessible. There were reported in Texas areas of loblolly pine,

estimated to contain 20,907,100,000 feet, the cut from which during the census year was 61,570,000 feet.

In comparison with the timber area of Michigan, Wisconsin and Minnesota, the Southern timber area appears to be almost untouched. With an amount of standing pine nearly four times as great, the cut during the census year was only one-fourth as large. At the present rate of cutting, the supply in the former region will last, allowing for growth, not over twenty-five years at the outside, while that in the South will be ample for an indefinite period. Nothing is more certain, however, than that the rate of cutting will greatly increase hereafter, especially in the South, which, with Washington, Oregon and northern California, will, in the not distant future, furnish most of the merchantable lumber.

**Agricultural Implements.**—The manufacture of agricultural implements has of late years increased very rapidly. Since 1870 the capital invested and the value of the annual product have more than doubled. According to the Census statistics of agriculture, the value of farming implements and machines increased from \$151,587,638, in 1850, to \$406,520,055, in 1880, an increase of 168 per cent. (See page lxxxiii.)

The manufacture of agricultural machinery is mainly carried on in the states of Ohio, Illinois and New York, which together furnish about three-fifths of the capital and product, and in Wisconsin, Pennsylvania, Indiana, Kentucky, Michigan, Minnesota and Iowa.

**Shipbuilding.**—Under this heading the Census Reports include not only the building of new vessels of all classes, but all repairs upon vessels. The leading statistics are as follows:

Establishments (number).....	2,188
Capital.....	\$20,979,874
Hands (number).....	21,345
Amount of wages.....	\$12,713,813
Value of all materials.....	\$19,736,358
Number boats built.....	8,026
Number vessels built.....	2,415
Tonnage of vessels built.....	498,878
Number vessels repaired.....	16,507
Total value of products.....	\$36,800,327

The shipbuilding industry is not widely distributed. While during the census year there were establishments in thirty-seven of the states and territories, in many of them little or nothing was done. The principal shipbuilding states are Pennsylvania, which constructed during the census year 204,507 tons, or nearly one-half of the total construction of the country; New York with 76,418 tons, and Maine with 41,396 tons.

The character of the vessels constructed is indicated by the following summary:

CLASS OF VESSELS.	Number.	Aggregate Tonnage.	Average Tonnage.
For navigation of ocean, eastern coast and rivers.....	731	150,325	206
For navigation of western rivers.....	899	242,094	267
“ “ “ northern lakes....	142	30,752	217
“ “ “ canals.....	643	66,707	104

The first mentioned class includes sixty-seven iron vessels, having an aggregate tonnage of 31,347, and an average of 468 tons per vessel. Of this number more than half, aggregating 17,033 tons, were built in Pennsylvania. Next in this class of construction was Delaware, with 8,925 tons, while the tonnage built by New York was trifling, and Maine does not appear to have engaged to any extent in this branch of shipbuilding.

**Chemical Products.**—Under this head are grouped by the Census a great variety of products obtained by chemical processes. The principal ones are mentioned in the following schedule, with the amount and value of each in 1880:

CHEMICAL PRODUCTS.	AMOUNT.	VALUE.
Aniline colors (pounds)....	80,518	\$107,292
Anthracene “ ....	344,114	99,242
Sulphate of ammonia “ ....	16,575,088	618,485
Alum “ ....	39,217,725	808,105
Borax “ ....	3,692,443	277,233
Bromine “ ....	404,690	114,752
Phosphorus “ ....	56,292	29,271
Castor oil (gallons).....	893,802	790,741
Stearic acid candles (pounds)....	18,363,066	2,281,600
Soaps “ ....	446,296,138	20,365,599
Glycerine “ ...	7,117,825	961,477
Nitro-glycerine “ ....	3,039,722	1,830,417
Manufactured manures (tons)....	727,453	19,921,400
Dry colors (pounds)....	67,482,415	4,086,821
White lead “ ....	123,477,890	8,770,699
Other salts of lead “ ....	11,375,466	758,680
Ground barytes (tons).....	19,165	371,829
Zinc oxide (pounds)....	20,121,761	766,337
Acetate of lime “ ...	6,593,009	156,892
Potash and pearlash “ ....	4,571,671	232,643
Soda “ ....	40,259,938	866,560
Sulphur “ ....	1,200,000	21,000
Sulphuric acid “ ....	308,765,432	3,661,876
Glucose “ ....	151,740,400	4,551,212
All other products.....	.....	44,927,101

Sulphate of ammonia is produced most largely in Pennsylvania, New York and Ohio. Alum is made principally in Pennsylvania, with a small production in New Jersey and New York. Castor oil, aside from importations, is obtained mainly from Missouri, New Jersey and Illinois. Of stearic acid candles Ohio furnished more than one-half the product of the United States, the remainder being made in

California, Missouri, Kentucky, Illinois and New York. The manufacture of soap was reported in every state and territory, with the exception of Georgia and North Carolina. The leading producer is New York, followed by Illinois, Pennsylvania, Ohio, Massachusetts and New Jersey. Glycerine is manufactured principally in Ohio and New York, the production of other states being trifling. Nitro-glycerine was made mainly in Ohio, Pennsylvania and New Jersey. In the manufacture of dry colors, Pennsylvania was far in the lead, her product being about two-fifths of the whole; and next in order were New York, Massachusetts and Connecticut. White lead and other salts of lead are manufactured very largely in Pennsylvania, New York, Missouri, Ohio and Illinois. The production of sulphuric acid is distributed widely over the Northern states, the principal producers being New Jersey, Pennsylvania, New York and Maryland. Glucose is made only in trifling amounts outside of New York and Illinois.

