GLASS.

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The manufacture of glass in this country dates almost from the arrival of the first English colonists in what is now the United States. One of the earliest attempts, if not the first, at manufacturing in the original thirteen colonies was directed toward the production of glass, and a glass works erected for that purpose in 1608 or 1609, and located about a mile from Jamestown, Va., was probably the first manufactory erected in America by the English colonists. In 1608 the London Company sent glassworkers to America to operate the plant, and in the following year some of the products constituted a part of the first cargo of goods exported from this country.[1] This first glass factory probably produced bottles exclusively. Its career was brief, as in 1617 it was reported fallen into decay, and later was swept entirely away in the Indian massacre of 1622. In 1620 a subscription list was started in Jamestown to erect a factory for the manufacture of glass beads, the currency among the Indians, and in 1621 the London Company sent Italian workmen for this plant, which seems to have been located some distance from Jamestown, as it escaped the massacre of 1622, and is referred to as late as 1623. In 1639 a glass factory was located at Salem, Mass., and previous to this, although the exact date is not known, glass was first made in New York on Manhattan Island.[2] The first mention of a glass factory in Pennsylvania is contained in a very vague reference in a letter written by William Penn in 1683. The progress of the industry during the colonial period was slow and financial reverses were the rule. The scarcity of glass during the Revolutionary War stimulated factory erection, and early in the Nineteenth century the industry assumed much prominence, being confined largely to Massachusetts, New York, eastern Pennsylvania, New Jersey, and Maryland. These early factories were usually situated within easy access to forests, from which the fuel supply was obtained. Not until the erection of the first factory west of the Allegheny Mountains, at Pittsburg in 1797, was coal used as a fuel in glass manufacture, and it was many years before it came into general use.[3] The Atlantic seaboard long held supremacy in the manufacture of glass, but with the westward spread of population and the discovery of rich fuel resources in western Pennsylvania, West Virginia, Ohio, and Indiana, the center of the industry has steadily moved westward and the bulk of the production has been for some time west of the Alleghenies.

This report, with the statistical tables accompanying it, includes only establishments manufacturing glass from the crude material and does not include the large number of separate establishments engaged in the reworking of glass, such as silvering, beveling, cutting, engraving, decorating, etc. A number of the glass establishments, however, carry on these processes in direct connection with the manufacture of the "metal" in the same factory, and such establishments are included.

The inquiry into glass manufacture for this census was based on the following classification of the industry: (1) Building glass, all establishments making common window glass, plate glass, and all varieties of cast and rolled sheet glass; (2) pressed and blown glass, all establishments manufacturing pressed or blown flint glassware, tableware, jellies, tumblers, goblets, lamps, chimneys, lantern globes, gas and electric lighting ware, stem ware, opal ware, cut glass, etc.; (3) bottles and jars, all establishments manufacturing bottles and jars in flint, green, or amber glass. It has been found necessary to combine the last two divisions, as several firms reported production in both these branches.

Table 1 is a comparative summary of the statistics for the industry as returned at the censuses of 1850 to 1900, inclusive, with the percentages of increase for each decade.

[1] Stith's History of Virginia, pages 77 and 82.
[2] Bishop's History of American Manufactures, Vol. I, pages 233 and 234.
[3] History of Pittsburg, by Neville B. Craig, 1851, pages 276 and 277.

TABLE 1.—COMPARATIVE SUMMARY, 1850 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	DATE OF CENSUS.						PER CENT OF INCREASE.				
	1900	1890	1880	1870	1860	1850	1890 to 1900	1880 to 1890	1870 to 1880	1860 to 1870	1850 to 1860
Number of establishments	355	294	169	201	112	94	20.7	74.0	[1]15.9	79.5	19.1
Capital	$61,423,903	$40,966,850	$18,804,599	$14,111,642	$6,133,666	$3,402,350	49.9	117.9	33.3	130.1	80.3
Salaried officials, clerks, etc., number	2,268	[2]1,095	[3]	[3]	[3]	[3]	107.1	.....	.....	.....	.....
Salaries	$2,792,376	[2]$1,232,561	[3]	[3]	[3]	[3]	126.6	.....	.....	.....	.....
Wage-earners, average number	52,818	44,892	24,177	15,822	9,016	5,668	17.7	85.7	52.8	75.5	59.1
Total wages	$27,084,710	$20,885,961	$9,144,100	$7,846,425	$2,903,382	$2,094,576	29.7	128.4	16.5	170.2	38.6
Men, 16 years and over	42,173	36,064	17,778	11,505	8,765	5,571	16.9	102.9	54.5	31.3	57.3
Wages	$24,901,233	$19,546,351	[3]	[3]	[3]	[3]	27.4	.....	.....	.....	.....
Women, 16 years and over	3,529	1,885	741	715	251	97	87.2	154.4	3.6	184.9	158.8
Wages	$840,001	$332,245	[3]	[3]	[3]	[3]	152.8	.....	.....	.....	.....
Children, under 16 years	7,116	6,943	5,658	3,602	[3]	[3]	2.5	22.7	57.1	.....	.....
Wages	$1,343,476	$1,007,365	[3]	[3]	[3]	[3]	33.4	.....	.....	.....	.....
Miscellaneous expenses	$3,588,641	$2,267,696	[4]	[4]	[4]	[4]	58.3	.....	.....	.....	.....
Cost of materials used	$16,731,009	$12,140,985	$8,028,621	$6,133,168	$2,914,303	$1,556,833	37.8	51.2	30.9	110.6	87.2
Value of products	$56,539,712	$41,051,004	$21,154,571	$19,235,862	$8,775,155	$4,641,676	37.7	94.1	10.0	119.2	89.1

[1] Decrease. [2] Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See Table 12.)
[3] Not reported separately. [4] Not reported.

The remarkable growth of the glass making industry in the last half century is shown in Table 1. With the exception of a decrease in the number of establishments between 1870 and 1880, the table shows a steady increase in every item from 1850 to 1900. From 1850 to 1900 the number of establishments increased 261, or 277.7 per cent. The great improvement in factory construction and equipment and the broadening of the scope of the business during the same period are indicated by the increase in capital from $3,402,350 in 1850 to $61,423,903 in 1900, or 1,705.3 per cent. The number of wage-earners has increased from 5,668 in 1850 to 52,818 in 1900, or 831.9 per cent; and wages paid, from $2,094,576 in 1850 to $27,084,710 in 1900, or 1,193.1 per cent. During the same period the cost of materials used has increased from $1,556,833 to $16,731,009, or 974.7 per cent; and the value of products, from $4,641,676 to $56,539,712, or 1,118.1 per cent.

The growth from 1890 to 1900 was vigorous, as shown by an increase of 20.7 per cent in number of active establishments, and of 49.9 per cent in capital invested. The increase in capital was largely caused by the general introduction during the decade of the tank melting furnace, which necessitates much more costly and permanent factory construction and equipment than the pot furnace, which it is fast supplanting.

Of the total cost of materials used in 1900, $16,731,009, the principal item was the cost of packages and package materials, which was $3,390,627, and in 1890 was $1,853,462, an increase of $1,537,165, or 82.9 per cent. This large increase was caused in part by the demand for a neater package for finished products in nearly all lines of glass manufacture, created by increased competition, and by the more general use of the carton package for lamp chimneys, shades, globes, and the great variety of high-grade glassware, and the increased use of paper between sheets in packing building glass. In addition to the above package materials, establishments manufacturing pressed and blown ware, bottles, and jars reported in 1900, $1,522,917 as the cost of caps, metal trimmings, and rubber supplies. The cost of these materials was not reported separately at the census of 1890, but there has been an enormous increase in their consumption.

The total cost of fuel in 1900 was reported as $3,203,146. Of this amount, natural gas cost $1,575,278; coal, $1,074,074; and oil, $409,158; the remainder being divided between coke and wood. A number of establishments, particularly in Indiana, reported little or no cost for fuel, as they were either getting "free gas" as an inducement for location, or owned the source of their supply, and reported the small cost of maintenance under the item of general expense. Hence there was a large amount of natural gas used as fuel which was not reported.

Soda ash is the third largest item of cost in materials used, 157,779 tons being reported, at a cost of $2,259,939. In 1890, 96,777 tons were reported, costing $3,108,233. The average cost per ton in 1900 was $14.32, and in 1890, $32.12. While the quantity of soda ash used in glass manufacture during the decade increased 63 per cent, the cost decreased 27.3 per cent. The comparison shows the benefits derived by the glass industry from the development of the American soda-ash manufacture in the last ten years, a development that received the greater share of its impetus from men actively connected with the glass industry.

The increase in the value of products between 1890 and 1900 was 37.7 per cent, but it is safe to say the increase in the quantity of products was in excess of that, especially in the output of bottles, jars, and glassware, owing to the general introduction of the tank melting furnace and the adoption of improved mechanical equipment. The number of pieces of glassware, bottles, jars, etc., manufactured, was not reported at the census of 1890. It is therefore impossible to make a comparison with such data at the present census. The total production of plate glass, rough and polished, in 1890, was 12,206,942 square feet; and in 1900, 17,512,262 square feet, an increase of 43.5 per cent. There were 2,773,824 square feet of cathedral glass manufactured in 1890, and 8,846,361 square feet in 1900, or an

increase of 218.9 per cent. The quantities of skylight and wire glass manufactured in 1900 were 3,679,694, and 1,295,504 square feet, respectively. No report was made of these products at the census of 1890. In 1890 there were 3,768,884 boxes of window glass manufactured, and 4,341,282 boxes in 1900, an increase of only 15.2 per cent. The comparatively small increase is explained by the much shorter "run" of factories during the "fire" covered by the present census, the average "run" being about six months in 1900 and nearly ten months in 1890. In addition, a large percentage of the available capacity of the factories was idle in 1900 for want of workmen.

Table 2 shows the idle establishments, by states, with the capital invested and the equipment of the factories, for 1900.

TABLE 2.—IDLE ESTABLISHMENTS, BY STATES: 1900.

	United States.	Illinois.	Indiana.	Kentucky.	New Jersey.	New York.	Ohio.	Pennsylvania.	Washington.	West Virginia.
Number of establishments	60	6	7	2	8	4	8	19	1	5
Capital	$3,544,536	$258,000	$121,035	$70,581	$84,700	$337,900	$308,018	$1,968,582	$60,000	$335,720
Equipment and character of works:										
Furnaces, number	41	8	.....	.....	6	.....	8	13	.....	6
Pots, number	488	140	.....	.....	42	.....	87	156	.....	63
Tanks—										
Continuous, number	27	1	6	.....	3	4	2	10	.....	1
Rings, number	248	6	46	.....	29	52	15	90	.....	10
Pot capacity, number	592	18	92	.....	82	132	30	218	.....	20
Intermittent or day, number	16	.....	3	3	1	.....	2	4	1	2
Pot capacity, number	139	.....	41	18	36	.....	4	18	10	12
Flattening ovens, number	38	2	.....	.....	11	10	.....	14	.....	1
Monkey ovens, number	32	.....	.....	.....	.....	.....	30	2	.....	.....
Blow furnaces, number	20	.....	.....	.....	2	4	.....	12	.....	2
Casting tables, number	6	3	.....	.....	.....	.....	.....	3	.....	.....
Annealing ovens, number	67	4	12	29	4	.....	.....	16	.....	2
Bending ovens, number	3	.....	.....	.....	.....	.....	.....	2	.....	1
Clay grinding mills, number	2	.....	.....	.....	.....	.....	.....	2	.....	.....
Grinding machines, number	13	.....	.....	.....	3	.....	5	5	.....	.....
Polishing machines, number	3	.....	.....	.....	2	.....	.....	1	.....	.....
Shops, number	167	15	51	11	5	26	16	43	.....	.....
Glory holes, number	118	8	16	6	1	4	22	55	.....	6
Lehrs, number	153	8	14	.....	12	20	29	47	.....	23
Decorating kilns, number	11	.....	.....	.....	.....	.....	1	.....	.....	10
Decorating lehrs, number	2	.....	.....	.....	.....	.....	1	1	.....	.....
Hand presses, number	56	.....	.....	5	.....	.....	3	29	.....	19
Mechanical presses, number	12	.....	.....	.....	.....	.....	.....	7	.....	5
Blowing machines, number	10	.....	.....	.....	.....	10	.....	.....	.....	.....
Finishing machines, number	15	.....	.....	.....	.....	.....	.....	13	.....	2
Crimping machines, number	16	.....	.....	.....	.....	.....	10	6	.....	.....
Sand-blast machines, number	3	.....	.....	.....	.....	.....	1	.....	.....	2
Grinding machines for fruit-jar tops, number	4	.....	1	.....	.....	.....	.....	3	.....	.....

In addition to the 355 active establishments reported in 1900, Table 2 shows that 60 establishments, with a capital of $3,544,536, were reported as idle during the census year. These establishments were located as follows, by states: Illinois, 6; Indiana, 7; Kentucky, 2; New Jersey, 8; New York, 4; Ohio, 8; Pennsylvania, 19; Washington, 1; West Virginia. 5. Only those idle establishments that seemed reasonably certain of being again put in operation in the near future are included in Table 2. No account was taken of the many dismantled and abandoned glass factories in the country.

Of the 60 idle establishments reported, 41, with a capital of $2,296,587, were for the manufacture of pressed and blown ware or bottles and jars. The equipment of these establishments was as follows: 22 furnaces of 257 pots; 19 continuous tanks of 152 rings, or 304 pots capacity; 11 intermittent or day tanks of 120 pots capacity; 118 glory holes; 61 annealing ovens; 117 lehrs; 11 decorating kilns; 2 decorating lehrs; 56 hand presses; 12 mechanical presses; 10 blowing machines; 15 finishing machines; 16 crimping machines; 3 sand-blast machines; and 4 machines for grinding fruit jar tops. The remaining 19 idle establishments were building-glass factories, which reported a total capital of $1,247,949, and the following equipment: 19 furnaces of 231 pots; 8 continuous tanks of 96 rings or 288 pots capacity; 5 day tanks of 19 pots capacity; 38 flattening ovens; 32 monkey ovens; 20 blow furnaces; 6 casting tables; 6 annealing ovens; 3 bending ovens; 36 lehrs; 13 grinding machines; 3 polishing machines; and 2 clay grinding mills.

In addition to the establishments that were idle throughout the census year, a certain portion of the furnace equipment of active establishments was reported as idle. In active building glass factories, 29 pot furnaces with 471 pots, and one intermittent or day tank furnace of 7 pots capacity were reported as idle. In active pressed and blown ware and bottle and jar factories, 31 pot furnaces with 336 pots, 14 continuous tank furnaces with 79 rings of 158 pots capacity, and 16 intermittent or day tank furnaces of 76 pots capacity were reported as idle. The entire idle furnace equipment of active establishments in both branches of glass manufacture was as follows: 60 pot furnaces with 807 pots, 14 continuous tank furnaces with 79 rings of 158 pots capacity, and 17 intermittent or day tank furnaces of 83 pots capacity. It should be stated in this connection that this idle equipment is included in all tables presenting such data in this report, except Table 2. Adding the statistics of active establishments to those shown in Table 2 gives a total of 415 active and idle establishments in the United States, with a capital of

$64,968,439. The combined equipment of all establishments is as follows: Furnaces, 492; pots, 5,595; continuous tanks, 233; pot capacity of continuous tanks, 4,525; intermittent or day tanks, 163; pot capacity of intermittent or day tanks, 1,040; flattening ovens, 323; monkey ovens, 34; blow furnaces, 279; casting tables, 106; annealing ovens, 936; bending ovens, 12; clay grinding mills, 73; grinding machines, 240; polishing machines, 297; shops, 4,145; glory holes, 1,537; lehrs, 1,480; decorating kilns, 116; decorating lehrs, 25; hand presses, 971; mechanical presses, 61; blowing machines, 179; finishing machines, 155; crimping machines, 510; mechanical polishers, 16; sand-blast machines, 76; grinding machines for fruit jar tops, 141.

Table 3 presents the value of new construction, by states, during the census year. Only the value of additions to existing factories is given in the table, not including ordinary repairs and the value of new plants constructed.

TABLE 3.—NEW CONSTRUCTION, BY STATES: 1900.

STATES.	Cost of new construction (additions to old works, not including ordinary repairs) during census year.
United States	$578,917
Georgia	2,500
Illinois	43,448
Indiana	186,004
Michigan	4,848
New Jersey	22,664
New York	37,429
Ohio	26,141
Pennsylvania	184,082
West Virginia	12,201
Wisconsin	59,000

Table 4 presents comparative statistics of glass manufacture, by states, for the years 1880, 1890, and 1900.

TABLE 4.—COMPARATIVE STATISTICS, BY STATES: 1880 TO 1900.

STATES.	Year.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.							
						Total.		Men, 16 years and over.		Women, 16 years and over.		Children, under 16 years.	
				Number.	Salaries.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.
United States	1900	355	$61,423,903	2,268	$2,792,376	52,818	$27,084,710	42,173	$24,901,233	3,529	$840,001	7,116	$1,343,476
	1890	294	40,966,850	[1] 1,095	[1] 1,232,561	44,892	20,885,961	36,064	19,546,351	1,885	332,245	6,943	1,007,365
	1880	[2] 194	219,329,699	(3)	(3)	24,177	9,144,100	17,778	(3)	741	(3)	5,658	(3)
Illinois	1900	6	2,181,801	75	110,100	3,304	1,621,286	2,607	1,496,891	148	28,456	549	95,939
	1890	13	1,721,878	31	44,710	2,762	1,188,051	2,215	1,121,526	20	3,860	527	62,665
	1880	6	425,000	(3)	(3)	732	342,027	632	(3)	.....	(3)	100	(3)
Indiana	1900	110	12,775,389	509	649,227	13,015	7,226,047	10,910	6,808,042	634	129,808	1,471	288,197
	1890	21	3,556,563	79	75,682	3,010	1,469,149	2,633	1,422,104	197	27,811	180	19,234
	1880	4	1,442,000	(3)	(3)	862	284,207	695	(3)	53	(3)	114	(3)
Kentucky	[4] 1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	[5] 1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1880	5	795,000	.....	.....	522	150,322	364	(3)	11	(3)	147	(3)
Maryland	1900	7	581,086	31	38,976	742	339,518	562	313,920	54	8,678	126	16,925
	1890	11	871,111	16	12,176	1,397	696,560	1,045	650,921	24	6,864	328	38,775
	1880	7	406,000	(3)	(3)	612	234,254	524	(3)	.....	(3)	88	(3)
Massachusetts	1900	5	258,949	39	28,060	387	188,674	343	179,236	19	4,392	25	5,046
	1890	6	365,051	18	17,774	496	201,653	455	195,221	19	3,732	22	2,700
	1880	10	723,000	(3)	(3)	946	388,342	828	(3)	58	(3)	60	(3)
Missouri	1900	3	2,198,316	26	47,448	650	341,375	648	340,825	.....	.....	2	550
	1890	5	2,201,353	39	54,082	1,113	542,157	1,016	524,373	.....	.....	97	17,784
	1880	6	1,430,000	(3)	(3)	965	381,098	709	(3)	36	(3)	220	(3)
New Jersey	1900	26	5,397,662	317	284,960	5,388	2,462,745	4,866	2,278,306	170	32,726	847	151,713
	1890	34	3,744,894	152	132,619	5,688	2,730,100	4,601	2,605,798	42	8,405	1,045	115,897
	1880	22	2,568,021	(3)	(3)	3,578	1,300,038	2,762	(3)	46	(3)	770	(3)
New York	1900	27	2,242,834	117	139,698	2,556	1,305,264	2,201	1,239,971	73	17,881	282	47,462
	1890	30	2,297,699	56	61,413	3,229	1,422,626	2,587	1,319,607	92	17,025	550	85,994
	1880	29	1,875,600	(3)	(3)	3,078	1,046,812	2,116	(3)	50	(3)	912	(3)
Ohio	1900	28	5,451,513	199	249,029	4,546	2,067,384	3,505	1,844,958	405	96,017	636	126,409
	1890	59	4,094,677	216	230,323	6,435	2,901,255	5,053	2,700,036	538	74,227	844	126,992
	1880	19	1,172,850	(3)	(3)	1,688	644,520	1,170	(3)	81	(3)	437	(3)
Pennsylvania	1900	119	28,287,187	842	1,110,383	19,420	10,287,491	15,136	9,338,261	1,546	414,250	2,738	534,980
	1890	99	20,459,049	424	518,640	18,510	8,728,520	14,824	8,090,926	749	154,689	2,937	482,905
	1880	77	7,609,706	(3)	(3)	9,784	3,897,306	6,999	(3)	294	(3)	2,491	(3)
West Virginia	1900	16	1,338,084	85	97,551	1,949	789,422	1,319	657,984	468	103,748	162	27,690
	1890	7	825,313	34	46,946	1,371	511,079	970	446,349	190	32,632	211	32,098
	1880	4	550,522	(3)	(3)	946	311,650	615	(3)	100	(3)	231	(3)
All other states [6]	1900	8	711,082	28	36,944	866	455,504	576	402,839	12	4,100	278	48,565
	1890	9	829,262	30	38,196	881	494,811	665	469,490	14	3,000	202	22,321
	1880	5	332,000	(3)	(3)	464	168,524	364	(3)	12	(3)	88	(3)

[1] Includes proprietors and firm members, with their salaries; number only reported in 1900 but not included in this table. (See Table 12.)
[2] Includes 25 establishments idle or in process of construction, with a capital of $525,100. Not separately reported by states in 1880.
[3] Not reported separately.
[4] No establishments reported.
[5] Included in "all other states."
[6] Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1. 1880—California, 1; Connecticut, 1; Iowa, 1; Michigan, 1; New Hampshire, 1.

TABLE 4.—COMPARATIVE STATISTICS, BY STATES: 1880 TO 1890—Continued.

STATES.	Year.	Miscellaneous expenses.	MATERIALS USED. Total cost.	Mixing sand, tons.	Grinding sand, tons.	Soda ash (carbonate of soda) tons.	Salt cake (sulphate of soda), tons.	Nitrate of soda, tons.	Pearlash, pounds.	Litharge, pounds.
United States	1900	$3,588,641	$16,731,009	581,720	265,438	157,779	53,257	10,770	4,406,211	8,386,106
	1890	2,267,696	12,140,985	369,328	227,416	96,777	38,092	7,031	2,544,978	5,501,559
	1880	(1)	8,028,621	155,447	39,500	49,626	7,877	2,859	592,932	2,313,203
Illinois	1900	210,588	674,008	32,978	.....	12,017	.....	440	.....	115,600
	1890	134,625	682,248	23,693	.....	7,324	2,143	592	.....	40,000
	1880	(1)	297,842	9,767	.....	2,495	648	.....	.....	.....
Indiana	1900	690,165	4,582,141	179,367	71,152	48,629	14,371	2,829	453,481	1,482,887
	1890	360,384	865,374	31,821	50,000	7,608	4,694	263	.....	.....
	1880	(1)	433,733	7,124	32,300	2,854	.....	.....	.....	.....
Kentucky	1900	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1890	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1880	(1)	134,104	3,548	.....	840	337	49	20,000	7,000
Maryland	1900	26,065	151,500	3,493	.....	1,601	.....	149	75,000	36,982
	1890	35,847	295,337	12,703	.....	2,558	112	230	77,000	94,000
	1880	(1)	239,682	5,344	.....	1,902	36	36	.....	.....
Massachusetts	1900	14,243	137,185	1,622	.....	194	125	24	207,967	364,448
	1890	35,760	127,180	1,920	.....	386	157	16	74,300	140,750
	1880	(1)	329,864	2,205	.....	392	255	75	130,111	298,260
Missouri	1900	98,119	281,515	10,366	4,743	3,048	226	.....	.....	.....
	1890	116,397	557,874	11,690	22,652	4,130	180	63	.....	.....
	1880	(1)	351,871	8,042	7,200	3,071	.....	31	.....	.....
New Jersey	1900	241,655	1,488,700	81,260	433	20,630	697	1,314	60,270	72,049
	1890	116,009	1,310,953	49,278	.....	16,644	1,542	263	34,035	39,873
	1880	(1)	1,088,346	26,282	.....	8,274	1,320	120	100	20,000
New York	1900	145,505	899,590	22,820	50	7,508	1,453	548	469,186	822,130
	1890	167,900	825,498	21,050	.....	6,444	2,116	232	500,334	1,218,264
	1880	(1)	944,691	16,122	.....	5,865	26	194	142,456	559,257
Ohio	1900	155,512	1,253,164	37,707	6,897	11,072	1,751	1,259	850,171	2,063,000
	1890	294,744	1,602,599	54,406	.....	12,894	6,607	1,628	335,216	786,991
	1880	(1)	459,333	10,008	.....	3,244	233	332	28,000	210,000
Pennsylvania	1900	1,867,879	6,435,463	191,859	182,117	46,398	34,297	4,330	1,938,334	3,143,727
	1890	911,178	5,294,992	149,239	154,764	34,287	20,251	3,277	1,474,093	3,086,681
	1880	(1)	3,350,660	61,452	.....	18,419	4,822	1,841	268,496	1,218,686
West Virginia	1900	112,791	593,251	10,025	46	2,847	337	307	351,802	285,283
	1890	40,805	277,033	5,350	.....	2,209	.....	416	50,000	100,000
	1880	(1)	208,064	3,183	.....	1,315	.....	179	3,769	.....
All other states[2]	1900	26,119	284,492	10,223	.....	3,335	.....	70	.....	.....
	1890	54,047	301,897	8,178	.....	2,293	290	51	.....	.....
	1880	(1)	190,481	2,375	.....	955	200	2	.....	.....

STATES.	Year.	MATERIALS USED—continued. Lime and quicklime, bushels.	Limestone, tons.	Arsenic, pounds.	Manganese, pounds.	Fire clay and pot clay, pounds.	Pots (not including those made at works), number.	Cost of fuel.[1]	PRODUCTS. Aggregate value.[3]
United States	1900	993,349	91,015	2,349,261	1,493,538	32,151,017	8,941	$3,203,146	$56,539,712
	1890	929,706	45,482	1,823,007	610,915	37,066,652	8,006	2,340,912	41,051,004
	1880	869,886	2,597	713,974	191,146	17,233,891	18,655	(1)	21,154,571
Illinois	1900	56,734	4,815	45,607	59,838	642,000	309	155,400	2,834,398
	1890	25,525	3,387	121,308	14,336	859,382	498	146,834	2,372,011
	1880	49,607	300	26,100	.....	833,000	627	(1)	901,343
Indiana	1900	287,685	27,993	837,487	521,980	8,624,298	2,429	355,300	14,757,888
	1890	61,818	6,877	214,100	87,052	3,153,600	701	89,866	2,995,409
	1880	47,842	.....	32,000	.....	692,000	1,100	(1)	790,781
Kentucky	[4]1900	.....	.....	.....	.....	.....	.....	.....	.....
	[5]1890	.....	.....	.....	.....	.....	.....	.....	.....
	1880	10,300	12	302	1,600	166,000	202	(1)	388,405
Maryland	1900	18,910	185	4,621	11,167	245,900	164	47,980	557,895
	1890	87,698	.....	16,520	14,600	2,487,620	363	80,145	1,256,697
	1880	62,865	.....	2,710	1,500	692,000	587	(1)	587,000
Massachusetts	1900	699	100	7,789	8,101	66,158	110	33,047	418,458
	1890	20	390	4,275	8,150	330,733	45	44,691	431,487
	1880	2,848	846	6,697	9,049	466,479	150	(1)	854,345
Missouri	1900	762	4,112	24,233	33,000	426,520	58	75,689	765,564
	1890	12,916	2,278	104,811	56,022	2,210,091	98	157,928	1,215,329
	1880	47,275	360	24,000	3,960	951,350	601	(1)	919,827

[1] Not reported in 1880.
[2] Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1. 1880—California, 1; Connecticut, 1; Iowa, 1; Michigan, 1; New Hampshire, 1.
[3] While the aggregate value for the respective states is the aggregate value of products reported for all branches of glass manufacture, this total can not be obtained by adding the amounts given, as the reports of certain products have been suppressed, to avoid disclosing the operations of individual establishments.
[4] No establishments reported.
[5] Included in "all other states."

TABLE 4.—COMPARATIVE STATISTICS, BY STATES: 1880 TO 1900—Continued.

STATES.	Year.	MATERIALS USED—continued. Lime and quicklime, bushels.	Limestome, tons.	Arsenic, ponnds.	Manganese, pounds.	Fire clay and pot clay, pounds.	Pots (not including those made at works), number.	Cost of fuel.[1]	PRODUCTS. Aggregate value.[2]
New Jersey	1900	248,654	8,577	102,490	143,465	2,108,845	366	445,828	5,093,822
	1890	198,086	3,397	75,256	17,065	3,841,290	518	384,951	5,218,152
	1880	174,680	455	38,453	12,000	2,880,998	2,118	(1)	2,810,170
New York	1900	41,024	2,462	101,570	90,721	1,033,200	475	227,158	2,756,978
	1890	90,502	778	52,026	32,489	2,775,355	450	244,893	2,723,019
	1880	98,854	.....	6,600	27,505	1,837,650	1,661	(1)	2,420,796
Ohio	1900	94,547	3,356	228,587	76,117	2,549,910	1,199	249,405	4,547,083
	1890	108,597	6,932	375,196	124,581	7,141,278	1,780	156,404	5,649,182
	1880	45,635	.....	28,916	16,436	848,025	835	(1)	1,549,320
Pennsylvania	1900	184,969	38,309	896,074	457,581	15,926,246	3,461	1,421,710	22,011,130
	1890	268,674	20,248	746,393	216,910	13,086,298	3,223	858,281	17,179,137
	1880	309,122	1,124	547,266	110,178	6,495,169	5,170	(1)	8,720,584
West Virginia	1900	19,660	450	80,503	58,944	154,940	350	88,905	1,871,706
	1890	14,107	.....	89,822	16,450	662,550	170	54,885	945,234
	1880	7,533	.....	.....	8,518	933,720	332	(1)	748,500
All other states[3]	1900	39,705	656	20,300	32,624	373,000	20	102,724	924,706
	1890	61,763	1,195	28,300	23,260	518,500	160	113,034	1,065,397
	1880	13,825	.....	930	400	437,500	272	(1)	463,600

STATES.	Year.	PRODUCTS—continued. Building glass. Total value.	Window. 50-foot boxes, number.	Window. Value.	Plate. Total value.	Plate. Total cast, square feet.	Plate. Sold rough, square feet.	Plate. Polished plate made, square feet.	Pressed and blown glass and bottles and jars, value.
United States	1900	[4] $17,096,234	4,341,282	$10,879,355	[5] $6,194,279	[5] 34,758,994	628,684	16,883,578	$39,443,478
	1890	13,928,296	3,768,884	9,058,802	[5] 4,869,494	[5] 19,319,509	3,106,831	9,100,111	27,122,708
	1880	5,915,618	1,864,734	5,047,313	[5] 868,305	[5] 1,700,227	377,227	1,042,000	15,238,953
Illinois	1900	.....	.....	.....	.....	.....	.....	.....	2,810,398
	1890	.....	.....	.....	.....	.....	.....	.....	1,945,790
	1880	373,343	115,271	373,343	.....	.....	.....	.....	528,000
Indiana	1900	5,711,948	1,701,729	4,176,587	1,520,361	[6] 8,553,838	31,917	5,177,160	9,045,935
	1890	1,331,745	360,114	885,745	946,000	2,383,793	100,000	1,758,248	1,163,654
	1880	725,797	91,759	229,397	496,400	970,000	130,000	642,000	64,984
Kentucky	[6] 1900	.....	.....	.....	.....	.....	.....	.....	.....
	[7] 1890	.....	.....	.....	.....	.....	.....	.....	.....
	1880	3,512	.....	.....	3,512	20,684	20,684	.....	334,893
Maryland	1900	.....	.....	.....	.....	.....	.....	.....	454,633
	1890	.....	.....	.....	.....	.....	.....	.....	674,900
	1880	332,000	141,000	332,000	.....	.....	.....	.....	255,000
Massachusetts	1900	.....	.....	.....	.....	.....	.....	.....	402,258
	1890	72,748	.....	.....	72,748	569,375	434,150	.....	.....
	1880	149,845	41,866	104,002	45,843	209,543	209,543	.....	704,600
Missouri	1900	.....	.....	.....	.....	.....	.....	.....	.....
	1890	.....	.....	.....	.....	.....	.....	.....	.....
	1880	390,550	24,000	68,000	322,550	500,000	17,000	400,000	529,277
New Jersey	1900	274,011	124,541	267,611	.....	.....	.....	.....	4,819,811
	1890	1,316,170	622,432	1,316,170	.....	.....	.....	.....	3,901,982
	1880	729,155	296,685	729,155	.....	.....	.....	.....	2,081,015
New York	1900	346,790	89,522	243,085	.....	.....	.....	.....	2,410,188
	1890	.....	.....	.....	.....	.....	.....	.....	2,000,842
	1880	540,903	216,748	540,903	.....	.....	.....	.....	1,879,893
Ohio	1900	671,422	200,854	519,187	.....	.....	.....	.....	3,875,661
	1890	.....	.....	.....	.....	.....	.....	.....	4,073,385
	1880	358,000	127,122	358,000	.....	.....	.....	.....	1,191,320
Pennsylvania	1900	9,213,545	2,068,840	5,301,131	3,912,414	[5] 19,546,674	579,905	10,877,250	12,797,585
	1890	6,406,924	1,430,455	3,648,577	2,758,347	9,024,273	515,177	5,849,519	10,772,213
	1880	2,222,513	780,283	2,222,513	.....	.....	.....	.....	6,498,071
West Virginia	1900	.....	.....	.....	.....	.....	.....	.....	1,770,553
	1890	.....	.....	.....	.....	.....	.....	.....	945,234
	1880	.....	.....	.....	.....	.....	.....	.....	748,500
All other states[8]	1900	873,518	156,296	371,754	761,504	6,658,482	16,862	829,168	1,056,456
	1890	4,300,709	1,355,883	3,208,310	1,092,399	7,342,068	2,057,504	1,492,344	1,644,698
	1880	90,000	30,000	90,000	.....	.....	.....	.....	373,500

[1] Not reported in 1880.
[2] While the aggregate value for the respective states is the aggregate value of products reported for all branches of glass manufacture, this total can not be obtained by adding the amounts given, as the reports of certain products have been suppressed, to avoid disclosing the operations of individual establishments.
[3] Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin; 1. 1890—California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1. 1880—California, 1; Connecticut, 1; Iowa, 1; Michigan, 1; New Hampshire, 1.
[4] Includes "all other products" for building glass as follows: Indiana, $15,000; New Jersey, $6,400; and Massachusetts, $1,200; total, $22,600.
[5] Includes "cathedral," "skylight," "wire," and "all other products" for this class.
[6] No establishments reported.
[7] Included in 'all other states."

TABLE 4.—COMPARATIVE STATISTICS, BY STATES: 1880 TO 1900—Continued.

STATES.	Year.	EQUIPMENT AND CHARACTERISTICS OF WORKS.[1]									
		Furnaces, number.	Pots, number.	Tanks.[2]		Flattening ovens, number.	Monkey ovens, number.	Casting tables, number.	Annealing ovens, number.	Lehrs, number.	Clay grinding mills, number.
				Number.	Pot capacity.						
United States	1900	451	5,107	353	4,834	285	2	100	2,409	1,350	71
	1890	564	4,932	.....	.....	135	19	62	2,142	599	153
	1880	285	2,421	.....	.....	68	16	16	1,704	.....	171
Illinois	1900	10	129	18	906	1	2	4	289	31	.....
	1890	27	225	.....	.....	8	.....	6	269	11	4
	1880	8	74	.....	.....	.....	.....	.....	.....	.....	.....
Indiana	1900	125	1,354	112	1,551	116	.....	17	419	437	23
	1890	48	449	.....	.....	13	2	8	217	43	9
	1880	10	108	.....	.....	.....	.....	.....	.....	.....	.....
Kentucky	[3]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	[4]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1880	6	47	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	1900	12	107	1	6	2	.....	.....	21	20	2
	1890	19	161	.....	.....	4	.....	.....	34	23	6
	1880	9	68	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts	1900	7	65	1	90	1	.....	.....	15	13	1
	1890	11	69	.....	.....	1	.....	6	25	8	2
	1880	11	99	.....	.....	.....	.....	.....	.....	.....	.....
Missouri	1900	7	110	5	73	.....	.....	14	130	2	1
	1890	13	148	.....	.....	1	.....	23	117	.....	7
	1880	7	51	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	1900	33	255	51	769	6	.....	.....	266	100	4
	1890	80	469	.....	.....	22	1	.....	352	50	22
	1880	44	289	.....	.....	.....	.....	.....	.....	.....	.....
New York	1900	29	247	22	282	5	.....	5	131	67	6
	1890	55	400	.....	.....	14	6	2	105	47	26
	1880	43	389	.....	.....	.....	.....	.....	.....	.....	.....
Ohio	1900	42	539	18	237	12	.....	3	144	119	5
	1890	85	806	.....	.....	25	1	1	123	142	21
	1880	20	187	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	1900	168	2,117	93	1,303	138	.....	57	880	485	27
	1890	197	1,982	.....	.....	45	9	16	788	241	48
	1880	112	1,029	.....	.....	.....	.....	.....	.....	.....	.....
West Virginia	1900	15	156	20	90	2	.....	.....	18	65	1
	1890	17	144	.....	.....	.....	.....	.....	18	33	3
	1880	8	82	.....	.....	.....	.....	.....	.....	.....	.....
All other states[5]	1900	3	28	12	127	2	.....	.....	96	11	1
	1890	12	79	.....	.....	2	.....	.....	94	1	6
	1880	7	48	.....	.....	.....	.....	.....	.....	.....	.....

STATES.	Year.	EQUIPMENT AND CHARACTERISTICS OF WORKS—continued.									
		Grinding machines, number.	Polishing machines, number.	Shops, number.	Glory holes, number.	Presses or pressing machines, number.	Finishing machines, number.	Crimping machines, number.	Grinding and engraving machines, number.	Horses and mules, number.	Wagons, carts, and drays, number.
United States	1900	227	294	3,978	1,419	964	140	494	187	409	407
	1890	186	214	2,894	880	801	91	288	798	590	484
	1880	70	70	1,353	437	522	.....	.....	716	749	679
Illinois	1900	.....	.....	427	146	13	2	1	3	23	24
	1890	4	50	115	48	2	.....	.....	1	25	13
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indiana	1900	61	86	1,397	351	201	33	169	29	21	23
	1890	43	.....	77	92	8	.....	.....	4	29	27
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kentucky	[4]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	[5]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	1900	1	.....	67	24	7	.....	.....	4	13	17
	1890	3	.....	148	23	4	50	15	17	21	21
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts	1900	.....	.....	38	16	9	.....	5	.....	8	9
	1890	.....	.....	33	7	9	.....	.....	85	11	11
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Missouri	1900	21	24	26	6	.....	.....	.....	.....	9	7
	1890	26	50	23	.....	.....	.....	.....	.....	30	24
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] The equipment of glass manufacturing plants, other than furnaces and pots, not having been reported by state totals in 1880, the comparison can be made only for the United States for that year.
[2] Not reported in 1880 and 1890.
[3] No establishments reported.
[4] Included in "all other states."
[5] Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado. 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1. 1880—California, 1; Connecticut, 1; Iowa, 1; Michigan, 1; New Hampshire, 1.

TABLE 4.—COMPARATIVE STATISTICS, BY STATES: 1880 TO 1900—Continued.

STATES.	Year.	EQUIPMENT AND CHARACTERISTICS OF WORKS—continued.									
		Grinding machines, number.	Polishing machines, number.	Shops, number.	Gloryholes, number.	Presses or pressing machines, number.	Finishing machines, number.	Crimping machines, number.	Grinding and engraving machines, number.	Horses and mules, number.	Wagons, carts, and drays, number.
New Jersey	1900	.....	.....	718	301	55	1	.....	22	98	111
	1890	12	.....	328	199	17	.....	.....	47	122	107
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York	1900	3	.....	312	66	49	2	32	9	49	47
	1890	7	.....	236	41	30	.....	.....	23	67	65
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio	1900	12	10	613	93	125	59	35	5	18	18
	1890	13	.....	441	130	243	21	57	258	31	33
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	1900	129	174	144	351	444	42	252	54	134	126
	1890	73	114	1,316	370	403	20	151	303	213	147
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Virginia	1900	.....	.....	158	28	60	1	.....	10	6	6
	1890	2	.....	104	24	85	.....	10	60	12	12
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other states[1]	1900	.....	.....	78	37	1	.....	.....	1	30	19
	1890	3	.....	78	6	.....	.....	.....	.....	29	24
	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Table 5 presents comparative statistics of glass manufacture, by classes of products, for the years 1880, 1890, and 1900, with the per cent of increase for each decade.

TABLE 5.—COMPARATIVE SUMMARY, BY CLASSES OF PRODUCTS, 1880 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	Year.	Total.	Building glass.	Pressed and blown glass and bottles and jars.	PER CENT OF INCREASE.		
					Total.	Building glass.	Pressed and blown glass and bottles and jars.
Number of establishments	1900	355	124	231	20.7	24.0	19.1
	1890	294	100	194	74.0	85.2	68.7
	1880	169	54	115	.....	.....	.....
Capital	1900	$61,423,903	$26,617,122	$34,806,781	49.9	45.0	53.9
	1890	$40,966,850	$18,353,576	$22,613,274	117.9	151.8	96.4
	1880	$18,804,599	$7,290,155	$11,514,444	.....	.....	.....
Salaried officials, clerks, etc., number	1900	2,268	615	1,653	107.1	110.6	105.9
	1890	1,095	292	803	.....	.....	.....
	1880	(2)	(2)	(2)	.....	.....	.....
Salaries	1900	$2,792,376	$811,983	$1,980,393	126.6	140.2	121.4
	1890	$1,232,561	$338,112	$894,449	.....	.....	.....
	1880	(2)	(2)	(2)	.....	.....	.....
Wage-earners, average number	1900	52,818	11,902	40,916	17.7	[3]0.7	24.3
	1890	44,892	11,982	32,910	85.7	147.3	70.2
	1880	24,177	4,846	19,331	.....	.....	.....
Total wages	1900	$27,084,710	$9,029,673	$18,055,037	29.7	26.1	31.5
	1890	$20,885,961	$7,159,903	$13,726,058	128.4	194.4	104.5
	1880	$9,144,100	$2,431,789	$6,712,311	.....	.....	.....
Men, 16 years and over	1900	42,173	11,801	30,372	16.9	1.4	24.3
	1890	36,064	11,633	24,431	102.9	154.2	35.1
	1880	17,778	4,577	13,201	.....	.....	.....
Wages	1900	$24,901,283	$8,999,613	$15,901,620	27.4	27.2	27.5
	1890	$19,546,351	$7,073,965	$12,472,386	.....	.....	.....
	1880	(2)	(2)	(2)	.....	.....	.....
Women, 16 years and over	1900	3,529	20	3,509	87.2	[3]70.1	93.0
	1890	1,885	67	1,818	154.4	[3]27.2	180.1
	1880	741	92	649	.....	.....	.....
Wages	1900	$840,001	$4,901	$835,100	152.8	[3]76.2	168.0
	1890	$332,245	$20,598	$311,652	.....	.....	.....
	1880	(2)	(2)	(2)	.....	.....	.....
Children, under 16 years	1900	7,116	81	7,035	2.5	[3]71.3	5.6
	1890	6,943	282	6,661	22.7	59.3	21.5
	1880	5,658	177	5,481	.....	.....	.....
Wages	1900	$1,343,476	$25,159	$1,318,317	33.4	[3]61.5	39.9
	1890	$1,007,365	$65,345	$942,020	.....	.....	.....
	1880	(2)	(2)	(2)	.....	.....	.....

[1] Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1. 1880—California, 1; Connecticut, 1; Iowa, 1; Michigan, 1; New Hampshire, 1.

[2] Not reported separately.

[3] Decrease.

TABLE 5.—COMPARATIVE SUMMARY, BY CLASSES OF PRODUCTS, 1880 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE—Continued.

	Year.	Total.	Building glass.	Pressed and blown glass and bottles and jars.	PER CENT OF INCREASE.		
					Total.	Buildihg glass.	Pressed and blown glass and bottles and jars.
Miscellaneous expenses	1900	$3,588,641	$1,365,865	$2,222,776	58.3	27.7	85.5
	1890	$2,267,696	$1,069,545	$1,198,151	.....	.....	.....
	1880	(1)	(1)	(1)	.....	.....	.....
Cost of materials used	1900	$16,731,009	$4,679,084	$12,051,925	37.8	1.2	60.3
	1890	$12,140,985	$4,621,535	$7,519,450	51.2	102.0	31.0
	1880	$8,028,621	$2,287,987	$5,740,634	.....	.....	.....
Value of products	1900	$56,539,712	$17,096,284	$39,443,478	37.7	22.7	45.4
	1890	$41,051,004	$13,928,296	$27,122,708	94.1	135.4	78.0
	1880	$21,154,571	$5,915,618	$15,238,953	.....	.....	.....
Pot and tank furnaces, number	1900	804	241	563	42.6	23.6	52.6
	1890	564	195	369	97.9	137.8	81.8
	1880	285	82	203	.....	.....	.....
Pot capacity of furnaces, number	1900	9,941	3,726	6,215	101.6	84.1	113.7
	1890	4,932	2,024	2,908	103.7	173.1	73.1
	1880	2,421	741	1,680	.....	.....	.....

[1] Not reported.

Tables 4 and 5 show large increases in the number of salaried officials and their salaries, between 1890 and 1900, caused by the organization of large consolidations in the glass business within the last five years. The most interesting disclosure, however, is the widespread substitution of the tank for the pot furnace for melting glass. No statistics of tank furnaces appear in the report on glass manufacture at the census of 1890, although a number were in existence at that time. These tanks were then largely regarded as in the experimental stage, although it had been demonstrated in 1888 that their operation was a success, particularly in the manufacture of window glass. It was several years before glass manufacturers were convinced of the advantages of the tank over the pot furnace; but from 1890 on, the introduction of the tank has been steady and is the prominent feature of the progress of the American glass industry during the last decade. A larger production and a more uniform quality of glass are rendered possible by the use of the tank system of melting than by the pot-furnace system, especially in the manufacture of window glass and bottles and jars. Although the cost of the installation of the tank system is considerably greater than that of the pot system, the former is much more economical and regular in operation. In many departments of the glass industry it meets the demand for more glass for less money. The introduction of the continuous tank in the manufacture of bottles and jars has been fully as general as in the manufacture of window glass, and continuous and intermittent or day tanks are being more and more extensively used in the manufacture of common tumblers and jellies, opal ware, lantern globes, lamp founts, chimneys, shades, and globes, and novelties and specialties in pressed and blown ware.