**Paper.**—The manufacture of paper is carried on mainly in Massachusetts, in which state about one-fourth of the capital in the country is located. New York, Ohio and Pennsylvania follow next, the combined capital of the four states being nearly 60 per cent. of all invested in this industry in the United States.

In 1880 there were in the country 692 paper manufactories, with a capital of \$46,241,202, employing 24,422 hands, to whom was paid as wages \$8,525,355, an annual average of \$349 per hand. The value of all material used was \$33,951,297. The value of all products was \$55,109,914, including the various kinds of paper, in the following quantities:

Printing paper (tons).....	149,177
Writing " " .....	32,937
Wrapping " " .....	134,294
Binders' board " .....	20,014
Wall paper " .....	14,737
Colored paper (pounds).....	14,756,268
Bank note paper " .....	296,000
Tissue paper " .....	8,125,957
All other paper " .....	178,719,831

**Brick and Tile.**—The manufacture of brick and tile is distributed widely over the country, there being no state or territory which does not contain one or more establishments. This industry is rather more important in the

states in the upper part of the Mississippi valley, with New York and Pennsylvania, than elsewhere, these states having 56 per cent. of all the capital of the country. Together with New Jersey, Massachusetts and Maryland, they have nearly three-fourths of the entire capital. In these states are included also most of the large establishments.

The number of establishments which, in 1870, was 3,137, was 5,631 in 1880, an increase of nearly 80 per cent., while capital increased 66 per cent. (reducing the capital in 1870 to a gold standard). This multiplication of small establishments is in marked contrast with the general tendency of manufactures toward concentration during the decade.

**Factory Cheese and Butter.**—As was noted in the chapter upon Agriculture, the manufacture of butter and cheese, and especially the latter, is in process of being transferred from the farm and dairy to the factory. Not less than 89 per cent. of the cheese product in 1880, together with 4 per cent. of the butter, was made in factories.

While butter and cheese factories were reported in nearly every state and territory, more than one-third of the entire capital was invested in the state of New York, and of the total cheese product this state produced, in 1880, nearly three-fifths. In the production of factory butter also, New York leads all the states, its product being nearly one-third that of the United States.

**Glass.**—In 1880 there were in the country 211 manufactories of glass, with a capital of \$19,844,699, and employing 24,177 hands. The number of furnaces was 348, and of pots 2,982. The wages paid during the year amounted to \$9,144,100, and averaged \$378 per hand. The value of materials was \$8,028,621, and of products \$21,154,571, showing an increase in value of the latter over the former of \$13,125,950, or 163 per cent. The classification of the products is as follows:

GLASS MANUFACTURES.	VALUE.
Glassware.....	\$9,568,520
Green glass.....	5,670,433
Plate " .....	868,305
Window " .....	5,047,313

The manufacture of glass is most largely carried on in the state of Pennsylvania, where nearly 39 per cent. of the total capital is invested, and to the next largest extent in New Jersey and New York.

**Power used in Manufactures.**—The manufactures of the United States employed in 1880 an aggregate of 3,410,837 horse power. Of this 64.07 per cent. was steam power, and 35.93 per cent. water power; in other words, the amount of steam power was nearly double that of water power. In 1870, the amount of power in use was reported as 2,346,142 horse power, of which 51.82 per cent. was steam power and 48.18 per cent. was water power. The increase in total power between 1870 and 1880 was 45.38 per cent., the greater proportion of which increase was in steam power, as is plainly shown by its relatively greater importance in 1880. In the same time, the increase in product of manufactures was 58.6 per cent., being somewhat greater than the increase in power.

The increase between 1870 and 1880 in the power employed in the principal industries, as shown on Plate 138, was in nearly every case greater than the increase of capital and of product in the same industries. This is in agreement with the increase of power per hand in all branches of manufactures, from 1.14 horse-power in 1870 to 1.25 horse-power in 1880, an increase amounting to 10 per cent, which indicates the extent of the transfer from manual labor to machine labor in that period.

The percentage of increase in the proportion of steam power employed in the same industries, ranges from 6 per cent. in manufactures of iron and steel to 46 per cent. in those of worsted goods, the average rate of increase being nearly 30 per cent.

Of the forty-seven states and territories, thirty-two reported steam in excess of water power, while in but fifteen was the reverse the case. In the interval between 1870 and 1880, the use of steam relatively increased in all excepting eight of the states and territories, namely, Arizona, Dakota, Idaho, Iowa, Kansas, Louisiana, Montana and Nebraska, all of which, except Louisiana, were in 1870 recently settled, and contained very little manufacturing power of any description.