The statistics of furnaces are of little value for comparative purposes, owing to the general introduction of the tank furnace during the last decade. The following comparisons have been made on the assumption that all furnaces reported in 1890 were pot furnaces; this is not strictly correct, as it is known that there were several tank furnaces in operation at that time, but they were not shown separately in the published statistics. The number of tank furnaces reported was small, however, and would not materially affect the comparisons.

Since 1890 there has been a decrease of 20 per cent in the total number of pot furnaces, 564 being reported in 1890 and 451 in 1900. In building glass, 195 pot furnaces were reported in 1890 and 193 in 1900, a decrease of only 2, while the decrease in the number of pot furnaces for pressed and blown glass and bottles and jars was 111, or 30.1 per cent, 369 being reported in 1890 and 258 in 1900. However, in 1900 there is a total increase for the United States of 353 tanks—206 continuous and 147 day—making a gain in the total number of melting furnaces in 1900 over 1890 of 240, or 42.6 per cent. In building glass, 34 continuous and 14 day tanks were reported in 1900, making an increase in the total number of furnaces for that class in 1900 of 23.6 per cent over the number reported in 1890. In the class of pressed and blown ware and bottles and jars, 172 continuous and 133 day tanks were reported in 1900, making a gain of 52.6 per cent in the total number of furnaces in that division in 1900 over the total for 1890.

By estimating the ring capacity of the continuous tank in building glass establishments as equal to 3 pots, and in pressed and blown glass and bottle and jar establishments as equal to 2 pots, and estimating the

ton capacity of the day tank in both classes as equal to a like pot capacity, the 353 tanks have a total capacity of 4,834 pots, 1,430 of which are in building glass factories and 3,404 in pressed and blown glass and bottle and jar factories. A comparison of the capacity of the pot furnaces reported in 1900 with the capacity reported in 1890, shows an increase in capacity of 3.5 per cent; an increase in building glass capacity of 13.4 per cent; and a decrease in pressed and blown ware and bottle and jar capacity of 3.3 per cent. However, the total capacity of both pot furnaces and tanks for the entire industry in 1900 increased 101.6 per cent over 1890; of building glass capacity, 84.1 per cent; and of pressed and blown ware and bottles and jars, 113.7 per cent. The increase of only 23.6 per cent in the number of furnaces in building glass factories, with an increase of 84.1 per cent in the pot capacity, indicates the much larger capacity of the average window tank than that of the tank used in the production of pressed and blown ware and bottles and jars, where the number of furnaces increased 52.6 per cent and the pot capacity increased 113.7 per cent. The day tank in building glass factories is used in the manufacture of skylight, tile glass, etc.

The general introduction of the tank for glass melting has created, within the past decade, a separate industry of considerable magnitude—the preparation of the clay for the construction of tanks. At the same time the manufacture of the glass melting pot has been transferred largely from the glass factory to a few establishments that make a specialty of its manufacture.

Table 6 presents the rank of states in glass manufacture as a whole from 1880 to 1890, according to value of products, with the percentages of total value of products for the United States.

TABLE 6.—RANK OF STATES ACCORDING TO VALUE OF PRODUCTS: 1880 TO 1900, WITH PER CENT OF TOTAL VALUE.

STATES.	RANK.			VALUE OF PRODUCTS.			PER CENT OF TOTAL VALUE.		
	1900	1890	1880	1900	1890	1880	1900	1890	1880
United States	.....	.....	.....	$66,539,712	$41,051,004	$21,154,571	100.0	100.0	100.0
Pennsylvania	1	1	1	22,011,130	17,179,137	8,720,584	38.9	41.8	41.2
Indiana	2	4	8	14,757,883	2,995,409	790,781	26.1	7.3	3.7
New Jersey	3	3	2	5,093,822	5,218,152	2,810,170	9.0	12.7	13.3
Ohio	4	2	4	4,547,083	5,649,182	1,549,320	8.1	13.8	7.3
Illinois	5	6	6	2,884,398	2,372,011	901,343	5.0	5.8	4.3
New York	6	5	3	2,756,978	2,723,019	2,420,796	4.9	6.6	11.5
West Virginia	7	9	9	1,871,795	945,234	748,500	3.3	2.3	3.6
Missouri	8	8	5	765,564	1,215,329	919,827	1.4	3.0	4.4
Maryland	9	7	10	557,895	1,256,697	587,000	1.0	3.1	2.8
Massachusetts	10	10	7	418,458	431,437	854,345	0.7	1.0	4.0
Wisconsin	11	13	.....	(1)	(1)	(2)	.....	.....	.....
California	12	14	13	(1)	(1)	140,000	.....	.....	0.7
Virginia	13	.....	.....	(1)	(2)	(2)	.....	.....	.....
Delaware	14	16	.....	(1)	(1)	(2)	.....	.....	.....
Georgia	15	12	.....	(1)	(1)	(2)	.....	.....	.....
Michigan	16	17	14	(1)	(1)	90,000	.....	.....	0.4
Colorado	17	15	.....	(1)	(1)	(2)	.....	.....	.....
Kentucky	.....	11	11	(2)	(1)	388,405	.....	.....	1.8
Connecticut	.....	.....	12	(2)	(2)	160,000	.....	.....	0.8
New Hampshire	.....	.....	15	(2)	(2)	70,000	.....	.....	0.3
Iowa	.....	.....	16	(2)	(2)	8,500	.....	.....	(3)
All other states[4]	.....	.....	.....	924,706	1,065,397	.....	1.6	2.6	.....

[1] Included in "all other states."
[2] Not reported.
[3] Less than one-tenth of 1 per cent.
[4] Includes the following states: 1890—California, Colorado, Delaware, Georgia, Kentucky, Michigan, Wisconsin; 1900—California, Colorado, Delaware, Georgia, Michigan, Virginia, Wisconsin.

Glass manufacture was reported in 17 states in 1900; in 17, in 1890; and in 16, in 1880. Wisconsin, Virginia, Delaware, Georgia, and Colorado were not reported in 1880. Iowa, New Hampshire, and Connecticut dropped out of the producing column in 1890, but Wisconsin, Delaware, Georgia, and Colorado were added. In 1900, Virginia, the home of the first glass factory, was again reported. No reports of glass manufacture were made from Kentucky in 1900. Since 1900 glass factories have been projected in Washington, Kansas, Tennessee, and South Carolina.

Pennsylvania has occupied first place as a glass-producing state for the last three decades. The discovery of gas in Indiana attracted many factories early in the last decade, especially from Ohio, where the gas was practically exhausted for factory purposes after a few years' existence. As a result, in 1900 Indiana has changed places with Ohio as a glass-producing state, the value of its product in 1900 being nearly five times that of 1890. New Jersey, the third state in 1900 and 1890, and the second in 1880, has held its prominent position by virtue of good sand deposits and advantageous geographical position, and largely from the fact that there are numerous native glass workers in the state not at all inclined to leave, even when better positions are offered elsewhere. There are indications, however, that this reserve on the part of the New Jersey workman is disappearing, and it is a question if the state will continue to hold its present position. West Virginia, which was ninth in glass manufacture in 1890, was seventh in the value of its glass products in 1900, increasing nearly 100 per cent during the decade. The excellent fuel resources of this state, in view of the rapid decline of the gas fields of Indiana, have recently greatly stimulated the growth of its glass manufacture, and will no doubt have the effect of placing it among the leading states in the industry.

The direction of the growth of the industry has

always closely followed the fuel supply. The evident failing of the gas supply in Indiana has fixed attention on the gas field of southeastern Kansas, and it is probable that in a short time the industry will be established in that section, although unfavorable freight rates and the refusal of the citizens to hold out tempting cash bonuses for the location of factories have so far kept the glass factory out of that field. Some establishments now in Indiana are likely to be soon moved to the gas fields of West Virginia or western Pennsylvania, and some have already been transferred into the coal fields of Indiana and Illinois and will operate with gas produced from the coal of these states. The largest factories in the Indiana gas field are likely to be soon equipped to operate with gas produced from coal, which will give the glass industry of the state a permanency always lacking when cheap natural gas is the fuel used. During the present decade, owing to the absence of a great cheap fuel supply and the steady adoption of the producer gas-fuel system, many factories will be located at new points within convenient access to the great glass consuming sections, particularly in the West. The Pacific coast is attracting more and more attention as a field for glass manufacture, and the cheap fuel oil of southern California, coupled with the growing demand for a glass package from the fruit packers, will probably lead to a decided increase in the glass production of that state within a very short time.

BUILDING GLASS.

Table 7 presents comparative statistics, by states, for the building glass industry, for 1890 and 1900.

TABLE 7.—COMPARATIVE STATISTICS, BUILDING GLASS: 1890 AND 1900.

STATES.	Year.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.							
						Total.		Men, 16 years and over.		Women, 16 years and over.		Children, under 16 years.	
				Number.	Salaries.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.
United States	1900	124	$26,617,122	615	$811,983	11,902	$9,029,673	11,801	$8,999,613	20	$4,901	81	$25,159
	1890	100	18,353,576	[1]292	[1]338,112	11,982	7,159,903	11,683	7,073,965	67	20,598	282	65,345
Indiana	1900	51	7,080,415	224	274,105	3,912	3,251,819	3,908	3,250,119	.....	.....	4	1,700
	1890	11	2,897,100	52	45,377	1,530	914,539	1,499	907,201	17	5,860	14	1,478
Massachusetts	[2]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1890	3	58,750	3	1,250	84	26,602	84	26,602	.....	.....	.....	.....
New Jersey	1900	4	218,990	8	6,826	230	163,245	230	163,245	.....	.....	.....	.....
	1890	12	967,923	22	16,288	1,082	720,184	1,048	717,104	.....	.....	34	3,080
New York	1900	7	334,035	11	15,160	228	164,291	226	163,979	.....	.....	2	312
	[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio	1900	7	2,039,134	25	22,570	477	376,006	477	376,006	.....	.....	.....	.....
	[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	1900	46	14,661,120	307	435,015	6,459	4,706,720	6,368	4,679,801	20	4,901	71	22,018
	1890	28	9,715,850	104	145,152	5,399	3,258,692	5,172	3,192,078	50	14,783	177	51,881
All other states[3]	1900	9	2,283,428	40	58,807	596	367,592	592	366,463	.....	.....	4	1,129
	1890	46	4,718,953	111	130,045	3,887	2,239,886	3,830	2,230,980	.....	.....	57	8,906

STATES.	Year.	Miscellaneous expenses.	MATERIALS USED.									
			Aggregate cost.	Glass sand.		Soda ash (carbonate of soda).		Salt cake (sulphate of soda).		Nitrate of soda.		Limestone.	
				Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.
United States	1900	$1,365,865	$4,679,084	177,966	$298,879	25,500	$338,584	52,789	$512,835	614	$9,262	60,274	$106,540
	1890	1,069,545	4,621,535	167,792	352,904	22,715	718,098	85,624	561,398	76	3,605	38,912	117,690
Indiana	1900	348,665	1,319,675	59,746	102,019	8,037	106,883	14,158	180,018	50	1,875	18,911	31,987
	1890	297,127	510,845	18,785	47,481	2,567	79,137	4,409	55,970	.....	.....	6,467	15,577
Massachusetts	[2]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1890	2,112	32,921	958	2,626	210	6,560	157	4,710	.....	.....	195	450
New Jersey	1900	12,141	86,720	2,763	2,833	615	11,396	500	5,700	.....	.....	350	850
	1890	40,258	366,208	14,594	16,991	4,183	129,866	42	876	.....	.....	3,337	13,628
New York	1900	14,569	120,748	2,977	3,773	59	1,433	1,453	13,605	23	1,056	917	1,621
	[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio	1900	19,505	158,526	5,851	7,836	666	9,669	1,751	18,428	.....	.....	1,982	3,102
	[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	1900	867,168	2,697,041	95,176	172,003	13,206	168,022	34,239	286,548	541	6,331	34,910	62,380
	1890	391,847	2,236,396	71,085	190,178	7,017	240,799	20,036	342,947	.....	.....	18,193	60,734
All other states[3]	1900	103,817	296,374	11,453	10,415	2,917	41,181	688	8,536	.....	.....	3,204	6,600
	1890	338,201	1,475,170	52,370	95,678	8,738	261,736	10,980	156,895	76	3,605	10,720	27,401

[1] Includes proprietors and firm members, with their salaries; number only reported in 1900 but not included in this table. (See Table 13.)
[2] Included in "all other states."
[3] Includes establishments distributed as follows: 1900—Illinois, 1; Maryland, 2; Massachusetts, 1; Missouri, 2; West Virginia, 2; and Delaware, 1. 1890—Plate glass: Illinois, 2; Missouri, 2; New York, 1; and Ohio, 1. 1890—Window glass: Delaware, 1; Illinois, 3; Maryland, 4; Massachusetts, 1; Michigan, 1; Missouri, 1; New York, 8; and Ohio, 21.

TABLE 7.—COMPARATIVE STATISTICS, BUILDING GLASS: 1890 AND 1900—Continued.

STATES.	Year.	MATERIALS USED—continued.											
		Lime and quicklime.		Arsenic.		Manganese.		Grinding sand.		Rouge.		Fire clay and pot clay.	
		Cwt.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Tons.	Cost.	Pounds.	Cost.	Pounds.	Cost.
United States	1900	125,080	$12,315	1,321,130	$63,067	68,600	$2,316	263,933	$160,305	835,749	$24,448	23,510,700	$170,522
	1890	92,026	17,590	1,092,622	38,191	126,322	5,335	227,416	151,995	1,116,669	64,390	26,050,242	240,137
Indiana	1900	12,060	1,745	517,839	25,867	13,000	735	70,853	36,811	267,345	9,061	7,282,228	57,310
	1890	1,772	435	113,500	4,479	42,000	1,760	50,000	20,000	150,000	7,350	2,918,000	25,985
Massachusetts	[1]1900												
	1890	16	6	2,000	60	5,000	250					105,212	727
New Jersey	1900	72,922	2,373	5,085	280							196,840	2,148
	1890	14,050	5,613	11,724	403							1,057,500	14,653
New York	1900			40,552	2,066	1,200	63					288,750	2,438
	[1]1890												
Ohio	1900	3,150	482	105,243	4,875			6,800	2,040	14,900	723	1,603,910	4,749
	[1]1890												
Pennsylvania	1900	20,185	3,919	610,807	27,923	20,400	643	181,537	119,557	532,524	13,971	13,365,852	97,832
	1890	13,117	3,697	582,279	19,663	4,500	190	154,764	120,669	640,669	52,154	9,587,565	112,544
All other states[2]	1900	16,713	3,796	41,604	2,056	34,000	875	4,743	1,897	20,980	693	773,120	6,045
	1890	63,071	7,889	383,119	13,586	74,822	3,135	22,652	11,326	326,000	4,886	12,381,965	86,228

STATES.	Year.	MATERIALS USED—continued.									
		Pots (not including those made at works).		Fuel.						All other materials, cost.
				Total cost.	Natural gas, cost.	Oil.		Coal.		All other fuel, cost.	
		Number.	Cost.			Gallons.	Cost.	Tons.	Cost.		
United States	1900	3,830	$101,061	$1,119,022	$751,354	723,654	$23,161	269,611	$335,856	$8,651	$1,759,978
	1890	2,587	87,434	990,993	328,274	47,250	2,250	414,576	611,743	48,726	1,271,775
Indiana	1900	1,482	45,035	195,376	193,590	489	78	432	1,138	570	525,003
	1890	447	15,885	81,958	200			64,525	80,758	1,000	154,878
Massachusetts	[1]1900										
	1890	26	340	13,488				4,083	10,500	2,983	3,709
New Jersey	1900	65	1,300	30,343		133,414	4,070	12,406	24,905	1,368	29,497
	1890	159	4,445	119,741		47,250	2,250	33,581	101,198	16,293	60,087
New York	1900	332	10,395	42,741		54,171	2,742	20,769	37,450	2,549	41,557
	[1]1890										
Ohio	1900	336	9,110	35,772	11,212	113	25	28,593	24,323	212	61,740
	[1]1890										
Pennsylvania	1900	1,366	25,641	710,415	535,070	177,256	5,679	161,368	166,866	2,800	1,001,856
	1890	912	43,042	375,254	298,590			67,643	74,125	2,539	674,525
All other states[2]	1900	249	9,580	104,375	11,482	358,211	10,567	46,043	81,174	1,152	100,325
	1890	1,043	23,722	400,557	29,484			244,744	345,162	25,911	378,576

[1] Included in "all other states."

[2] Includes establishments distributed as follows: 1900—Illinois, 1; Maryland, 2; Messachusetts, 1; Missouri, 2; West Virginia, 2; and Delaware, 1. 1890—Plate glass: Illinois, 2; Missouri, 2; New York, 1; and Ohio, 1. 1890—Window glass: Delaware, 1; Illinois, 3; Maryland, 4; Massachusetts, 1; Michigan, 1; Missouri, 1; New York 8; and Ohio 21.

TABLE 7.—COMPARATIVE STATISTICS, BUILDING GLASS: 1890 AND 1900—Continued.

STATES.	Year.	PRODUCTS. Building glass. Total value.[1]	Window. Boxes.	Window. Value.	Plate. Total cast. Square feet.	Plate. Rough, sold. Square feet.	Plate. Rough, sold. Value.	Plate. Polished plate made. Square feet.	Plate. Polished plate made. Value.	Plate. Cathedral. Square feet.	Plate. Cathedral. Value.	All other products, value.
United States	1900	$17,096,284	4,341,282	$10,879,365	34,758,994	628,684	$75,887	16,883,578	$5,158,598	8,846,361	$567,252	$415,142
	1890	13,928,296	3,768,884	9,037,187	[2]19,319,509	3,106,831	337,057	9,100,111	4,172,484	2,773,824	279,407	102,161
Indiana	1900	5,711,948	1,701,729	4,176,587	8,553,338	31,917	4,780	5,177,160	1,415,224	.....	.....	15,000
	1890	1,831,745	360,114	885,745	2,383,793	100,000	20,000	1,758,248	886,000	.....	.....	40,000
Massachusetts	[3]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1890	72,748	.....	.....	569,375	434,150	59,025	.....	.....	.....	.....	13,723
New Jersey	1900	274,011	124,541	267,611	.....	.....	.....	.....	.....	.....	.....	6,400
	1890	1,316,170	622,432	1,295,100	.....	.....	.....	.....	.....	.....	.....	21,070
New York	1900	346,790	89,522	243,085	.....	.....	.....	.....	.....	.....	.....	57,011
	[3]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio	1900	671,422	200,854	519,187	.....	.....	.....	.....	.....	.....	.....	.....
	[3]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	1900	9,213,545	2,068,340	5,301,131	19,546,674	579,905	68,032	10,877,250	3,441,734	.....	.....	331,648
	1890	6,406,924	1,430,455	3,648,577	9,024,273	515,177	82,282	5,849,519	2,676,115	.....	.....	.....
All other states[4]	1900	878,518	156,296	371,754	6,658,482	16,862	3,075	829,168	301,640	8,846,361	567,252	5,083
	1890	4,300,709	1,355,883	3,207,765	7,342,068	2,057,504	175,800	1,492,344	610,369	2,773,824	279,407	27,368

STATES.	Year.	EQUIPMENT AND CHARACTERISTICS OF WORKS. Furnaces, number.	Pots, number.	Tanks.[5] Number.	Tanks.[5] Pot capacity.	Flattening ovens, number.	Monkey ovens, number.	Casting tables, number.	Annealing ovens, number.	Clay-grinding mills, number.	Grinding machines, number.	Polishing machines, number.	Horses and mules, number.	Wagons, carts, and drays, number.
United States	1900	193	2,296	48	1,430	285	2	100	869	63	227	294	92	93
	1890	195	2,024	.....	.....	135	19	62	542	75	123	214	220	187
Indiana	1900	82	825	13	552	116	.....	17	258	22	61	86	14	13
	1890	27	333	.....	.....	13	2	8	172	9	39	50	22	21
Massachusetts	[3]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1890	6	22	.....	.....	.....	.....	6	21	.....	.....	.....	3	3
New Jersey	1900	3	24	3	72	6	.....	.....	.....	3	.....	.....	6	7
	1890	24	188	.....	.....	22	1	.....	.....	9	.....	.....	27	28
New York	1900	9	65	.....	.....	5	.....	5	5	6	3	.....	5	3
	[3]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio	1900	13	162	2	66	12	.....	3	23	3	12	10	3	2
	[3]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	1900	66	1,014	29	731	138	.....	57	485	23	129	174	47	52
	1890	61	750	.....	.....	45	9	16	245	22	59	114	93	60
All other states[4]	1900	20	206	1	9	8	2	18	98	6	22	24	17	16
	1890	77	731	.....	.....	55	7	32	104	35	25	50	75	75

[1] While the total value for the respective states is the total value of products reported for all classes of the building glass manufacture, this total can not be obtained by adding the amounts given, as the reports of certain products have been suppressed to avoid disclosing the operations of individual establishments.
[2] Includes 4,338,743 square feet of skylight, ribbed glass, opalescent glass, etc.
[3] Included in "all other states."
[4] Includes establishments distributed as follows: 1900—Illinois, 1; Maryland, 2; Massachusetts, 1; Missouri, 2; West Virginia, 2; and Delaware, 1. 1890—Plate glass: Illinois, 2; Missouri, 2; New York, 1; and Ohio, 1. 1890—Window glass: Delaware, 1; Illinois, 3; Maryland, 4; Massachusetts, 1; Michigan, 1; Missouri, 1; New York, 8; and Ohio, 21.
[5] Not reported in 1890.

Of the 124 establishments reporting for 1900, 13 manufacture polished plate glass, 9 of which also make skylight; 11, rough, rolled, or ribbed glass, cathedral, wire, or skylight glass, or glass tiling and no plate glass; and 100, window glass.

Plate Glass.—The plate-glass establishments are located as follows, by states: 8 in Pennsylvania; 3 in Indiana; and 1 each in Missouri and Ohio. The total capacity of these plants is 53 furnaces with 1,100 pots, having an estimated capacity of 31,866,000 square feet a year. However, only 696 pots were active during the census year, casting 21,172,129 square feet of glass, 16,883,578 square feet of which were polished, and 628,684 square feet sold as rough glass. In 1900, 85.5 per cent more polished plate glass was made than in 1890, while the prices at which it sold were 33.3 per cent under those of 1890. In 1876, three years after the first substantial success in the manufacture of polished plate glass in the United States, the domestic production was about 600,000 square feet, and importations for consumption were 4,628,439 square feet, indicating a total plate-glass consumption in the United States of 5,228,439 square feet, against sales of foreign and domestic glass in 1900 of about 18,000,000 square feet, the imports of plate glass for consumption for the year amounting to 1,064,079 square feet.

After abortive attempts to successfully manufacture polished plate glass in this country, at Cheshire, Mass., in 1852–53, and at Lenox Furnace, Mass., in 1855–1871,[1] the first successful production of polished plate glass occurred at the plant at New Albany, Ind., built in 1869 by Capt. J. B. Ford, and operated after 1872 by W. C. DePauw. Not until 1873 did the plant succeed in producing polished plate glass, and Mr. De Pauw stated[2] that not until 1879 was it possible to produce the glass at a profit. This plant was dismantled at some time during the last decade because of unfavorable location and obsolete equipment. The manufacture of polished plate glass was commenced at Crystal City, Mo., in 1875, by the American Plate Glass Company, which company was reorganized the following year by the Hon. E. A. Hitchcock as the Crystal City Plate Glass Company, and has continued in successful operation since, the plant now being owned by the Pittsburg Plate Glass Company, which owned 10 of the 13 establishments reported in 1900. When Captain Ford left New Albany in 1872,[3] he at once located a plant at Louisville, Ky., leaving there in 1875, and starting a plant at Jeffersonville, Ind. These 4 establishments were the ones reported at the census of 1880.

The large profits made by these establishments caused a boom in plate glass factory erection, which was further stimulated by the discovery of gas in Indiana about 1890, the success of natural gas in the manufacture of plate glass having been demonstrated in the factory built by Captain Ford at Creighton, Pa., in 1883. In 1893 Hon. E. A. Hitchcock stated before the Ways and Means Committee of the House of Representatives that there were 12 establishments manufacturing polished plate glass, located at Creighton, Tarentum, Charleroi, Ford City, Butler, Duquesne, and Irwin, in Pennsylvania; New Albany, Elwood, Kokomo, and Alexandria, in Indiana; and Crystal City, Mo. These establishments manufactured plate glass largely in excess of the consumption, and a period of low prices followed, that led, in 1895, to the consolidation of eight establishments under the head of the Pittsburg Plate Glass Company. The outside establishments were the DePauw, at New Albany, Ind.; the American, at Alexandria, Ind.; the Standard Plate Glass Company, at Butler, Pa.; and the Penn Plate Glass Company, at Irwin, Pa. The plant at New Albany was soon abandoned and that at Alexandria was closed, but on the burning of the factory at Irwin about two years ago, the Penn Plate Glass Company secured the factory at Alexandria, Ind., and now operates it as the American Plate Glass Company.

In 1897 the Marsh Plate Glass Company erected a plant at Walton (now Floreffe), Pa., to manufacture thin plate glass under the patents of George Marsh, which substituted a table for holding the plate by a vacuum process in place of plaster of paris, during the grinding and polishing. The Marsh Company claimed to be able to successfully manufacture polished plate glass in all popular glazing sizes as thin as one-sixteenth of an inch, and by their improved table and system of holding the glass, to practically eliminate all breakage. Before this claim was fully demonstrated, the plant was bought by the Pittsburg Plate Glass Company, and has since been used largely as an experimental factory. Experiments in the manufacture of thin plate glass are also being tried at the plant of the Pittsburg Company at Ford City, Pa. The Marsh Company was the first to successfully introduce the continuous lehr for annealing plate glass, a process that promises to soon displace the slower and more expensive annealing kiln system. A factory was erected near Toledo, Ohio, by the Edward Ford Plate Glass Company in 1900, which was in operation only six months during the census year. This factory is equipped with a continuous lehr, and in the extensive use of electricity as motive power is an innovation.

The principal improvement in plate glass manufacture during the last decade was undoubtedly the successful introduction of the annealing lehr, as noted above, at the plant of the Marsh Plate Glass Company, at Walton, Pa. Although its introduction into the older plants has so far been slow, owing to the expense attending the abandonment of the costly kiln system in use at those plants, yet competition will soon have the effect of bringing the lehr into general use. Previous to the introduction of the lehr, the annealing

[1] Tenth Census of the United States, Report on Glass Manufacture; by Joseph D. Weeks, Special Agent, page 98.
[2] Ibid., page 99.
[3] Ibid., page 99.

of plate glass was done in practically the same manner as at the commencement of the industry in this country. As soon as the cast is made the plate is introduced into the annealing oven or kiln, a large, shallow, reverberatory furnace of brick, on the smooth floor of which the plate is laid. The kiln being heated to near the melting point and all openings tightly closed, it is allowed to cool gradually to a point where it is opened and the plate removed, the process requiring fully three days.

The plate glass annealing lehr averages about 200 feet in length, and starts from the casting table as a continuous, connected series of five kilns, after which it is the usual rod lehr common in window glass manufacture. The five stations at the start are on a solid hearth of especially prepared clay, giving an absolutely smooth, level bed. The whole interior of the lehr is brilliantly lighted by electricity, and the heat at any point can be controlled with the utmost nicety by the use of pyrometers. After the cast is made the plate is introduced into the first station of the lehr, where the temperature is near the melting point. In due time the plate passes into the second station, where the temperature is lower. So the plate passes through the five stations with a diminishing temperature. When the plate leaves the fifth station, it has become thoroughly "set," and passes to the rod lehr, which carries it along through decreasing temperatures until, three hours after the cast was made, the annealing process is complete, and the plate is taken out of the lehr ready for the grinding process. The time required to anneal a plate under the lehr system, compared with that under the kiln system—three hours as against three days—indicates the revolutionizing possibilities of the lehr, when cost of construction is also taken into consideration. A lehr that will anneal the product of 96 pots, or 96 plates of glass a day, costs about $20,000 to build, and displaces 96 old-style three-plate kilns, which cost about $1,000 each to build. The lehr takes up far less space than does the kiln system, and the building required for the lehr costs about $6,000, as against $30,000 for the construction of the proper building for the 96 kilns it would displace.

With the lehr, smaller pots are used and thinner and smaller plates cast, resulting in a great increase in the average size of the finished plate, as the smaller the original cast, the better are the chances for the plate going through the annealing, grinding, and polishing processes successfully without diminution of size. The lehr-annealed plate, is much straighter than that annealed in the kiln, owing to the solid hearth of the first five stations of the lehr; the floor of the kiln is much more liable to develop inequalities which misshape the plate. The thinness of the lehr-annealed plate means less time spent in grinding, and the smaller size of the rough plate, makes it possible to lay and relay the lehr-annealed plate on the grinding and polishing tables, much quicker, and with less labor, than the kiln-annealed plate.

H. L. Dixon, the well-known glass furnace engineer, asserts that 90 per cent of the polished plate glass manufactured can be annealed in the lehr, the remaining 10 per cent being glass in extremely large sizes, requiring the old style kiln. He is convinced that it is only a question of time until the very largest sizes can be annealed in the lehr. It is claimed that actual practice has shown that the average size of the lehr-annealed glass, cast from small pots, is 90 square feet per plate when squared, while under the kiln system, with large pots and the attempt to continually cast extreme sizes, the average size of the plate taken from the kiln and squared is about 60 square feet, and when finished, about 18 square feet. In addition to the lehr at Floreffe, Pa., the Pittsburg Plate Glass Company reported 3 lehrs at Ford City, Pa., 2 of the 3 being for large sizes and the third for small sizes of about 50 to 60 square feet. The Ford Plate Glass Company, near Toledo, Ohio, report 1 lehr that is said to operate successfully on sizes of 50 to 60 square feet. At Alexandria, Ind., the American Plate Glass Company have a lehr which is said to be working satisfactorily with plates from 75 to 80 square feet.

As is often the case with important inventions, the successful introduction of the lehr in plate glass manufacture came, not from experts, but from novices in the plate glass business, who carried it to success, while the plate glass manufacturers greeted it with derision and declared it impossible. Henry Fleckner, a veteran window glass factory manager of Pittsburg, was the man who first operated the lehr with success at Walton, and the successful operation of the lehrs at Ford City and Toledo, is said to be largely due to Eugene Morenus, a window glass factory manager, and Ralph Gray, a manufacturer of skylight glass.

In addition to the lehr, the Marsh Plate Glass Company at Walton introduced, in the Marsh patent table, the idea of reducing the temperature of the glass while being ground and polished, by the circulation of a constant flow of water under the table. This cooling device, which permits the operation of the grinders and polishers at a much higher speed, has been installed in several foreign factories by Mr. Marsh, and will no doubt soon be put into use in this country. The transfer tables introduced at Ford City, Pa., in the last decade, have added considerably to the rapidity and ease of production, as has also the extended use of electricity as a lifting and motive power. Prior to the adoption of the transfer table, the grinding and polishing tables were stationary, and after one side of the plate had been ground and polished, it was necessary to remove it from its bed of plaster to continue the process. The transfer table is movable from grinder to polisher, thus making it possible to grind and polish one side of a plate without turning it, effecting a great saving in time and decreasing the loss by breakage attending the operation of moving the plate from its bed of plaster of paris.

President John Pitcairn, of the Pittsburg Plate Glass Company, testified[1] before the subcommission of the United States Industrial Commission, at Philadelphia, Pa., December 22, 1900, that since the inception of the plate glass industry in this country, the tendency of prices has been downward, except during 1900, when prices were increased, as a result of an average increase in the cost of raw materials of about 85 per cent, increased cost of manufacture, owing to the diminution of the gas supply, and the substitution of coal, and a better understanding among the manufacturers. He submitted the following table of prices, at periods of five years from 1875 to 1900:

SQUARE FEET.	1875	1880	1885	1890	1895	1900
1 to 3	$0.71	$0.51	$0.46	$0.40	$0.30	$0.31
3 to 5	0.84	0.61	0.55	0.48	0.36	0.38
5 to 10	1.12	0.80	0.72	0.64	0.48	0.60
10 to 25	1.49	1.06	0.96	0.85	0.63	0.81
25 to 50	1.56	1.11	1.01	0.89	0.66	0.85
50 to 100	1.69	1.21	1.09	0.97	0.72	0.90

During 1897, overproduction resulted in a demoralized condition of the industry, and prices were very low. The advance in prices from that time to 1900 was estimated by Mr. Pitcairn to amount to from 50 to 60 per cent. According to the same authority, about two-thirds of the American plate-glass production is sold in sizes under 10 square feet and without profit, a very large part of this two-thirds being sold at a loss. This glass comes into competition with the imported German looking-glass plate, which is blown, ground, and polished, and imported largely into this country to be silvered and used in cheap mirrors. For several years the American plate-glass manufacturers have been meeting this glass, and by a special arrangement with the manufacturers of furniture and mirrors, have succeeded in displacing it with domestic plate glass of a better quality, at prices less than the cost of production. Since 1895 the bulk of the American polished plate glass has been sold direct to the consumer, the Pittsburg Plate Glass Company having established jobbing houses in nearly a score of the large cities, in which branch of the business $4,044,000 was invested in 1900.

For years and with but slight interruptions, the plate-glass manufacturing interests of Europe have been closely allied as to regulation of prices and adjustment of production. As the business of the plate-glass industry in the United States has never been extended beyond the home market, cooperation on that account has not been considered valuable by the European interests; hence, this market has been a "dumping ground" for the surplus European production, and exceptionally low prices have been made on foreign glass for the United States. During the census year prices on stock sizes of European polished plate glass were 36 per cent lower for the United States than for England, while polished plate glass imported into the United States from France, averaged only about 50 per cent of the prices quoted in that country. The fact that the European surplus is placed in this market at a price below average cost, accounts for the heavy importations of polished plate glass. In face of this the domestic production in 1900 increased 85.5 per cent over that of 1890, evincing the steady acquisition of the home market for the domestic product. The production of polished plate glass in Europe in 1900 was given by Mr. Pitcairn in his testimony, in the following table, which shows the regulation of production by giving the productive capacity, and the actual output of the several factories:

NAMES OF COMPANIES.	Producing capacity, square feet.	Actual output, square feet.
Belgium:		
Auvelais	5,000,000	2,500,000
St. Roch	5,000,000	2,500,000
Moustier	3,300,000	1,600,000
Charleroi	2,900,000	1,400,000
Oignies	2,200,000	1,100,000
Courcelles	2,100,000	1,100,000
Roux	1,900,000	1,100,000
Floreffe	1,500,000	700,000
St. Gobain	800,000	400,000
Total, 9 factories	24,700,000	12,400,000
France:		
St. Gobain (4 factories)	7,500,000	3,800,000
Nord	3,700,000	1,800,000
Aniche	1,700,000	1,400,000
Boussoit	1,600,000	.....
Assevent	800,000	800,000
Total, 8 factories	15,300,000	7,800,000
Germany:		
Stolberg and Mannheim	4,700,000	2,400,000
Eckamp	2,600,000	1,300,000
Schalke	2,000,000	1,000,000
Herzogenrath	1,900,000	1,000,000
Perz-Urbach	1,600,000	.....
Frieden	1,200,000	600,000
Altwasser	700,000	300,000
Total, 8 factories	14,700,000	6,600,000
England:		
Pilkington Brothers	.....	4,200,000
London and Manchester	.....	2,300,000
British	.....	900,000
Union	.....	500,000
Total, 4 factories	[1] 7,900,000	7,900,000
Austria:		
Stankau	.....	.....
St. Gobain (Bilen)	.....	.....
Total, 2 factories	[1] 2,300,000	1,100,000
Russia:		
Nord	.....	1,100,000
LaKash	.....	700,000
Moscow	.....	700,000
Midi	.....	700,000
Total, 4 factories	[1] 3,200,000	3,200,000
Italy:		
Pisa (St. Gobain Company)	800,000	800,000
Grand total	68,900,000	39,300,000

[1] Producing capacity of each factory not reported separately.

The average wages paid in plate glass manufacture in the United States, during the year 1900, was estimated by Mr. Pitcairn to be about 200 per cent higher than in England, and about 300 per cent higher than in Belgium. In support of the latter claim he presented the following table, giving a comparison of American and

[1] Report of the Industrial Commission, Vol. XIII, Trusts and Industrial Combinations, pages 225 to 242.

Belgian wages in the plate glass industry in 1900, the Belgian figures being compiled by the European representative of the Pittsburg Plate Glass Company:

	American rate per month, 30 days.	Belgian rate per month, 30 days.	Per cent American higher than Belgian.
Casting department:			
Foremen	$150.00	$96.50	56.0
Finishers	92.10	28.95	218.0
Melters	82.50	28.95	185.0
Skimmers	70.50	28.95	144.0
Stowers	70.50	28.95	144.0
Furnace cleaners	60.00	20.26	196.0
Kiln dressers	69.00	20.26	241.0
Casting and drawing	57.00	20.26	181.0
Cutters	86.40	20.26	326.0
Fillers	57.00	20.26	181.0
Bookers	57.00	20.26	181.0
Teamers	90.00	28.95	211.0
Kiln heaters	54.00	17.37	211.0
Grinding department:			
Foremen, day	121.20	28.95	318.0
Foremen, night	121.20	28.95	318.0
First grinders	82.80	23.16	257.0
Second grinders	68.40	23.16	195.0
First layers	99.00	23.16	327.0
Second layers	68.40	9.65	609.0
Canal men	52.20	20.26	158.0
Sandpit men	52.20	20.26	158.0
Matchers	71.00	20.26	250.0
Sand wheelers	52.20	20.26	158.0
Polishing department:			
Foremen, day	121.20	34.74	250.0
Foremen, night	121.20	34.74	250.0
First layers	111.60	23.16	382.0
Second layers	95.76	23.16	313.0
Third layers	90.00	23.16	289.0
Fourth layers	79.36	23.16	243.0
Mixers	78.12	17.37	350.0
Plaster wheelers	45.00	20.26	122.0
Matchers	72.00	20.26	255.0
Finishers	54.72	20.26	255.0
Bench boys	39.60	8.40	371.0
Warehouse:			
Foremen	150.00	40.00	275.0
Examiners	75.00	20.26	270.0
Cutters	67.50	20.26	233.0
Gang men	42.00	17.37	141.0
Blockers	45.00	17.37	159.0
Glass washers	37.50	17.37	116.0
Frames:			
Foremen	80.00	30.00	166.0
Examiners	60.00	28.95	108.0
Cutters	63.00	28.95	180.0
Gang men	60.00	20.24	196.0
Emery department:			
Washer	60.00	34.74	73.0
Washer, helper	50.00	17.37	187.0
Machinery department:			
Foremen	150.00	43.42	245.0
Engineers	63.00	25.50	147.0
Machinists	97.50	26.05	274.0
Carpenters	80.00	23.16	245.0
Bricklayers	90.00	23.16	289.0
Laborers	37.50	17.37	116.0
Pipe fitters	67.50	24.00	181.0
Blacksmith	79.50	24.12	230.0
Blacksmith, helper	45.00	17.37	159.0
Boiler men	60.00	25.50	135.0
Pot department:			
Foremen	90.00	28.95	211.0
Pot makers	70.50	28.95	144.0
Tampers	51.10	18.33	179.0
Gas producers:			
Foremen	85.00	28.95	194.0

About 66 per cent of the wage-earners in the plate-glass industry are native Americans. At the commencement of the industry in the United States it was necessary to get foreign workmen of experience, but the American is so much quicker to learn and is so much more steady, that he is preferred at present.

All of the improvement made in the manufacture of plate glass in this country during the last twenty-five years, aside from some details in the construction of machinery, has been for the purpose of increasing the size of the plates cast and improving the quality of the glass. Until very recently the same methods have been employed for casting, annealing, grinding, and polishing that have been in use for years. The liability of breakage during the finishing process that has attended the attempts to cast extremely large-sized plates, has resulted in a very great reduction in the average size of finished plates. The use of smaller pots, casting smaller and thinner plates for annealing in lehrs, and the adoption of new machinery for grinding and polishing, will undoubtedly result in a considerable decrease in the cost per square foot, and an increase in average size of finished plates, along with a material decrease in undesirable small sizes. A few large pots will be sufficient to supply the demand for extremely large sizes. In the manufacture of plate glass, the use of tank melting furnaces in connection with fining-pot furnaces, is likely to appear in the near future, and the size of the plates cast can then be regulated at will. The possibilities of such a process in connection with the continuous lehr, can scarcely be estimated. The introduction of the continuous lehr, has largely reduced the high ratio formerly existing between cost of construction and capacity of plate-glass factories, and has already resulted in the entrance of 6 new companies, into the field; 4 of the projected factories being in Pennsylvania, and 1 each in Michigan and Illinois.

Cathedral Glass.—There were 8,846,361 square feet of cathedral glass manufactured in 1900, valued at $567,252, compared with 2,773,824 square feet in 1890, valued at $279,407, an increase in quantity of 218.9 per cent, and in value of 103 per cent. The quality of this product has been brought to such perfection, that not only has the domestic market been largely supplied, but a good export trade has been developed with Germany, England, and France. The superiority of colors is increasing the demand for American cathedral or opalescent glass, from the leading foreign art centers. During the census year, 4 establishments in New York, Indiana, and Illinois reported export shipments direct from factories to the value of $13,432.

Wire Glass.—The manufacture of wire glass has been established in the United States on a firm basis during the last decade, and it is probable that this branch of the building glass industry will reach large proportions in the next few years. The quantity manufactured during the census year was 1,295,504 square feet, valued at $129,051. During the year several shipments were made to England, but exact details could not be secured. The industry is yet in its infancy. Wire glass, which is made by casting two sheets of glass with a wire net imbedded between them, has been recognized as a perfect fire retardent, especially adapted for partitions, fire shutters, skylights, and glazing in all places subject to the stress of fire or storm. It is manufactured by 4 establishments, 3 in Pennsylvania and 1 in Missouri.

Skylight Glass, etc.—Although no statistics of skylight glass are shown in the report on glass manufacture at the Eleventh Census, it can be stated that the manufacture of this product has considerably increased, reaching 3,679,694 square feet, valued at $165,086, in 1900.

Nearly all the plate-glass establishments make a specialty of its manufacture and 3 separate establishments produce it almost exclusively. The export trade in this glass is developing in an encouraging manner. The production of bent glass, for store fronts, show cases, etc., is becoming a prominent feature in connection with the production of plate glass, and there are several establishments, in addition, exclusively engaged in this business, which obtain the plate and window glass sheets from the factories and rework them, so are not included in this report. Of the 9 bending ovens included in this report, 5 are in Indiana and 4 in Pennsylvania. Within a few years the manufacture of glass tile has been introduced in this country on an extensive scale. One establishment is making it exclusively, while several others report it as a side line. Its use as a perfect sanitary wall, ceiling, and floor material gives promise of a large growth in this branch of glass manufacture.

Window Glass.—During the last decade a very great improvement has been made in the manufacture of window glass in the United States. This has been brought about by the introduction of the continuous tank furnace for melting the crude materials, in preference to the pot furnace which had been used exclusively since the start of the industry in this country in the early colonial days. Separate statistics of tank furnaces are not shown in the report on glass manufacture at the census of 1890, the tank prior to that date being largely an experiment in this country and in such limited use as to be deemed unworthy of special note at that census. At that time, however, the tank furnace was in successful use in Europe, especially in Belgium. The successful introduction of the tank furnace in the United States occurred at Jeannette, Pa., in 1888, and from 1890 it has been steadily displacing the pot furnace, until in 1900, 54.5 per cent of the capacity of active window-glass factories was contained in tank furnaces. The adoption of the tank has given the window-glass industry a permanency that was lacking when pot furnaces were used exclusively, and when the cost of construction was not great enough to prevent the ready abandonment of a plant for a more avantageous location. While the tank melting system is much more economical than the pot-furnace system, the cost of installation and other factory equipment is much greater. As a result the location of the tank factory is more apt to be selected with respect to permanency than is the case with the pot-furnace factory. The operation of tank furnaces by gas produced from coal has proven very satisfactory, both as to the quality of glass produced and cheapness of cost, indicating, in view of the failing supply of natural gas, the fuel likely soon to be in most general use.

The census year covered a portion of a period of great activity in window glass factory construction on a large and permanent scale, an activity possibly the greatest in the history of the industry. For several years prior to 1900 the establishments operating the largest proportion of the capacity had been getting into closer relations as to regulation of prices and factory operation, resulting in the more or less constant maintenance of an exceptionally good price list. These high prices attracted new capital into the field, and during the census year there were over 30 factories reported which were built within two years. At the close of the census year about 30 window-glass factories were either building or definitely planned, notwithstanding the fact that during the year a close combination of establishments, controlling about 65 per cent of the total capacity, had been effected and prices had been sharply cut to discourage further erection of factories.

In 1900 there were 100 establishments reported as manufacturing window glass, an increase of 19 per cent over the number reported in 1890, and 104.1 per cent over the number reported in 1880. Only 19 more melting furnaces were reported in 1900 than were reported in 1890, but, owing to the greater capacity of the tank, the gain in total pot capacity was 87 per cent. In 1900 there were 165 melting furnaces reported, with a total capacity of 2,429 pots; 146 furnaces of a total capacity of 1,299 pots in 1890; and 76 furnaces with a capacity of 665 pots in 1880; showing a gain since then of 117.1 per cent in number of furnaces, and 265.3 per cent in pot capacity. In 1900 the production was 4,341,282 boxes, valued at $10,879,355; in 1890, 3,768,884 boxes, valued at $9,058,802; and in 1880, 1,864,734 boxes, valued at $5,047,313. There is indicated an increase of 15.2 per cent for 1900 over 1890 in the number of boxes produced, and an increase of 20.1 per cent in the total value of products. Compared with 1880, the number of boxes produced in 1900 increased 132.8 per cent, and the total value of product increased 115.5 per cent. The average value of a box of window glass (50 square feet), according to the census returns in 1900 was $2.51; in 1890, $2.40; and in 1880, $2.71.

Of the 165 furnaces with a total capacity of 2,429 pots reported in 1900, 36 were tank furnaces of a total capacity of 1,327 pots and 129 were pot furnaces that contained 1,102 pots, a decrease from the number of pot furnaces and their total capacity as reported in 1890, of 11.6 per cent and 15.2 per cent, respectively. The great increase in capacity in 1900 over 1890 is confined entirely to the tank furnace, but the total production of 1900 compared with 1890 is not in keeping with this increase, owing to the greatly restricted operation of the factories in 1900, due to a "fire" averaging about six months as against a "fire" of ten months in 1890.

The distribution of the window glass capacity of active establishments in furnaces and pot capacity for

1900 is shown in the following statement, by states, in the order of their importance in capacity:

STATES.	Number of establishments.	Total number of furnaces.	Total pot capacity.	Number of tank furnaces.	Pot capacity.	Number of pot furnaces.	Number of pots.
United States.	100	165	2,429	36	1,327	129	1,102
Indiana	46	83	1,109	17	601	66	508
Pennsylvania	32	48	960	14	588	34	372
Ohio	6	10	128	2	66	8	62
New Jersey	4	6	96	3	72	3	24
New York	5	5	40	.....	.....	5	40
Maryland	2	5	28	.....	.....	5	28
West Virginia	2	3	22	.....	.....	3	22
Delaware	1	2	16	.....	.....	2	16
Massachusetts	1	2	18	.....	.....	2	18
Illinois	1	1	12	.....	.....	1	12

The bulk of the capacity of Indiana was in the counties of Grant, Blackford, Madison, Delaware, and Jay, located in the "gas belt." The capacity in Pennsylvania was largely confined to the Pittsburg district and McKean county. The Ohio plants were at Barnesville, Lancaster, Findlay, and Quaker City. The largest proportion of the capacity located in New Jersey was in Cumberland county. In New York there were 5 factories, 3 of which were in Ithaca, and 1 each in Canastota and Durhamville. The 2 factories in Maryland were located in Baltimore. There was 1 factory in Delaware, located at Wilmington. The only plant in Massachusetts, which was originally established in 1853, was at Berkshire. About 75 per cent of the total capacity was controlled from Pittsburg, Pa., the headquarters of the American Window Glass Company, and about ten other companies. The former owned 39 plants during the census year.

At the close of the census year there was either building or definitely planned new capacity amounting to over 600 pots. Over 100 of these new pots were located in West Virginia; nearly 250 in the district of McKean county, Pa.; about 75 in the coal fields of Illinois and Indiana; 75 in southern New Jersey; and about 75 in the "gas belt" of Indiana.

One feature of the manufacture during the census year was the notable scarcity of skilled workmen. This scarcity, together with the increase in the capacity of the plants, made the total capacity greatly exceed the supply of skilled workmen available for its operation in the four divisions of the work, gathering, blowing, flattening, and cutting. The supply of workmen was about sufficient to operate 2,000 pots, and owing to the strong organization of the men and their strict rules of admission, no considerable relief was possible. The result was that the skilled workmen dominated the industry as seldom before in the history of the trade. The wage scales were the highest in years, and most profitable inducements were offered in addition by manufacturers to secure men for their plants. Every window-glass factory in the country operates under union rules, and the wage scales are settled for each "fire" at conferences of committees representing the manufacturers and the union.

The 5 companies of a "miscellaneous" character shown in Table 13 were all cooperative and engaged in the manufacture of window glass, most of them having been established within the census year, and were financially supported by the union, which loaned money proportioned on the pot capacity of each plant. There were 2 establishments of this character reported in the pressed and blown ware and bottle and jar branch of the industry. It should be stated, in this connection, that there were in the glass industry in addition 9 incorporated establishments of a cooperative character operating under charters, which in all the tables are included under the head of corporations. They are in all essential particulars cooperative associations. This movement toward cooperation arose from the desire to secure more work during the year, the capacity of the factories having been for some time so much in excess of current consumption that the "run" of the factories had been getting less each year, averaging about six months where it was formerly ten. The past record of cooperation in the window glass industry of the United States has been unsatisfactory, all going well as long as the market conditions were good, but financial ruin usually appearing with any depression in the trade. The indications at present are very favorable for cooperative manufacture, and it will probably spread very rapidly in the industry in the near future. The greatest impetus it receives comes from the scarcity of workmen, which is leading manufacturers to organize companies in which a large share of the stock is held by the workmen, who are thus less likely to be tempted away by offers from other manufacturers.

Along with these quasi-cooperative companies many real cooperative companies, composed entirely of the men in the factory, are being established, especially among the Belgian workmen, who form a considerable proportion of the entire working force. The window-glass workers compose the only body of organized workmen in the building-glass manufacturing industry of this country, there being no organization among the plate-glass workers, from whom very little skill is required, machinery doing practically all the work in the factory.

The question of machinery is beginning to agitate the window-glass industry. So far, practically the entire process of manufacture requires skilled hand labor. The growing scarcity of workmen has stimulated efforts to perfect a mechanical process which will do the work now done by the gatherer and blower, and it is probable that eventually the smaller sizes of window glass will be successfully manufactured by machinery.

The average normal consumption of window glass in the United States is estimated at 5,400,000 boxes a year. A considerable portion of this demand is supplied by imported glass, chiefly from Belgium. This market

has for years received the surplus window glass of that country, and any advance in American prices at once results in increased importations. The 50-foot box of single strength foreign glass weighs about sixty-two and one-half pounds, and the 50-foot box of double strength, about ninety-two and one-half pounds. In reducing the number of pounds of imported glass to boxes, the average weight of a box is placed at 70 pounds, and it is estimated that 25 per cent of the total glass imported is double strength. The total importation of window glass for the year ending June 30, 1900, was 51,343,339 pounds, or 733,476 boxes, valued at $1,555,924. There were imported 47,202,267 pounds in 1899; 38,908,992 pounds in 1898; 55,961,813 pounds in 1897; 53,182,301 pounds in 1896; 40,786,279 pounds in 1895; 52,437,068 pounds in 1894; 63,715,989 pounds in 1893; 72,682,127 pounds in 1892; 58,932,738 pounds in 1891; and 73,112,550 pounds in 1890. A strike, which was threatened in the Belgian factories at the close of 1900, caused a sharp decrease in the importation of window glass in 1901. The quantity imported during the year ending June 30, 1901, was 27,285,607 pounds.

The American window glass exported during the year ending June 30, 1900, was valued at $36,218, and in 1899 at $32,690. The domestic glass can not compete with the cheaper foreign glass, yet an increasing quantity of American window glass is going into Mexico, Canada, and the West Indies.

PRESSED AND BLOWN GLASS AND BOTTLES AND JARS.

Table 8 presents comparative statistics, by states, of the manufacture of pressed and blown glassware and bottles and jars, for 1890 and 1900.

TABLE 8.—COMPARATIVE STATISTICS, PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1890 AND 1900.

STATES.	Year.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.							
						Total.		Men, 16 years and over.		Women, 16 years and over.		Children, under 16 years.	
				Number.	Salaries.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.
United States	1900	231	$34,806,781	1,653	$1,980,393	40,916	$18,055,037	30,372	$15,901,620	3,509	$835,100	7,035	$1,318,317
	1890	194	22,613,274	[1]803	[1]894,449	32,910	13,726,058	24,431	12,472,386	1,818	311,652	6,661	942,020
Illinois	1900	5	2,143,658	71	106,600	3,291	1,615,786	2,594	1,491,391	148	28,456	549	95,939
	1890	8	1,353,978	28	40,210	2,291	937,515	1,747	871,420	20	3,860	524	62,235
Indiana	1900	59	5,694,974	285	375,122	9,103	3,974,228	7,002	3,557,923	634	129,808	1,467	286,497
	1890	10	659,468	27	30,305	1,480	554,610	1,184	514,903	180	21,951	166	17,756
Maryland	1900	5	479,534	28	36,576	657	275,354	477	249,756	54	8,673	126	16,925
	1890	5	371,205	10	9,768	762	358,783	448	317,005	24	6,864	290	34,914
Massachusetts	1900	4	255,949	38	27,660	375	179,329	331	169,891	19	4,392	25	5,046
	[2]1890												
New Jersey	1900	22	5,178,672	309	278,634	5,153	2,299,500	4,136	2,115,061	170	32,726	847	151,713
	1890	22	2,776,971	130	116,331	4,606	2,009,916	3,553	1,888,694	42	8,405	1,011	112,817
New York	1900	20	1,908,799	106	124,538	2,328	1,140,973	1,975	1,075,992	73	17,831	280	47,150
	1890	21	1,507,891	45	52,400	2,505	1,054,934	1,869	952,903	92	17,025	544	85,006
Ohio	1900	21	3,412,379	174	226,459	4,069	1,691,378	3,028	1,468,952	405	96,017	636	126,409
	1890	37	2,979,987	163	171,519	5,184	2,037,452	3,762	1,836,233	538	74,227	844	126,992
Pennsylvania	1900	78	13,626,067	535	675,368	12,961	5,580,771	8,768	4,658,460	1,526	409,349	2,667	512,962
	1890	71	10,743,199	320	378,488	13,111	5,469,828	9,652	4,898,848	699	139,956	2,760	431,024
West Virginia	1900	14	1,265,624	80	93,016	1,886	734,676	1,258	603,817	468	103,748	160	27,111
	1890	7	825,313	34	46,946	1,371	511,079	970	446,349	190	32,632	211	32,098
All other states[3]	1900	8	841,125	27	36,420	1,093	563,042	803	510,377	12	4,100	278	48,565
	1890	18	1,395,267	46	53,482	1,650	791,941	1,306	746,031	33	6,732	311	39,178

[1] Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See Table 14.)
[2] Included in "all other states."
[3] Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Georgia, 2; Kentucky, 2; Maryland, 2; Massachusetts, 2; Missouri, 2; Wisconsin, 1.

TABLE 8.—COMPARATIVE STATISTICS, PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1890 AND 1900—Continued.

STATES.	Year.	Miscellaneous expenses.	MATERIALS USED. Aggregate cost.	Glass sand. Tons.	Glass sand. Cost.	Soda ash (carbonate of soda). Tons.	Soda ash (carbonate of soda). Cost.	Salt cake (sulphate of soda). Tons.	Salt cake (sulphate of soda). Cost.	Nitrate of soda. Tons.	Nitrate of soda. Cost.	Limestone. Tons.	Limestone. Cost.
United States	1900	$2,222,776	$12,051,925	403,754	$547,943	132,279	$1,921,405	468	$5,755	10,156	$311,675	30,741	$75,177
	1890	1,198,151	7,519,450	211,536	547,094	74,062	2,390,135	2,468	42,781	6,955	274,686	6,570	18,760
Illinois	1900	210,329	664,858	32,778	33,231	11,942	163,694	.....	.....	440	13,720	4,815	9,912
	1890	105,387	566,905	19,378	30,257	7,059	226,608	46	389	579	18,330	2,466	9,377
Indiana	1900	341,500	3,262,466	119,621	139,056	40,592	579,688	213	3,214	2,279	73,368	9,082	15,895
	1890	63,257	364,529	13,036	32,704	5,041	154,757	285	8,321	263	10,190	410	820
Maryland	1900	22,313	120,759	2,076	3,929	1,263	19,080	.....	.....	149	5,000	118	319
	1890	15,966	139,971	6,721	20,133	927	25,170	.....	.....	230	8,371	.....	.....
Massachusetts	1900	13,483	130,095	1,322	6,265	189	5,217	.....	.....	24	880	.....	.....
	[1]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	1900	229,514	1,401,980	78,497	75,688	20,015	299,245	197	1,778	1,314	21,165	8,227	24,621
	1890	75,751	944,760	34,684	60,749	12,461	368,946	1,500	22,500	263	11,189	60	120
New York	1900	130,936	778,842	19,843	42,344	7,449	112,153	.....	.....	525	18,118	1,545	5,205
	1890	89,366	582,180	11,996	38,099	4,505	138,003	113	1,450	232	10,797	293	587
Ohio	1900	136,007	1,094,688	31,856	59,199	10,406	147,128	.....	.....	1,259	39,684	1,374	3,434
	1890	196,432	1,139,651	30,975	86,624	11,110	347,883	169	2,888	1,628	59,021	566	1,480
Pennsylvania	1900	1,000,711	3,788,422	96,688	157,462	33,192	471,130	58	768	3,789	126,058	3,399	8,730
	1890	519,331	3,058,596	78,154	284,671	27,270	923,540	215	3,579	3,277	138,658	2,055	5,626
West Virginia	1900	109,904	557,868	9,205	12,958	2,796	42,751	.....	.....	307	10,982	325	575
	1890	40,805	277,033	5,350	20,845	2,209	77,725	.....	.....	416	15,140	.....	.....
All other states[2]	1900	28,079	302,497	11,873	17,811	4,435	81,369	.....	.....	70	2,800	1,856	6,486
	1890	91,856	455,835	11,242	23,012	3,480	127,553	140	3,654	67	2,990	720	750

STATES.	Year.	MATERIALS USED—continued. Lime. Cwt.	Lime. Cost.	Arsenic. Pounds.	Arsenic. Cost.	Manganese. Pounds.	Manganese. Cost.	Litharge (red lead). Pounds.	Litharge (red lead). Cost.	Potash or pearlash. Pounds.	Potash or pearlash. Cost.	Fire clay and pot clay. Pounds.	Fire clay and pot clay. Cost.
United States	1900	669,649	$135,586	1,028,131	$49,563	1,424,938	$55,177	8,350,585	$487,927	4,335,828	$183,143	8,640,317	$50,661
	1890	651,739	132,502	730,385	23,384	484,593	25,745	5,501,559	300,096	2,544,978	135,047	11,016,410	88,766
Illinois	1900	45,387	10,175	45,207	2,153	68,838	1,910	115,000	6,200	.....	.....	562,000	4,960
	1890	20,420	3,960	85,881	2,894	13,936	848	40,000	2,400	.....	.....	310,000	1,985
Indiana	1900	218,088	35,854	319,648	14,981	508,980	18,920	1,481,887	76,155	443,481	18,054	1,342,070	7,084
	1890	47,682	7,193	100,600	2,878	45,052	2,419	.....	.....	.....	.....	235,600	1,740
Maryland	1900	14,725	1,233	1,650	83	11,167	566	36,982	1,857	75,000	3,000	141,300	717
	1890	14,140	1,009	14,020	395	14,600	765	94,000	4,975	77,000	3,550	420,000	3,200
Massachusetts	1900	559	112	6,789	330	8,101	207	364,448	24,497	207,967	8,994	26,158	120
	[1]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	1900	126,001	24,500	97,405	4,632	143,465	5,674	72,049	3,918	60,270	2,866	1,912,005	11,727
	1890	144,418	27,372	63,532	1,576	17,065	785	39,878	2,118	34,035	1,877	2,783,790	24,901
New York	1900	32,819	8,885	61,018	2,876	89,521	3,737	790,909	46,114	414,438	17,552	744,450	5,935
	1890	52,850	16,560	20,727	706	29,489	1,515	1,218,264	73,049	500,334	27,237	1,017,673	7,535
Ohio	1900	72,488	14,230	123,344	6,876	76,117	3,672	2,063,000	117,035	850,171	34,129	946,000	2,306
	1890	84,032	16,708	179,406	5,772	111,181	5,907	786,991	35,810	335,216	16,985	1,240,250	10,677
Pennsylvania	1900	127,790	34,027	285,267	13,372	437,181	16,331	3,141,027	191,568	1,932,699	81,991	2,560,394	15,990
	1890	201,822	42,744	164,114	6,117	212,410	11,742	3,086,681	167,499	1,474,093	77,440	3,498,733	27,027
West Virginia	1900	11,228	2,820	69,303	3,295	58,944	2,239	285,283	20,583	351,802	16,557	134,940	1,437
	1890	11,286	3,237	89,822	2,606	16,450	985	100,000	5,800	50,000	3,500	662,550	3,245
All other states[2]	1900	20,564	3,750	18,500	965	32,624	1,421	.....	.....	.....	.....	271,000	885
	1890	75,089	13,719	12,283	440	24,410	779	140,750	8,445	74,300	4,458	847,814	8,456

[1]Included in "all other states."
[2]Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Georgia, 2; Kentucky, 2; Maryland, 2; Massachusetts, 2; Missouri, 2; Wisconsin, 1.

TABLE 8.—COMPARATIVE STATISTICS, PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1890 AND 1900—Continued.

STATES.	Year.	MATERIALS USED—continued.										PRODUCT.
		Pots (not including those made at works).		Fuel.							All other materials, cost.	Total value.
				Total cost.	Natural gas, cost.	Oil.		Coal.		All other fuel, cost.		
		Number.	Cost.			Gallons.	Cost.	Tons.	Cost.			
United States	1900	5,111	$280,086	$2,084,124	$823,924	11,967,202	$385,997	485,852	$738,218	$135,985	$5,863,703	$39,443,478
	1890	5,419	306,441	1,349,919	452,124	1,576,470	60,939	308,945	684,739	152,117	1,884,094	27,122,708
Illinois	1900	284	16,930	154,020	.....	1,663,301	41,084	113,475	94,232	18,704	247,953	2,810,398
	1890	398	30,448	112,027	.....	492,072	23,300	54,781	66,403	22,324	127,382	1,945,790
Indiana	1900	947	56,849	159,924	157,963	135	37	520	1,478	446	2,063,474	9,045,935
	1890	254	14,170	7,908	.....	.....	.....	4,900	6,258	1,650	111,429	1,163,664
Maryland	1900	164	7,286	33,416	.....	148,396	6,234	12,315	22,089	5,093	44,273	454,633
	1890	240	10,970	31,360	.....	.....	.....	12,756	26,974	4,386	30,073	674,900
Massachusetts	1900	110	5,175	30,287	.....	371,867	15,619	3,416	12,782	1,886	48,061	402,258
	[1]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	1900	301	11,217	415,485	.....	4,964,767	155,257	92,520	194,457	65,771	499,464	4,819,811
	1890	359	12,279	265,210	.....	.....	.....	71,486	205,175	60,035	145,128	3,901,982
New York	1900	143	7,125	184,417	9,190	1,293,521	45,603	48,190	121,302	8,322	324,381	2,410,188
	1890	150	6,005	151,650	.....	55,944	2,664	39,707	124,027	24,959	108,987	2,000,842
Ohio	1900	863	52,861	213,633	99,404	1,250,637	31,874	48,816	78,138	4,217	400,501	3,875,661
	1890	1,152	71,172	96,167	64,579	33,054	1,575	33,565	27,972	2,041	382,607	4,073,385
Pennsylvania	1900	2,095	110,124	711,295	481,833	938,873	44,548	139,116	159,503	25,411	1,799,081	12,797,585
	1890	2,311	132,402	488,027	336,545	46,200	1,650	55,128	124,716	20,116	804,524	10,772,213
West Virginia	1900	184	11,199	77,423	75,534	18,650	585	1,271	1,304	.....	354,549	1,770,553
	1890	170	12,222	54,885	51,000	.....	.....	3,160	2,085	1,800	76,843	945,231
All other states[2]	1900	20	1,320	104,224	.....	1,317,055	45,156	26,213	52,933	6,135	81,966	1,056,456
	1890	385	16,773	147,685	.....	949,200	31,750	33,462	101,129	14,806	97,121	1,644,698

STATES.	Year.	EQUIPMENT AND CHARACTERISTICS OF WORKS.															
		Furnaces, number.	Pots, number.	Tanks.[3]		Clay-grinding mills, number.	Grinding machines, number.	Shops, number.	Glory holes, number.	Annealing ovens, number.	Lehrs, number.	Presses or presses mechanical, number.	Finishing machines, number.	Crimping machines, number.	Grinding and engraving machines, number.	Horses and mules, number.	Wagons, carts, and drays, number.
				Number.	Pot capacity.												
United States	1900	258	2,811	305	3,404	8	20	3,978	1,419	1,540	1,025	964	140	494	137	317	314
	1890	369	2,908	.....	.....	78	63	2,894	880	1,600	599	801	91	283	798	370	297
Illinois	1900	9	117	18	306	.....	.....	427	146	289	31	13	2	1	3	23	24
	1890	18	140	.....	.....	3	4	115	48	263	11	2	.....	.....	1	24	12
Indiana	1900	43	529	99	999	1	1	1,397	351	161	321	201	33	169	29	7	20
	1890	21	116	.....	.....	.....	4	77	32	45	43	8	.....	.....	4	7	6
Maryland	1900	7	79	1	6	.....	.....	67	24	21	18	7	.....	.....	4	8	11
	1890	7	77	.....	.....	1	.....	113	15	15	20	4	50	15	17	5	4
Massachusetts	1900	5	47	1	90	.....	.....	38	16	15	12	9	.....	5	.....	7	8
	[1]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	1900	30	231	48	697	1	4	718	301	266	95	55	1	.....	22	92	104
	1890	56	281	.....	.....	13	12	323	199	352	50	17	.....	.....	47	95	79
New York	1900	20	182	22	282	.....	.....	312	66	126	55	49	2	32	9	44	44
	1890	39	259	.....	.....	15	7	236	41	104	47	30	.....	.....	23	49	46
Ohio	1900	29	377	16	171	2	.....	613	93	121	102	125	59	35	5	15	6
	1890	55	521	.....	.....	10	13	441	130	122	142	243	21	57	258	21	2
Pennsylvania	1900	102	1,103	64	572	4	15	144	351	395	323	444	42	252	54	87	74
	1890	136	1,232	.....	.....	26	14	1,816	370	543	241	403	20	151	303	120	87
West Virginia	1900	12	134	20	90	.....	.....	158	28	18	59	60	1	.....	10	5	5
	1890	17	144	.....	.....	3	2	104	24	18	33	85	.....	10	60	12	12
All other states[2]	1900	1	12	16	191	.....	.....	104	43	128	9	1	.....	.....	1	29	18
	1890	20	138	.....	.....	7	7	169	21	138	12	9	.....	.....	85	37	29

[1] Included in "all other states."
[2] Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Georgia, 2; Kentucky, 2; Maryland, 2; Massachusetts, 2; Missouri, 2; Wisconsin, 1.
[3] Not reported in 1890.

Table 8 shows that there were 231 establishments engaged in the manufacture of pressed and blown ware and bottles and jars during the census year, as compared with 194 in 1890, an increase of 19.1 per cent. Of the number in operation in the census year, 84 manufactured pressed and blown flint and lime glassware, such as tableware, jellies, common tumblers, goblets, lamps, chimneys, lantern globes, shades, globes, gas and electric lighting goods, blown tumblers, stem ware, bar ware, opal ware, cut glass, etc. The remaining 147 establishments manufactured bottles and jars in every variety of flint, green, and amber glass. As several establishments had products in both of the above classes and a fair division of their business in each branch could not be made, it was necessary to consolidate the reports of the two divisions. The total value of pressed and blown ware and bottles and jars in 1900 was 45.4 per cent in excess of that reported in 1890, the totals being $39,443,478 and $27,122,708, respectively. Of the total value of pressed and blown ware and bottles and jars in 1900, 55.9 per cent was the value of bottles and jars and 44.1 per cent that of pressed and blown ware, as shown in Table 14. Of the total value of all glass manufactured during the census year, the value of bottles and jars was 38.3 per cent and that of pressed and blown ware, 30.2 per cent.

Pennsylvania ranks first with 32.4 per cent of the total value of products in the manufacture of pressed and blown ware and bottles and jars in 1900. It was first also in 1890, with 39.7 per cent of the total value of products. Indiana, owing to its natural gas, ranked second in 1900, with 22.9 per cent, and sixth in 1890, with 4.3 per cent of the value of products. New Jersey was third in both 1900 and 1890, with 12.2 and 14.4 per cent of the value of products, respectively. Ohio was in fourth place in 1900, with 9.8 per cent of the value of products, but in 1890 was second, by reason of its gas fields, with 15 per cent of the total value of products. Illinois in 1900 retained the rank held in 1890, fifth place, while New York dropped from fourth place in 1890 to sixth place in 1900, on account of the western movement of the factories during the last decade. Reference to Table 14 shows that Pennsylvania leads in the production of pressed and blown ware, reporting 49.5 per cent of the total value of products, while Ohio and Indiana, the next two in rank, report 16 per cent and 15.8 per cent, respectively. West Virginia and New York report 8.1 per cent and 6.9 per cent, respectively. Indiana was the leading state in 1900 in the manufacture of bottles and jars, showing 29.2 per cent of the total value of products; New Jersey, 20.5 per cent; Pennsylvania, 19.2 per cent; Illinois, 12.4 per cent; New York, 5.5 per cent; and Ohio, 4.9 per cent.

The number of establishments reported in 1900 as engaged in the manufacture of pressed and blown lime and flint glassware and bottles and jars was 65.1 per cent of the total number of glass-manufacturing establishments of all kinds. In 1890 they were 66 per cent of the total number. The amount of capital invested in this branch of the industry in 1900 showed an increase of 53.9 per cent over 1890. The average number of wage-earners employed in 1900 was 24.3 per cent greater than in 1890, while the total amount of wages paid showed an increase of 31.5 per cent over 1890. There was an increase of 24.3 per cent in the average number of men employed and 27.5 per cent in their wages; the number of women increased 93 per cent and their wages 168 per cent. The increase in the number of women employed was due largely to the development of the manufacture of decorated ware during the last decade, giving employment to many young women. The average number of boys (practically all children in glass factories are boys) increased only 5.6 per cent and their wages 39.9 per cent. The small increase in the number of boys between 1890 and 1900 was due largely to the strict enforcement of the truant school laws in the principal glass-manufacturing states, which caused a great scarcity of boys, particularly in the bottle factories, and also largely accounted for the increase of 39.9 per cent in wages. The difficulty of obtaining boys is confined to establishments making pressed and blown ware and bottles and jars, practically none being employed in building-glass factories. Their chief duty is to carry the ware from the blower or presser to the annealing department and to attend to the molds, important items in the operation of the factory, so that their absence causes a general curtailment of production.

One result of this state of affairs was a general effort to invent means for dispensing with boy labor. One apparently practicable plan to this end is the use of a portable sheet-iron box or oven, capable of being kept at a satisfactory temperature, into which the ware is placed as it comes from the mold. When the "iron boy" is filled, two laborers carry it to the annealing department and unload the ware into the annealing ovens or lehrs. In this way, it is claimed, several laborers can handle the production of the factory with as much speed and at less cost than when boys are employed. As a result of a recent scarcity, the plan of employing young women or girls was agitated, but this aroused such a storm of indignant protest from all workers that it was never put into operation.

The total cost of materials used in 1900 in pressed and blown ware and bottle and jar manufacture was 60.3 per cent greater than in 1890. The total cost of fuel reported in 1900 is 54.4 per cent in excess of the total reported in 1890, the reported value of natural gas used being 82.2 per cent greater; however, a number of establishments owning their source of supply in 1890 and 1900 made practically no report of cost for gas fuel, but charged the expense against cost of maintenance. A remarkable increase in the use of oil as a fuel is shown, the number of gallons used being 659.1

per cent greater in 1900 than in 1890, while the cost increased 533.4 per cent. The average cost per gallon in 1900 was 3.2 cents, as compared with 3.9 cents in 1890. Ninety-four and three-tenths per cent of the quantity of fuel oil reported as used in glass manufacture in 1900 was used by the factories which manufactured pressed and blown ware and bottles and jars. A large number of small tanks operated with fuel oil, and a large quantity was used in the glory holes, the number of which in the entire industry in 1900 was 61.3 per cent in excess of the number reported in 1890. There was an increase of 57.3 per cent in the quantity of coal used and an increase of only 7.8 per cent in the cost. The average cost per ton in 1900 was $1.52, as compared with $2 22 per ton in 1890. The increased use of the tank furnace, with coal-gas producers using a cheap grade of slack coal, was the cause in a large measure of this decided decline in the average cost per ton.

The total number of furnaces in this branch of glass manufacture in 1900 shows an increase of 52.6 per cent over the number reported in 1890, and the total pot capacity increased 113.7 per cent; of this capacity, 54.8 per cent is contained in continuous and day or intermittent tank furnaces, which were of insignificant number prior to 1890. The use of the continuous tank in this branch of the industry is confined almost entirely to the bottle and jar trade, only 10 being reported in the pressed and blown ware establishments. Bottles of all kinds are being made from the continuous tank, and the bulk of the fruit jar and beer bottle production is made in this manner. Within the last few years flint glass for bottles and jars of such a fair quality has been made in the tank furnace that, taken in connection with the cheaper cost of production and the increased output, flint glass made in tanks for bottleware is rapidly superseding the pot-made flint glass. The adoption of the tank for manufacturing flint-glass bottles has been so general that at the close of the census year the flint-glass bottle blowers, numbering over 2,000, who since 1878 had been joined in a trades union with workmen in 13 other branches of the flint-glass trade, were preparing to leave that association and join with the green bottle blowers' union. This step was finally taken one year later by a large number.

A small decrease in the total number of annealing ovens in use in pressed and blown ware and bottle and jar manufacture was reported in 1900 as compared with 1890, and at the same time the number of annealing lehrs increased 71.1 per cent, showing that the annealing oven is being displaced by the faster and more economical lehr. The principle of the oven method of annealing is the gradual reduction of the heat, while the lehr method is based on the principle of gradually withdrawing the glass from the heat. The new method lends itself more readily to scientific exactness in securing results and, being continuous in operation, makes it possible to handle the increased output of the factory in much less time and at smaller cost.

The manufacture of bottles and jars is the oldest branch of the glass industry in this country, the first glass factory, at Jamestown, Va., in 1608, probably operating exclusively on bottles. It has always formed a prominent part of the industry and in the last decade has made greater progress than any other branch of glass manufacture. The tank furnace, machinery, and improved factory equipments and facilities have resulted in a large increase in the value of products.

Specialization is the prevailing characteristic. A few years ago it was customary for each establishment to manufacture a large variety of ware, and the workman as a rule was accustomed to make a little of everything; but it is now the tendency to restrict the output of the factory to a particular article, and the workman is an expert in one branch of his trade, the general workman having given way to the specialist capable of maintaining the highest speed. This specializing tendency is particularly marked in the manufacture of fruit jars and beer bottles. For years bottles were made in connection with window glass from the same furnace. A survival of this is present in the trade to-day with 5 establishments, manufacturing both window glass and bottles; separate furnaces are used, however.

In no branch of the glass industry has the use of machinery made so great a change as in bottle and jar manufacture during the last decade, and especially the last four years. This applies particularly to the manufacture of fruit jars and wide-mouth ware, such as vaseline jars, jam jars, etc. Prior to 1890 the manufacture of machine-made wide-mouth bottles or jars was largely experimental, and practically no fruit jars had been made by machinery. Since that date the enormous production of small wide-mouth articles, such as vaseline jars, of which one establishment in New York uses 10,000,000 yearly, has been made almost entirely by machines, while fully 90 per cent of the fruit jars are machine-made, and it is only a question of a very short time until the fruit jar will be made exclusively in this manner. The results so far attained indicate that in a few years the bulk of the entire wide-mouth bottle production will be made by machinery.

Prior to the use of machinery, the method of manufacture of wide-mouth ware was to gather the glass from the furnace on a blowpipe, forming it to a suitable preliminary shape in a block or on a marver, and then inserting the glass in a mold and blowing to the desired form. After separating the glass from the blowpipe, a ragged edge of superfluous glass remained attached to the neck of the article, which had to be chipped and ground off to make the product salable. The manufacture of the Mason fruit jar, which since it was patented, in 1858, has constituted 90 per cent of the fruit jar production, has been most completely revolutionized by machinery. Prior to 1896 the glass was gath-

ered from the furnace upon a blowpipe, was then blocked or rolled in a hollow block to get a preliminary shape, then swung by the blower and blown up, rolled on a flat slab or marver, and again blown until it was just large enough to admit of being inserted in the blow mold. The mass of glass was then put into the mold and blown up, so as to completely fill the mold and form a collar of surplus glass extending above the top of the jar about an inch and a quarter. Above this collar was the remainder of a thin bubble into which the blower had formed the glass outside the mold so as to separate it from the blowpipe. This collar and bubble constituted the "blow-over," which had to be removed before the jar was marketable. After being annealed the jar was taken by a workman who, with a file, chipped off most of the "blow-over" and then filed it down as smooth as possible, leaving about one-sixteenth of an inch of the collar remaining, which was finally removed from the jar by the grinding machine. Then the jar had to receive a thorough washing by hand to remove all particles of broken glass and sand resulting from the chipping and grinding. After being carefully dried, the jar was at last ready to pack. The speed with which it was necessary to perform the operations of chipping, grinding, washing, and drying made the risk of breakage great, being estimated at the rate of from 8 to 20 per cent.

By the use of machinery the costly "blow-over" is avoided by first pressing the neck of the jar to finished form and then forming the body of the jar by blowing, so that when the jar leaves the blow mold to be annealed it is, so far as form is concerned, a marketable article. The process patented July 11, 1882, by Philip Arbogast, of Pittsburg, Pa., has been the basis for all machinery used in the manufacture of jars and wide-mouth bottles. He employed two separate molds, a press mold and a blow mold. Sufficient glass to make the desired article was taken from the furnace on a solid rod or punty and dropped into the press mold, the required quantity being separated from the mass on the punty by shears in the hands of a workman. A lever operated by the workman then brought down a plunger into the mold, pressing the mouth or neck of the article to finished form and pressing a wind cavity in the dependent mass of glass to aid in the blowing operation. The plunger being withdrawn, the mold was opened, and the ring inclosing the pressed neck with the dependent mass of glass was carried to the blow mold and inserted, after which the body of the article was blown up to the desired form. From 1884 to 1893 this process was followed in a small way on large candy and druggists' jars, wide-mouth bottles, vaseline and jam jars, milk jars, and tableware, such as bowls, pitchers, sugars, and creams, but the principal products were large drug and candy jars, which, after having the necks pressed to the finished form, were taken out of the press mold and greatly increased in size by manipulation of the blower before being placed in the blow mold. In 1893 the process began to be more extensively used on vaseline jars.

The idea of dispensing with the manual operation of transferring the glass from one mold to another was patented in England in 1886, both molds being combined into one by the use of sliding parts. About the same time the idea of placing a series of molds on a revolving table was also patented in that country, and patents were granted in the United States in 1889 on both devices, but they were never put into practical use. In 1896 an American combined the consolidated mold and rotary table. On a rotating table is placed a series of five separate, duplicate, double molds, each mold containing an outer blow section having a ring integral with it in which the neck of the article is pressed, and a telescopic press section rising within the blow section and receiving the glass, forming, with the neck of the blow section, a press mold. The glass is dropped into the combined mold when in this press mold position, and the table rotated, bringing the mold under the plunger, which enters it and presses the neck, and wind cavity into the dependent mass of glass. The plunger is withdrawn, and another rotation of the table brings the mold under the blow stem, the telescopic press section of the combined mold having dropped in the meantime, exposing the glass blank within the blow section. The bottom plate is inserted and the air admitted to expand the glass blank to the form of the blow mold. The next rotation of the table brings the mold to where it is opened by a boy, and the finished article is taken out and removed to the annealing oven.

All of the above operations are performed simultaneously, a finished article being produced at each rotation of the table. On such a machine the first commercially successful machine-made Mason fruit jar was manufactured in July, 1896, at the plant of the Atlas Glass Company at Washington, Pa. The numerous jar and wide-mouth bottle machines now in use have either separate blow and press molds arranged near together on a revolving table so that the shifting of the glass from one to the other is almost instantaneous, or have the molds combined in one. In all, the basic principle is the pressing of the finished neck and the subsequent blowing of the body. Compressed air for blowing and electricity for motive power have added much to the speed of the operation. The machine has a much greater productive capacity than is possible by the old hand method of blowing, and has reduced the cost of manufacture more than a third. Loss by breakage has been reduced to a minimum, while the finish of the ware is far superior to that of the handmade article.

So far, the manufacture of narrow neck bottle ware by machinery is not beyond the experimental stage in this country, although commercial success is claimed in Germany and Russia. The claim is made by the best authorities that the manufacture of narrow neck bot-

tles by machinery will soon be perfected and become as general as the mechanical production of wide-mouth ware. The method employed at present in making narrow neck bottles is to gather a suitable amount of glass from the furnace on the blowpipe, to roll it on a marver or turn in a block, to swing and blow and again roll on the marver to give it the proper form for insertion in the mold, where it is blown, forming the body and neck of the bottle. The article is then taken from the mold and carried to the glory hole, where the top of the neck is reheated and the ring or lip of the bottle neck is formed by the workman with a finishing tool, after which the bottle is ready for annealing. The greatest advance made so far in the mechanical production of narrow neck ware has been in the finishing process, although the finishing machine, as yet, is used to but a limited extent.

The number of fruit jars reported in 1900 was 789,298 gross of different sizes—pints, quarts, and half gallons—valued at $2,935,036. It is estimated that about 90 per cent of these were the Mason patent jar, which has a screw threaded neck for a metallic cap which presses down a rubber band on the shoulder of the jar, making a perfect seal. The other jars manufactured were more expensive kinds with special sealing devices, of which that with an all-glass top was the favorite. There were 34 establishments engaged in the manufacture of fruit jars during the census year, 6 of which made that class of ware exclusively. The largest fruit jar plant in the world, with a daily capacity of 240,000 jars, all machine-made, is in Indiana. Comparison with the statistics of the last two censuses shows a great development in this branch of the industry, caused principally by the introduction of the continuous tank in the last decade and the adoption of machinery within the last four years. In 1890, 268,978 gross of fruit jars were reported, valued at $1,390,430. There was an increase of 193.4 per cent in the number manufactured in 1900 over 1890. The average value per gross in 1900 was $3.72 as compared with $5.17 in 1890, a decrease of 28 per cent in the value per gross.

The statistics of fruit jars manufactured at the census of 1880 are incomplete, yet the total of 148,271 gross reported for Pennsylvania, New York, and New Jersey probably comprised very nearly the production of the entire country. The increase in the quantity manufactured in 1900 over 1880 was 432.3 per cent. No fruit jars were reported in Indiana in 1880; but this state headed the list in 1890 with 83,270 gross, valued at $440,657, or 31 per cent of the total production, and also in 1900 with 559,549 gross, valued at $2,106,250, or 70.9 per cent of the total production. Pennsylvania, which was first in 1880 in the manufacture of fruit jars, 67,770 gross having been reported, was third in 1890, with a product of 47,250 gross, valued at $233,125, and second in 1900, with 115,000 gross, valued at $436,104. Ohio was second in the manufacture of fruit jars in 1890 by reason of the discovery of natural gas, 60,726 gross, valued at $296,065, having been reported, while in 1900 the number had dwindled to 2,000 gross of a special kind, valued at $8,000. In 1880 there were 51,749 gross reported as manufactured in New Jersey; in 1890, 33,406 gross, valued at $181,410; and in 1900 this state reached third place, with 61,871 gross, valued at $192,467. In New York there were 28,752 gross manufactured in 1880; in 1890 there were reported 9,500 gross, valued at $55,000; and 31,235 gross, valued at $128,965, in 1900, an increase in the number manufactured of 228.8 per cent over 1890. The statistics for Illinois show a large decrease in fruit jars manufactured since 1890, the number reported in 1900 being 1,500 gross, valued at $9,000, compared with 20,750 gross in 1890, valued at $103,798. In West Virginia, from which no fruit jars were reported in either 1880 or 1890, there were manufactured 14,643 gross, valued at $43,750, in 1900.

At the close of the census year large quantities of fruit jars, roughly estimated at 340,000 gross, were being held in stock and were controlled by a selling agency formed among the principal manufacturers. A large portion of this stock was held by one firm, which had thousands of jars stacked in an open field. This stock had accumulated for several years and was held in prospect of the approaching failure of the natural gas and the consequent advance in prices.

The manufacture of prescription bottles, vials, and druggists' ware was carried on by 77 establishments in 1900, several of the largest factories in the country being operated almost exclusively on this class of goods. The value of these products in 1900 was 21.5 per cent of the total value of all bottles and jars manufactured. The statistics reported in 1890 of bottles and jars manufactured are of no value for comparative purposes, as they were not complete. However, the total number of bottles reported in that year, exclusive of beer bottles, was 2,170,961 gross. The average value per gross of this class of ware in 1900 was $1.92, which was a considerable reduction from the value per gross in 1890. This was due to the increased quantity of ware produced from the continuous tank furnace. Of the total quantity of this class of ware manufactured in the United States in 1900, 30.2 per cent was made in New Jersey, constituting 28 per cent of the total value, the average value per gross for the state being $1.79. Indiana ranked second, with 25.7 per cent of the total quantity and 25.4 per cent of the total value of the products, the average value per gross for the state being $1.90. Pennsylvania, by reason of much of the product of that state being of higher grade, closely followed Indiana in the value of the products, producing 25.4 per cent of the total value and 22.7 per cent of the total quantity, the average value per gross being $2.12. In Illinois 11 per cent of the total quantity and 8.7 per cent of the total value was manufactured, the average value per gross for

the state being $1.52. A large part of the southern trade was supplied by that state. The manufacture of homeopathic vials was carried on by 4 glass making establishments. These vials were also made during the census year in a large number of small shops where the tubing is bought and reworked. No account of these shops is taken in this report. The American prescription bottle has no superior in form and finish, and is far in advance of the ware manufactured abroad. Export shipments of this class of ware direct from factories in 1900 were reported to Canada, Australia, South and Central America, Cuba, Great Britain, France, Africa, East Indies, China, and Japan, of a total value of $93,094, which represented only a portion of the actual exportation, as the most of the trade was done through exporting houses.

The manufacture of beer, soda, and mineral water bottles in 1900 was reported by 75 establishments in 15 states, the total value of which was $5,075,068, or 23.4 per cent of the total value of all bottles and jars manufactured. Several establishments were employed almost exclusively in the manufacture of beer and soda bottles, the bulk of the trade being done by them. Plans were being prepared at the close of the census year for 6 new establishments to manufacture beer and soda bottles exclusively, while increases of capacity among established plants were general, nearly all being in the line of continuous tanks. Demand for ware in the census year was extraordinary, the home consumption being unusually large, while large quantities of bottles filled with beer were shipped to Cuba and the far East. The export trade in beer and soda bottles with Mexico reached its highest development during the census year, direct factory shipments aggregating 21,147 gross, valued at $66,333, being reported for that country. The manufacture of mineral water bottles largely increased during the decade and was unusually large during the census year. By far the largest part of the production in this branch of the industry was made from the continuous tank furnace.

The general use of the tank and better facilities for the maintenance of a high rate of speed by the workmen have resulted in a great increase in the average factory output within the last ten years, yet consumption at the close of the census year was demanding still greater capacity, and prices were at a high point. In 1890 a production of 204,948 gross of beer bottles was reported, the figures probably not being complete, but showing nearly all of the country's production in that year; this was exceeded in 1900 by Illinois alone, with 4 establishments reporting. As in 1890, Illinois in 1900 was first in the manufacture of beer, soda, and mineral water bottles, with 26.3 per cent of the total value and 30.1 per cent of the total quantity manufactured in the United States. Pennsylvania ranked second in value of products, with 17.8 per cent of the total, but the quantity manufactured was only 10.9 per cent of the total quantity. Establishments in Ohio reported 12.6 per cent of the total value and 16.2 per cent of the total number of gross, while the production in New York constituted 9.9 per cent of the total quantity and 9.3 per cent of the total value. A large percentage of the total value and quantity was reported under the head of "all other states," which came chiefly from Wisconsin and Missouri, each having a large establishment devoted to the exclusive manufacture of this class of ware. California, Colorado, Georgia, Michigan, and Virginia were the other states included under this head. New Jersey, with a production slightly less in quantity, led Indiana in the total value of beer, soda, and mineral water bottles manufactured. Following Indiana in this class of ware were Maryland, West Virginia, and Massachusetts, in the order named.

There were 81 establishments engaged in the manufacture of flasks and liquor bottles in 1900, the total value of the products being 11.1 per cent of the total value of bottles and jars manufactured, Indiana heading the list with 50.2 per cent of the total value and 61.4 per cent of the total quantity. There were several small establishments equipped with tank furnaces in this state operating exclusively on flasks with very cheap gas fuel, and cheap unorganized labor, that created considerable demoralization in prices and in the trade of the old establishments. To counteract this, the American Flint Glass Workers' Union, to which the organized flask workers belong, at the close of the census year was erecting a tank factory in Indiana to be operated exclusively on flasks, which were to be sold at prices to compete with these new firms, and thus to either force them out of the business or cause them to maintain prices and working conditions equal to those in force among organized manufacturers. This movement is unique in the history of trades unions, and is based on the principle that there is greater economy and efficiency in direct business competition than in the old method of taking men out on strike and supporting them on a relief roll. Pennsylvania was next to Indiana in the manufacture of flasks and liquor bottles, 14.5 per cent of the total quantity and 18.6 per cent of the total value being manufactured in that state. Liquor bottles and flasks were also manufactured in California, Georgia, Illinois, Maryland, Massachusetts, Michigan, New Jersey, New York, Ohio, Virginia, West Virginia, and Wisconsin.

The manufacture of milk jars or bottles is practically a development of the last decade. The demand has steadily increased, causing a corresponding increase in the furnace capacity used in the manufacture of this class of ware. The manufacture of milk jars was reported in 1900 by 31 establishments, 13 of which were located in Pennsylvania. The total value of milk jars of all sizes manufactured in 1900 was 3.4 per cent of the total value of all bottles and jars manufactured. The average value per gross for the United States was

$4.99. The mechanical production of milk jars is commercially possible, and it is probable that a large part of the product will be made by machinery during the present decade. The manufacture of milk jars was one of the most rapidly expanding branches of the glass trade at the close of the census year, the overwhelming merits of such a package for milk becoming more widely recognized and the demand steadily increasing. Pennsylvania led the productive list, with 55.1 per cent of the total quantity and 59.6 per cent of the total value. The percentages of the total quantity and total value of milk jars manufactured in the other states in 1900, are as follows: New Jersey, 13.5 per cent of the quantity and 14.7 per cent of the value; Indiana, 13.4 per cent of the quantity and 7.6 per cent of the value; Illinois, 5.1 per cent of both quantity and value; New York, 4.7 per cent of the quantity and 4.6 per cent of the value; Ohio, 4.1 per cent of both quantity and value; West Virginia, 3.1 per cent of the quantity and 3.2 per cent of the value.

The manufacture of bottles for patent and proprietary medicines is largely confined to the states of New Jersey, Illinois, and Indiana, although 47 establishments in 8 states were reported as engaged in the manufacture of such products. The value of bottles for patent and proprietary medicines manufactured in 1900 was 12 per cent of the value of bottles and jars of all kinds reported. The combined production of New Jersey, Illinois, and Indiana was 88.6 per cent of the total quantity for the United States. Bottles of this kind are made of a cheaper grade than prescription bottles and are used in steadily increasing quantities, a large quantity being exported filled. New Jersey for a long period has been first in the manufacture of this class of ware, and in 1900 there was reported from that state 46.4 per cent of the total quantity and 53.7 per cent of the total value for the United States. From Illinois was reported 23.4 per cent of the total quantity and 19 per cent of the total value; and from Indiana 18.9 per cent of the total quantity and 14.5 per cent of the total value. Bottles for patent and proprietary medicines were also manufactured in Pennsylvania, New York, Ohio, Maryland, and Georgia.

The manufacture of bottles and jars for the packing and preserving industries, exclusive of the enormous production of fruit jars, has steadily advanced during the past decade, owing to the remarkable growth of the above interests and the increasing recognition of glass as the ideal package. In this branch of the bottle and jar industry the value of the product in 1900 was 9.8 per cent of the total value of all bottles and jars manufactured, and 45 establishments in 10 states reported. The products covered a wide range of glass food packages, the average value being $2.70 per gross. The manufacture of machine-made ware in this line is increasing, although constituting as yet a very small proportion of the total. The 3 leading states in the manufacture of bottles and jars for packers and preservers were New Jersey, Indiana, and Pennsylvania. In New Jersey, 35.6 per cent of the quantity and 29.3 per cent of the value of these products was manufactured; in Indiana, 31.6 per cent of the quantity and 32.4 per cent of the value; and in Pennsylvania, 14.5 per cent of the quantity and 19.8 per cent of the value. Illinois followed, with 10.3 per cent of the quantity and 9.2 per cent of the value. This class of ware was also manufactured in Ohio, New York, California, West Virginia, Maryland, and Georgia; these states reporting in the order given as to quantity and value of product.

The number of demijohns and carboys manufactured in 1900 was 83,243 dozens, valued at $206,061. The average value per dozen for the several states varied with the proportion of the state's output of the more expensive carboy or the cheaper demijohn, the average value of the carboy being about twice that of the demijohn. New Jersey was first in the value of demijohns and carboys manufactured in 1900, with 42 per cent of the total value, followed by Illinois with 23.8 per cent of the total value, Pennsylvania with 17.9 per cent, and New York with 9.2 per cent. Under the head of "all other products," bottles and jars which were not specified, valued at $940,277, were reported. A large variety of ware was embraced under this head. During the census year the manufacture of large glass jars and retorts for laboratory use and for water coolers was successfully accomplished in this country, the process having been brought from France.

There was no such close organization of manufacturing interests in the bottle and jar industry during the census year as in the plate glass, window glass, and tableware industries. Eastern and western manufacturers of bottles have relied upon a common understanding to regulate prices, with varying success, particularly in some lines such as flasks and prescription bottles. The manufacture of beer bottles was controlled by a few firms, and very satisfactory results in keeping prices uniform were the rule. The prices of fruit jars were regulated by a selling agency agreement among controlling manufacturing interests. The workmen in both the green and flint bottle and jar trades were well organized and their rules as to duration of factory operation and a uniform scale of wages, which affected a large majority of the factories in all branches of glass manufacture, were the strongest factors in maintaining uniformity of prices. The green bottle blowers' organization, the Glass Bottle Blowers' Association, organized about 1877, is one of the best managed and most progressive trades unions in the United States, and had a membership of about 4,000 and about $100,000 in cash in the treasury at the close of the census year. The organization of flint or prescription bottle blowers numbered about 1,500, and formed a branch of the American Flint Glass Workers' Union, one of the largest trades unions in the country. The scale of

wages and the duration of the summer stop of the factories are fixed each year at a meeting of a joint committee representing organized workers and manufacturers. The only company stores in the glass trade in 1900 were in the bottle and jar branch of the industry. There were 10 of these stores, but in only two instances were the glass workers compelled to trade with them, as had been customary a short time before, the blowers' union having conducted a successful strike chiefly against the company store system. In 1890, 20 company stores were reported, 11 in connection with factories making bottles and jars and glassware, 8 in window glass works, and 1 in the plate glass branch. In 1880 there were 27 reported, as follows: 13 in connection with factories making bottles and jars and glassware, 12 in window glass works, and 2 in the plate glass branch.

Table 9 is a statement, by states, of the number of bottles manufactured, classified by capacity.

TABLE 9.—NUMBER OF BOTTLES MANUFACTURED, CLASSIFIED BY CAPACITY, BY STATES: 1900.

STATES.	BOTTLES.		
	4-ounce and under, number of gross.	4 to 16-ounce, inclusive, number of gross.	Over 16-ounce, number of gross.
United States	2,462,694	3,055,204	1,228,719
California	4,600	22,486	25,187
Georgia	13,000	17,000	7,350
Illinois	428,077	430,636	239,285
Indiana	562,345	872,318	199,947
Maryland	113,898	48,960	8,969
Massachusetts		4,865	1,561
Michigan	3,876	10,425	1,670
Missouri		46,667	23,333
New Jersey	764,385	614,385	130,046
New York	57,321	196,790	254,074
Ohio	74,015	195,054	94,338
Pennsylvania	405,528	496,670	199,310
Virginia	34,000	22,000	9,000
West Virginia	1,649	34,948	6,649
Wisconsin		42,000	28,000

It is possible that the statistics presented in the above table are not strictly accurate, as several establishments were unable to furnish more than an estimate of the number of bottles of each size manufactured. The total number of the three classes of bottles exceeds the total number reported in Tables 12 and 14 as "prescriptions, vials, and druggists' ware," "beers, sodas, and minerals," "liquors and flasks," and "patent and proprietary." This is probably accounted for by the fact that a large number of bottles included in the statement were not reported under either of the foregoing classifications, but were reported on the schedule under "all other products."

Pressed and Blown Glassware.—Pressed and blown lead and lime glassware manufactured in the United States is characterized by purity of color, excellence of design and finish, and cheapness of cost. The United States has been preeminent in the manufacture of pressed glassware ever since the invention of the process, which occurred about 1827 at a little plant in Sandwich, Mass., as the result of a suggestion of a carpenter who knew nothing of glass manufacture. His idea that molten glass could be pressed into any desired shape was at first regarded as absurd by experienced glass manufacturers.[1] Prior to this all glassware was blown, either offhand or in a mold, which required much greater skill and more time than the pressing operation.

About 37 years after the first glass press was constructed another important discovery was made, which so improved the composition of the batch for lime glass that, in purity and brilliancy, lime glassware was made to rival the more expensive lead glassware. Lime glass had been used in Europe and England for centuries in the manufacture of window glass, bottles and jars, and common tableware, and from an early period it had been used in the United States in the manufacture of tableware. But it was so inferior in purity and luster that it could not compete with lead glass, and was restricted to the cheapest and lowest grade of ware.

In 1864, according to the authority noted above, William Leighton sr., a glass manufacturer of Wheeling, W. Va., by the substitution of bicarbonate of soda for soda ash, and a better proportion of the materials in the batch, manufactured a lime glass that equaled in beauty the finest lead glass. This placed lime glass on a basis of competition with lead glass at less than one-half the cost. The almost immediate effect was a complete revolution in the manufacture, the production of lime glass rapidly increasing, while that of lead glass for tableware was soon reduced to a comparatively small quantity. The lime glass was not only cheaper, but had to be worked quicker than the lead glass, resulting, in connection with the use of the press, in a largely increased output.

The quantity of pressed ware manufactured has been greatly increased in the last decade by the removal of the arbitrary limit placed on the number of pieces to be made in a "turn" by the worker, and by the improvement of the old-style press by adding a rotating table carrying a series of molds, and operated by steam, compressed air, or electricity. The effectiveness of these improvements has been further increased by elaborating on the old wind system for cooling molds and workers. This increase in the speed of the old press without changing its basic form, and in that of the fire polishing and finishing operation, have been the notable changes during the last twenty years.

The effort to increase rapidity of production, especially in the last decade, was the principal characteristic of the pressed-ware trade. So well has this succeeded by the use of the improved press and continuous tank, that it has resulted in a large increase in the quantity manufactured, of common tumblers and jelly glasses, cheap, unfinished tableware, common lamps, etc., and a

[1] Tenth Census of the United States, "Report on Glass Manufacture," by Joseph D. Weeks, special agent, page 58.

large reduction in cost, although the best grade of pressed ware is still made on the old hand press. For years American pressed tableware has been unrivaled in brilliancy and in its close imitation of the real cut glass, the fire-polish finish being the greatest factor in this success. In beauty and variety of design, pressed tableware has equaled if not surpassed the real cut ware, new designs being produced each year in great profusion and at large cost.

During the last decade great mechanical progress has been made in the blown glass branch of the industry, but not to such an extent as in the production of fruit jars. Since 1897 a large number of thin blown tumblers have been made by machinery, and the same machine has been successfully applied to the manufacture of lamp chimneys, although trade conditions have restricted its advantages and prevented its operation in the manufacture of the latter to the extent reached on tumblers. In the manufacture of both tumblers and lamp chimneys, the machine greatly increases the output and lessens the expense of skilled labor. The machine has a circular table revolving around a central column or standard, the table carrying a series of duplicate molds, usually six. After the ball of glass has been gathered from the furnace on the blowpipe to the size required for the desired article, it is placed in the mold, which is closed, and the blowpipe held in place perpendicularly over the mold by a clamping device at the top of the machine, which engages with the upper end of the blowpipe. Over the mouthpiece of the pipe is placed a rubber hose which leads to a supply of air, furnished either by a compressing pump, or, if light pressure is required, as with some tumblers, by a fan system. The mechanical rotation of the table admits the air into the pipe, which is kept revolving, and blows up the glass in the mold until it is ready to be turned out for the finishing process. Ingenious mechanism regulates the air pressure. The entire operation is performed with great rapidity and it is claimed that the output of the machine is limited only by the ability of the workmen to supply the glass. The mechanical finishing of ware is now engaging the special attention of manufacturers, and a completely mechanical process, requiring small labor cost to perform the entire operation of finishing the ware after its removal from the blowpipe or mold, is the object sought. Manufacturers generally are of the opinion that more real progress will result from improvements in the finishing process than from further improvements in the mechanical process of making the ware. While the high-speed machine is a success on ordinary ware, both pressed and blown, the manufacture of high-grade ware seems to require the sympathetic touch of the skilled workman.

The manufacture of pressed and blown ware in 1900 was done almost entirely in Pennsylvania, Ohio, Indiana, West Virginia, and New York, only 3.7 per cent of the total value of such products being reported in Massachusetts, Illinois, Maryland, New Jersey, and Colorado. Specialization in manufacture was carried far in many lines, particularly in the manufacture of chimneys, tumblers, and lamps. Competition in nearly all lines was very active, particularly during the latter part of the decade, creating a strong tendency toward concentration of capacity along special lines, so as to manufacture at the lowest possible cost. The more rapid and safer handling of the ware, economy of working space in the factory, and facilities and conveniences for adding to the efficiency of the working force were considerations that received the greatest attention. Competition was so intense at the opening of the census year that all previous agreements between manufacturers as to prices were useless, and consequently prices of pressed and blown ware were unusually low. This was the principal cause of the formation of two close consolidations and additional general associations for the regulation of prices. The result was a decided improvement in prices during the latter half of the year. In July, 1899, a consolidation was effected of 7 establishments which manufactured lamp chimneys exclusively, and on November 1, 1899, 19 large pressed and blown ware establishments, equipped with about one-half of the available capacity of the United States, making a general line of tableware, tumblers, and novelties, came under the control of one central company. In 1891 a similar consolidation of 13 tableware establishments, principally in the immediate neighborhood of Pittsburg, Pa., was formed, and the number of plants was increased later. During the census year this company operated only 6 factories, 3 of which were in Pittsburg.

In the early part of the census year nearly all the manufacturers of pressed and blown ware agreed in forming an association to effectively maintain prices, and so successful was this association that on many articles unusually low prices, caused by sharp competition, were succeeded by quite profitable prices, which were well maintained. The association in attaining this end enlisted the aid of the jobbers by the establishment of a liberal rebate system, similar in some respects to the plan adopted by the consolidation of window glass manufacturers in the same year, although the latter went to the extent of forming the jobbers into an incorporated body pledged to cooperate with the manufacturing interests. The several consolidated companies engaged in the manufacture of glass established their headquarters in Pittsburg, which city, although it had lost nearly all the glass factories that had made it famous as the center of American glass manufacture, controlled more completely than ever, at the close of the census year, the manufacture of glass in the United States. Pittsburg was also the headquarters of all the glass-workers' associations, except that of the green bottle blowers, which was at Philadelphia. A large majority of the skilled workmen in the pressed and blown ware

industry were members of the American Flint Glass Workers' Union, which was organized in 1878, and embraced the workmen in 14 different branches of the trade. The membership was about 7,000 and the treasury contained about $100,000. By means of this organization the manufacture was carried on under a practically uniform wage scale and with concerted action as to factory operation.

The manufacture of tableware, which consists of pressed and blown articles in sets ranging from two or three pieces to over a hundred, of very great variety of form and size, was confined to the 4 states of Pennsylvania, Ohio, Indiana, and West Virginia, in the order named. Twenty-seven establishments reported products valued at $2,617,784, or 15.3 per cent of the total value of all ware made in the pressed and blown division of the industry, and numbering 65,514,100 separate pieces. There was a very great variety in the value of the different kinds of ware, but the average value per 100 pieces for the United States was $4.

In Pennsylvania 55.7 per cent of the total quantity, and 60.6 per cent of the total value, was manufactured, and the average value per 100 pieces in that state was $4.35. A large proportion of the product for the state was manufactured in the Pittsburg district. In Ohio 23 per cent of the total quantity, and 25.5 per cent of the total value, was reported, and the average value was $4.43 per 100 pieces. The great bulk of the product was manufactured in the valley of the Ohio River. By the substitution of glass of a cheap quality made in tanks for glass made in pots, and worked with the press at higher speed than customary, and by dispensing with the fire-polishing operation, a class of cheap unfinished tableware and other glassware was manufactured in Indiana during the closing years of the last decade. This largely accounts for the fact that only 11.1 per cent of the total value of tableware manufactured in the United States, compared with 19.3 per cent of the quantity, was made in that state. The average value per 100 pieces was $2.31. The manufacture of tableware in West Virginia was conducted entirely along the banks of the Ohio River, and 2 per cent of the total quantity, and 2.8 per cent of the total value, was manufactured there, at an average value of $5.48 per 100 pieces. A considerable proportion of the product was blown ware.

Considerable rivalry exists among the manufacturers of pressed tableware in the production of attractive designs and decorations. Most of the ware is in imitation of cut ware, and so highly has the art been developed that a careful examination is frequently required to detect the difference. It is the custom with a majority of the establishments to offer new designs at the opening of each year, a large amount of money being expended to secure these designs and to prepare the required molds. The profitable life of a design, unless it is unusually popular, is limited to one season, its place being taken by some new idea expected to better catch the popular fancy. A popular design will, in one season, prove extremely profitable, while the losses on unpopular designs are so great as to make the expression of the public's favor an exceedingly interesting matter to the manufacturers. Popular favor has changed in the last decade from imitation cut ware to plain ware, and from that to highly decorated ware, but the imitation cut ware has been in most constant demand, although within the last few years colored ware and plain crystal with gold decorations have been strongly favored. Within the last half of the decade the manufacture of colored ware, to compete with the influx of imported Bohemian ware, has been assuming shape, and it seems probable that this profitable field will not much longer be left wholly undisputed to the foreign manufacturer.

Tableware has long formed a large proportion of the exports of glass from the United States, by reason of its superiority of color and design. The export branch of the business received special attention in 1900, traveling representatives having been sent through South America, Australia, and the United Kingdom, and a number of permanent agencies were established by the larger interests. For a long period large quantities of American tableware have been used in Canada, and a field of large proportions is being opened in Australia, one glass manufacturing establishment during the census year, having made a single direct shipment to that country of 10 cars, or about 1,500,000 pieces, a small part of which was common lamps. Thirteen establishments reported exports direct from factory of a total value exceeding $100,000, to Canada, Australia, Mexico, South America, Cuba, Hawaii, England, and Germany. This represented only a small part of the total exports of tableware during the census year, as the bulk of the trade was done through exporting houses. A growing tendency has been noted on the part of the manufacturers to export direct from the factories, and foreign needs are being closely studied with a view to the increase of the export trade in the future.

Jelly glasses and pressed tumblers and goblets, 102,528,600 pieces in number, valued at $2,007,386, were manufactured by 28 establishments in 5 states in 1900. The value of such ware was 11.8 per cent of the total value of all pressed and blown ware manufactured in the United States. The average value was 23 cents per dozen.

In Pennsylvania 36.4 per cent of the total quantity and 39.5 per cent of the total value was manufactured, and the average value for the state was 25.5 cents per dozen. The proportion manufactured in Indiana was 31.4 per cent of the total value and 35.7 per cent of the total quantity, at an average value of 21 cents per dozen. From Ohio was reported 9.6 per cent of the total value and 19.7 per cent of the total quantity, at an average value of 23 cents per dozen. The remaining 9.5 per cent of total value and 8.2 per cent of total quantity

was manufactured about equally in Maryland and West Virginia, at an average value of 27 cents per dozen. At the close of the census year two large establishments, intended solely for the manufacture of jelly glasses and tumblers, were being built in West Virginia, and a large establishment was being erected in Ohio for the manufacture of the same class of ware by machinery and methods that were expected to still further reduce the cost and increase the possible output.

At the censuses of 1880 and 1890 incomplete returns were made of the manufacture of tumblers and goblets. In 1880, 46,415 dozen "tumblers" were reported from Massachusetts, 409,713 dozen from Ohio, and 2,500,000 dozen from Pennsylvania. In 1890, 5,438,700 dozen "tumblers and goblets," valued at $555,273, were reported as manufactured in Ohio; and 2,481,600 dozen, valued at $780,059, in Pennsylvania. The use of jelly glasses and tumblers in the packing trade is steadily increasing and there has been a steady growth in the exports.

Lamps manufactured in 1900 numbered 807,765 dozens, valued at $1,498,675, or $1.86 per dozen. They were in many varieties, from the most common pressed lamps to those ornately fashioned, and their value was 8.8 per cent of the total value of all pressed and blown ware. By far the largest proportion consisted of the commonest pressed grades. The manufacture was confined to 6 states and 27 establishments, several of which made a specialty of highly decorated lamps. The largest factory in the world making decorated lamps exclusively was located in Pennsylvania. Great progress was made during the last decade in the manufacture of decorated lamps of a medium grade, and this branch of the industry is receiving increased attention.

In Pennsylvania 65.6 per cent of the total value and 56.4 per cent of the total quantity was manufactured, at an average value of $2.16 per dozen. The largest proportion of Ohio's total product was common lamps; the quantity manufactured was 23.7 per cent of the total quantity, and the value 12.4 per cent of the total value, with an average value of 97 cents per dozen. In West Virginia, with the bulk of the production of decorated lamps, 18.4 per cent of the total value and 7.6 per cent of the total quantity was manufactured at an average value per dozen of $4.47. The lamps manufactured in Indiana were largely of a cheap grade; the quantity manufactured was 10.1 per cent of the total quantity, and the value 2.9 per cent of the total value, at an average value of 53 cents per dozen. Lamps were manufactured also in New York and Massachusetts, the product of the former state being largely common lamps, and that of the latter a better grade of ware.

The use of the tank in lamp manufacture has made possible a considerable reduction in cost from that of the old pot-melting method which was in general use in 1890. The manufacture of pressed lamps has been steadily increasing, resulting in a large reduction in the cost of the common article.

The value of lamp chimneys manufactured in 1900 was $2,719,583, the greatest in value of any single product reported under the pressed and blown glass branch of the industry, and was 15.9 per cent of the value of all pressed and blown glassware. The manufacture was reported in 6 states, but 90.4 per cent of the total value of products was manufactured in Indiana, Pennsylvania, and Ohio. The average value per dozen for the United States was 39 cents. Indiana led, with a product constituting 45.1 per cent of the total quantity and 44 per cent of the total value, the average value being 38 cents per dozen. Pennsylvania was second with 26.6 per cent of the total quantity and 23.5 per cent of the total value, at an average value of 35 cents per dozen. The quantity of lamp chimneys manufactured in Ohio was 21.9 per cent of the total, and the value 22.9 per cent; the average value per dozen was 42 cents. The remaining states in which lamp chimneys were manufactured were Illinois, New York, and Massachusetts. There were 27 establishments engaged in the manufacture.

A comparison of the statistics for 1900 with the incomplete statistics for 1890 and 1880 shows how the manufacture of chimneys has moved westward, following the natural gas and cheap fuel, and also gives some idea of the extent the production has been curtailed by the increased use of gas and electric light. The total number reported in 1890 was 7,534,473 dozens, valued at $1,816,016, and distributed as follows: Ohio, 4,025,120 dozens, valued at $541,836; Pennsylvania, 2,885,841 dozens, valued at $1,017,639; New York, 623,512 dozens, valued at $256,541. In 1880 the total number reported for the United States, no value being given, was 4,463,140 dozens, distributed as follows: Pennsylvania, 2,719,649 dozens; New York, 888,639 dozens; Ohio, 743,140 dozens; and Massachusetts, 111,712 dozens. No lamp chimneys were reported as manufactured in Indiana in either 1880 or 1890; this state was first, however, in 1900 in this branch of the industry, and succeeded Ohio, which was the leading state in 1890. This change in the relative positions of these two states was coincident with a similar change in the supply of natural gas. A decrease of 8.4 per cent in the total quantity manufactured in the United States is shown from 1890 to 1900, while the total value in 1900 exceeds that of 1890 by 49.8 per cent; this was due largely to the extremely low value reported for the product of Ohio in 1890, which was more than one-half of the total quantity reported at that time.

During the last decade the improvement in the manufacture of lamp chimneys was shown by better quality and a greater variety of design. There has been a large increase in the use of higher grade chimneys of special design. Special attention has been given to the package for fine grade ware, and a large number of such chimneys have, within the last few years, been packed in separate cartons, resulting in a decided improvement in appearance and in safety of shipment.

The manufacture of lamp chimneys by the blowing machine was limited to two factories in 1900, and in only one of these plants was it carried on extensively, being confined largely to a cheap class of goods. Machine-blown lamp chimneys will probably represent a large proportion of the production in the near future, although it is questioned if the higher grades of chimneys will not require hand work. During 1900 the lamp chimney market was fairly well regulated by an agreement between the largest manufacturing interests, but a number of small establishments in Indiana were causing demoralization in lime glass chimneys, or the cheap grade of goods. During the census year the tank furnace became a factor in the manufacture of the common lime glass chimneys, 4 tanks being reported. Great strides had also been taken toward improved factory equipment for handling the ware; lehrs operated by electricity, electric conveyors to take the ware from the lehr to the packer and then to the stock room or car, were among the improvements made, together with a great increase in the rapidity of the finishing operation. A good export trade has been developed in this branch of the industry. Large shipments have been made for many years by export houses, but during the census year the manufacturers renewed attempts to reach the export trade direct, and a special effort to introduce the American lamp chimney into England was successful, 66,667 dozen chimneys being reported as sent direct from factory to England during the year. The remainder of the exports that were shipped direct from the factories were sent to South America and Mexico.

Lantern globes were manufactured during the census year in 6 states by 27 establishments, and the number reported was 1,044,816 dozens, valued at $497,021, or 2.9 per cent of the total value of all pressed and blown ware manufactured. The average value per dozen was 48 cents, the average value by states ranging from 25 cents to $1.17 per dozen, depending upon the quality of the ware. There were two establishments employed exclusively in the manufacture of lantern globes, one in Indiana and one in West Virginia. The percentages of the product manufactured in the leading states, of the total for the United States, are as follows: Indiana, 52.4 per cent of the quantity and 35.4 per cent of the value, with an average value per dozen of 32 cents; New York, 15.5 per cent of the quantity and 38.2 per cent of the value, with an average value per dozen of $1.17; Ohio, 13.7 per cent of the quantity and 14 per cent of the value, with an average value per dozen of 49 cents; West Virginia, 12.6 per cent of the quantity and 6.6 per cent of the value, with an average value per dozen of 25 cents; Pennsylvania, 5.6 per cent of the quantity and 5.4 per cent of the value, with an average value per dozen of 46 cents. A small proportion was manufactured also in Massachusetts. Indiana and West Virginia supplied the great bulk of the output of cheap lantern globes, while New York led in the manufacture of ware of a higher grade. There were no statistics of the manufacture published at the census of 1890, but a great increase has been made during the decade. During the census year very active competition on the cheaper grades of lantern globes was developed. More than 10,000 dozen lantern globes were reported in 1900 as exported direct from the factories to Mexico and Central America; this represented but a small part of the total exportation.

The manufacture of pressed and blown shades, globes, electric bulbs, and glassware for gas and electric lighting ranked third in value of products in the pressed and blown ware branch of the industry in 1900, being 14.6 per cent of the total. The shades and globes ranged in quality from the plain pressed Welsbach gas article to the most costly and artistic products in fine plain and colored glass, richly decorated, engraved, or etched. The manufacture of glassware for the Welsbach gas light had developed to a very large extent. Electric glassware, such as incandescent bulbs and arc globes, formed a large item, although foreign competition in that line was quite active. The manufacture of gas and electric glassware has been largely a development of the last decade, and it is now one of the specialized lines of the industry. Although the increased use of gas and electricity has curtailed the use of the oil lamp in some quarters, yet a tendency has been shown toward the use of fancy lamps with highly decorated or ornamented shades and globes, more for decorative effect, probably, than real use, and this has greatly stimulated the production of globes and shades of a much higher quality in general than was ever before manufactured. The total production of shades, globes, and gas and electric goods in 1900 was manufactured in 7 states, from 3 of which, Pennsylvania, New York, and Ohio, 94.9 per cent of the total value was reported. There were 30 establishments engaged in the manufacture of these goods on a more or less extensive scale. The average value per dozen for the United States was 93 cents, the average value by states varying as the bulk of the output was cheap gas and electric ware or decorated shades and globes.

From Pennsylvania was reported 32 per cent of the total quantity and 58.1 per cent of the total value, the average value per dozen being $1.70. Large quantities of medium-priced globes and shades, cheap gas goods, and a valuable production of globes and shades of the finest quality were manufactured in that state. In New York a large quantity of high-grade shades and globes, and a large output of electric bulbs were manufactured. The quantity of articles of this class manufactured was 11.7 per cent of the total, and the value 20.8 per cent, with an average value per dozen of $1.66. A large number of electric bulbs was manufactured in Ohio, which was third in rank as to value of products, but was far in the lead as to quantity, with 52.3 per cent

of the total quantity reported and 16 per cent of the total value, the average value per dozen for the state being 28 cents. Shades, globes, and gas and electric goods were manufactured also in West Virginia, Massachusetts, Indiana, and New Jersey. Decorated shades and globes constituted the larger part of the product in West Virginia, and the product in Indiana was electric and gas ware, at an average value of 13 cents a dozen. Shades and globes were manufactured in Massachusetts, and in New Jersey the product was entirely electric bulbs. Great improvements have been made in the last few years in the package for shades and globes, nearly all the better grade being packed in separate cartons. The export trade has had a steady growth, but complete statistics were not obtained from the factories. A total of 44,200 dozen articles in this branch of the industry, mostly electric ware, was reported in 1900 as shipped direct from the factories to Canada, the West Indies, South America, and Australia. By far the largest proportion was exported to Canada.

Blown tumblers, stemware, and bar glasses, 6,127,367 dozen in number, were reported in 1900 by 17 establishments in 4 states. These products constituted 9.4 per cent of the value of all pressed and blown ware manufactured. The average value per dozen for the United States was 26 cents. The manufacture of this class of ware has become greatly concentrated, 94.3 per cent of the total value of products being reported from Pennsylvania and West Virginia. The percentages of the total quantity and total value manufactured in the two leading states are as follows: Pennsylvania, 57.3 per cent of the quantity and 69.3 per cent of the value, with an average value of 31 cents per dozen; West Virginia, 37.4 per cent of the quantity and 25 per cent of the value, with an average value of 17 cents per dozen. The remainder of the product was manufactured in Ohio and Indiana, the average value per dozen in Ohio being 25 cents, and in Indiana, 34 cents. The returns do not embrace the total production of blown tumblers, as many were reported under "cut glass," having received light cutting. A large proportion of the lower grade of blown tumblers manufactured in Pennsylvania was made on the blowing machine, but practically all the finer grades were made by hand. Great improvements in the finishing of this class of ware have been made in the last few years, and much of the "cracking-off" is done by a machine on which a gas jet is used in place of a wire, one machine, operated by a boy, having a capacity of 9,000 tumblers a day. Improvements in grinding machinery have made it possible for two girls with one machine to grind 22,500 dozen tumblers in a week. For a long period blown tumblers, stemware, and bar goods have formed a large item in glass exports, being shipped to the principal countries of the world in steadily increasing quantities.

Decorated opal or porcelain glassware was very much in favor with the public during the closing years of the last decade. It was made into small-piece sets, in an endless variety of novelties and toilet articles. In 1900 the manufacture of 3,750,443 dozen pieces was reported, representing 9.3 per cent of the total value of pressed and blown glassware manufactured. In large part the decorations were of the cheapest kind, the average price per dozen for the United States being 42 cents. Twenty-six establishments in 6 states reported its manufacture, and 90.7 per cent of the total value of the products was made in Pennsylvania and West Virginia. Establishments in Pennsylvania made 78 per cent of the total quantity and 76.8 per cent of the total value, and in West Virginia 12.8 per cent of the total quantity and 13.9 per cent of the total value. Establishments in Indiana, Ohio, Massachusetts, and New York were engaged also in manufacturing this class of ware. The great demand for decorated opal or porcelain glassware developed within the last half of the decade, and in 1900 its manufacture formed a prominent part in the operations of some of the largest pressed ware establishments in the country, leading to a large increase in the decorating facilities of those plants. The craze for opal ware was decreasing at the close of the census year and the production gave evidence of soon returning to normal proportions.

Cut glassware, 134,726 dozen pieces in number, valued at $672,463, an average of $4.99 a dozen, was reported by 12 establishments in 1900. This report does not cover the numerous glass-cutting establishments in which the basic material used is the glass blank and in which the manufacture consists merely in reworking the glass. A large portion of the cut glass reported from Pennsylvania and West Virginia was light-cut articles, such as tumblers, although there was 1 establishment in Pennsylvania engaged largely in the manufacture of cut ware of the highest grade. The percentages of the total quantity and total value manufactured in the several states are as follows: Pennsylvania, 42.2 per cent of the total quantity and 46.3 per cent of the total value, at an average value of $5.48 per dozen pieces; Massachusetts, only 2.5 per cent of the total quantity but 21.8 per cent of the total value, the average value of $44 per dozen indicating the manufacture of the richest cut ware; the same is true of Ohio, with only 2.2 per cent of the total quantity and 18.7 per cent of the total value, an average value per dozen of $43.45. In West Virginia, with its large production of blown ware, practically all light cutting was done, the product averaging $1.23 per dozen in value; the product of that state was 23 per cent of the total quantity, but only 13.1 per cent of the total value.

West Virginia was first in the number of pieces manufactured, although its product was practically all of the cheapest kind. A small product was also reported from Indiana. The largest part of the cut glass manufactured was made in establishments in which the glass was re-

worked only, and is not included in this report. A list of such establishments, published at the close of the census year, giving the number in each state, was as follows: New York, 21; Pennsylvania, 13; Illinois, 4; Connecticut, 2; and Massachusetts, Rhode Island, New Jersey, West Virginia, and Michigan, 1 each. The industry has had a large growth in the last decade, particularly during the latter part of it, the number of establishments having doubled and the number of frames operated more than trebled. The demand has steadily increased and the market widened as prices have been lowered by competition. The popularity of pressed ware in imitation of cut ware shows the widespread desire for the real cut article. An improvement that will probably be made in the industry is the manufacture of the blank by pressing, increasing the speed of manufacture fourfold over the blowing process. It was for a long time the practice to import the blanks from France for most of the finest grade of ware cut in this country, but the domestic blank is now conceded by competent judges to be equal, if not superior, and is steadily supplanting the imported article. The superiority of American rich cut glass is generally acknowledged at home and abroad.

The amount reported as the value of all other pressed and blown ware products, $1,384,945, includes a large variety of articles for different purposes. One item that has come into prominence during the last few years is the manufacture of prismatic glass for increasing the diffusion of sunlight in buildings. The product of the only establishment manufacturing glass play marbles in the United States, located in Ohio, is included in this total.

The value of all products other than glass reported by establishments manufacturing pressed and blown ware and bottles and jars was $690,562, a large item being packages, particularly for lamp chimneys. According to some manufacturers, the profit in certain lines of chimneys lies entirely in the sale of the package.

MATERIALS.

Table 10 is a comparative summary of the quantity and cost of the materials used, with percentages of increase, for 1890 and 1900.

TABLE 10.—QUANTITY AND COST OF MATERIALS USED, 1890 AND 1900, WITH PER CENT OF INCREASE.

	1900	1890	Increase.	Per cent of increase.
Total cost	$16,731,009	$12,140,985	$4,590,024	37.8
Glass sand, tons	581,720	369,328	212,392	57.5
Cost	$846,822	$899,998	[1]$53,176	[1]5.9
Soda ash, tons	157,779	96,777	61,002	63.0
Cost	$2,259,939	$3,108,233	[1]$848,294	[1]27.3
Salt cake, tons	53,257	38,092	15,165	39.8
Cost	$518,590	$604,179	[1]$85,589	[1]14.2
Nitrate of soda, ons	10,770	7,031	3,739	53.2
Cost	$320,937	$278,291	$42,646	15.3

[1] Decrease.

TABLE 10.—QUANTITY AND COST OF MATERIALS USED, 1890 AND 1900, WITH PER CENT OF INCREASE—Con.

	1900	1890	Increase.	Per cent of increase.
Limestone, tons	91,015	45,482	45,533	100.1
Cost	$181,717	$136,450	$45,267	33.2
Lime, hundredweights	794,679	743,765	50,914	6.8
Cost	$147,901	$150,092	[1]$2,191	[1]1.5
Arsenic, pounds	2,349,261	1,823,007	526,254	28.9
Cost	$112,680	$61,575	$51,055	82.9
Manganese, pounds	1,493,538	610,915	882,623	144.5
Cost	$57,493	$31,080	$26,413	85.0
Litharge, pounds	8,386,106	5,501,559	2,884,547	52.4
Cost	$490,200	$300,096	$190,104	63.3
Potash or pearlash, pounds	4,406,211	2,544,978	1,861,233	73.1
Cost	$186,847	$135,047	$51,800	38.4
Grinding sand, tons	265,438	227,416	38,022	16.7
Cost	$166,040	$151,995	$14,045	9.2
Fire clay or pot clay, pounds	32,151,017	37,066,652	[1]4,915,635	[1]13.3
Cost	$221,183	$328,903	[1]$107,720	[1]32.8
Pots, not including those made at works, number	8,941	8,006	935	11.7
Cost	$381,147	$393,875	[1]$12,728	[1]3.2
Fuel, cost	$3,203,146	$2,340,912	$862,234	36.8
Packages and packing materials, cost	$4,913,544	$1,853,462	$3,060,082	165.1
All other materials, cost	$2,722,873	$1,366,797	$1,356,076	99.2

[1] Decrease.

The cost of materials used in the combined industry of glass manufacture in 1900 was 37.8 per cent greater than in 1890. In nearly all the principal materials, a comparison of returns for 1900 with those for 1890 shows a large increase in the quantity used and a decided decrease in the average cost per unit, notwithstanding the fact that in 1900 the prices of practically all glass-making materials were sharply advanced. An increase of 57.5 per cent is shown in the total number of tons of glass-melting sand reported used in 1900 over 1890, 581,720 tons being reported in 1900 and 369,328 in 1890. On the other hand, a decrease of 5.9 per cent in total cost is shown in 1900 from 1890, the total cost in 1890 being $899,998, while in 1900 the total cost was $846,822. The average cost per ton in 1900 was $1.46 compared with $2.44 in 1890. Glass sand of very fine quality in practically inexhaustible supplies, is found in many parts of the country, although the chief sources of supply are still, as they have been for many years, the Juniata Valley in Pennsylvania; Hancock county, West Virginia; the Fox River district in Illinois; and St. Charles, St. Louis, and Jefferson counties in Missouri. By far the largest proportion of the glass sand used comes from these deposits, although southern New Jersey still furnishes sand for a number of factories in the East, and sand of the finest quality still comes from Berkshire, Mass. The cost of transportation and the fine quality of more available deposits have considerably restricted the output from the latter locality. During the census year a considerable quantity of good glass sand came from Westmoreland county, Pennsylvania.

The preparation of sand for the glass factories became a highly specialized business during the last decade, about a score of establishments being exclusively engaged in the industry, with elaborately equipped plants representing large investments. The active competition which developed among these establishments is

principally accountable for the large decrease in price in 1900 compared with 1890. Eight establishments in the Juniata Valley were merged under one head during the census year and prices on all grades of sand were sharply raised. Many glass manufacturers, however, had contracted for their supply for the season during the period of low prices, and, in addition, two of the largest manufacturing interests were mining and preparing their own sand to a large extent, making it cost them considerably below the average. Competition has led to the greatest care and attention in the preparation of the glass sand and the maintenance of a high quality.

The supply of soda ash for glass manufacture formerly came almost entirely from England; but during the last decade, through the development of the Solvay process, practically all soda ash used in glass making was of domestic manufacture, coming mainly from Syracuse, N. Y., and near Detroit, Mich. A large plant was projected during the census year at Barberton, Ohio, by glass manufacturing interests. One of the greatest advances in the domestic manufacture of soda ash was the establishment during the decade of large works at Wyandotte, Mich., by glass manufacturers to directly supply their wants. The number of tons of soda ash reported in 1900 was 157,779, compared with 96,777 tons in 1890, an increase of 63 per cent, while the total cost in 1900 was $2,259,939, compared with $3,108,233 in 1890, a decrease of 27.3 per cent. The average cost per ton in 1900 was $14.32, compared with $32.12 in 1890. The demand for soda ash in 1900 was unusually large, exhausting the domestic supply and greatly increasing importations. This abnormal demand came from outside the glass industry, the textile industry using a large quantity, and is shown by the large increase of importations in 1900 over 1899. As reported by the Bureau of Statistics of the Treasury Department, imports entered for consumption were 80,118,967 pounds, valued at $665,104, in 1900, compared with 41,844,101 pounds, valued at $304,549, in 1899.

The salt cake used in glass making twenty years ago was nearly all imported, but the greater portion of the amount consumed in the census year was of domestic manufacture, many large chemical manufacturers furnishing it, to the almost total exclusion of the foreign product. Competition has lowered the average cost per ton 38.6 per cent from 1890 to 1900, the average cost per ton for the respective years being $15.86 and $9.74. The number of tons used in 1890 was 38,092, costing $604,179, compared with 53,257 tons in 1900, costing $518,590, an increase in quantity of 39.8 per cent and a decrease in cost of 14.2 per cent.

Practically the entire supply of nitrate of soda used in glass manufacture in the United States comes from South America. The number of tons used in 1890 was 7,031, costing $278,291, compared with 10,770 tons in 1900, costing $320,937, an increase in quantity of 53.2 per cent and in cost of 15.3 per cent. In 1890 the average price per ton was $39.58, compared with $29.80 in 1900.

The number of tons of limestone used in glass manufacture in 1900 was 91,015, costing $181,717, or an average of $2 per ton, compared with 45,482 tons in 1890, costing $136,450, or an average cost of $3 per ton. The increase in the quantity used in 1900 over 1890 was 100.1 per cent, and in cost 33.2 per cent. Ohio and Indiana were the principal sources of supply.

The quantity of lime used in 1900 was 794,679 hundredweight, costing $147,901, compared with 743,765 hundredweight in 1890, costing $150,092, an increase in 1900 over 1890 of 6.8 per cent in quantity and 1.5 per cent in cost. The average cost per hundredweight in 1890 was 20.2 cents, and in 1900 was 18.5 cents. Much of the lime is wood-burned and ground and bolted, the industry being highly developed in Seneca county, Ohio, and vicinity.

England has been the chief source of the supply of arsenic used in glass manufacture. Recently, however, the imports from that country have been greatly reduced by the supply from the gold fields of British Columbia. At the close of the census year, movements were in progress which promised to result in the development of the manufacture in this country, and it is confidently asserted that in a few years the glass industry will be supplied entirely by arsenic of domestic manufacture. In 1890, 1,823,007 pounds were reported, costing $61,575, and in 1900, 2,349,261 pounds, costing $112,630, an increase of 28.9 per cent in the quantity and 82.9 per cent in the cost.

Manganese, which comes largely from Saxony, was used in 1890 in glass making to the extent of 610,915 pounds, costing $31,080, compared with 1,493,538 pounds in 1900, costing $57,493, an increase in quantity of 144.5 per cent and in cost of 85 per cent. The average price per pound was 5.1 cents in 1890 and 3.2 cents in 1900.

The proportion of litharge manufactured in the United States for use in glass manufacture is steadily increasing, but a large proportion is still imported from England. The quantity used in 1890 was 5,501,559 pounds, costing $300,096, compared with 8,386,106 in 1900, costing $490,200, an increase in quantity of 52.4 per cent and in cost of 63.3 per cent. The average cost per pound in 1890 was 5.5 cents and in 1900 was 5.8 cents.

There were 2,544,978 pounds of potash or pearlash, which was supplied principally from Germany, used in 1890, costing $135,047, compared with 4,406,211 pounds in 1900, costing $186,847, an increase in quantity of 73.1 per cent and in cost of 38.4 per cent. The average cost per pound in 1890 was 5.3 cents and in 1900 was 4.2 cents.

A notable increase is shown in the consumption of

packages and packing materials in 1900 over 1890. The cost of such materials in 1890 was $1,853,462 compared with $4,913,544 in 1900, an increase of 165.1 per cent. The neatness of the package received special attention during the latter part of the decade, and great improvement has resulted, compared with the practice followed formerly.

IMPORTS AND EXPORTS OF GLASS.

Table 11 presents the value of the different kinds of glass imported and exported from 1869 to 1900, inclusive.

TABLE 11.—VALUE OF GLASS IMPORTED AND EXPORTED: 1869 TO 1900.[1]

YEAR.	IMPORTS.										EXPORTS.		
	Total value.	Bottles, vials, carboys, etc.[2]	Cylinder and common window glass, unpolished.	Cylinder and crown glass, polished.		Plate glass.			Glass plates or disks for optical instruments.[4]	All other.	Total value.	Window glass.[5]	All other.
				Unsilvered.	Silvered.[3]	Fluted, rolled, or rough.	Cast, polished, unsilvered.	Cast, polished, silvered.					
1900	$5,037,931	$464,483	$1,555,924	$539,082	$286	$7,915	$226,295	$12,413	$125,449	$2,106,084	$1,936,119	$36,218	$1,899,901
1899	4,303,660	371,394	1,275,184	521,957	622	9,528	283,190	419	119,832	1,771,534	1,503,651	32,690	1,470,961
1898	3,782,617	338,861	953,116	569,380	66,768	9,880	161,637	562	107,572	1,574,841	1,211,084	23,480	1,187,604
1897	5,603,868	600,308	1,181,696	801,412	772,296	18,245	285,485	21,870	94,242	2,328,314	1,208,187	13,369	1,194,818
1896	7,528,420	382,101	1,067,999	190,704	1,158,321	23,486	773,250	34,119	92,628	3,805,812	1,062,225	14,994	1,047,231
1895	6,627,473	531,904	835,780	61,212	782,778	23,990	684,131	16,740	85,794	3,605,194	946,381	11,140	935,241
1894	5,288,697	606,188	1,067,787	22,314	786,004	38,121	449,086	75,106	71,881	2,272,215	922,072	19,811	902,761
1893	8,082,639	739,037	1,496,326	91,559	1,679,185	70,493	829,596	154,404	60,898	2,961,141	973,827	10,229	963,598
1892	8,828,952	827,761	1,674,679	158,464	1,549,968	56,162	887,626	119,201	69,988	3,485,103	942,302	10,238	932,064
1891	8,468,935	926,010	1,475,338	91,248	1,912,391	78,080	1,351,808	183,015	99,623	2,846,472	868,374	11,244	857,130
1890	7,411,843	912,704	1,461,736	74,546	1,529,401	84,715	931,323	240,819	58,830	2,108,269	882,677	8,910	873,767
1889	7,724,662	825,411	1,444,982	91,105	756,577	130,172	933,316	1,243,455	10,741	2,238,903	894,200	16,864	877,336
1888	7,867,263	815,564	1,397,898	95,147	59,208	131,224	1,258,736	1,801,514	12,538	2,295,434	881,628	10,733	870,895
1887	7,336,771	739,240	1,420,159	85,500	1,262	90,899	1,191,134	1,647,154	16,876	2,144,547	883,504	15,955	867,549
1886	6,858,085	609,435	1,360,955	27,807	.....	107,057	907,267	1,528,379	19,988	1,797,197	773,878	8,246	765,632
1885	6,256,194	590,160	1,630,844	18,287	189	118,693	900,461	1,192,147	.....	1,805,413	783,915	10,055	773,860
1884	7,552,498	521,787	2,431,068	28,695	.....	101,777	959,817	1,387,728	.....	2,121,626	839,756	18,665	821,091
1883	7,762,543	.....	1,736,700	62,630	.....	62,898	1,145,709	1,226,482	.....	3,528,174	998,857	.....	998,857
1882	6,634,371	.....	1,387,257	27,117	.....	56,407	1,183,482	943,706	.....	3,036,402	864,235	.....	864,235
1881	5,878,025	.....	1,414,709	57,754	.....	32,422	979,452	833,385	.....	2,560,303	756,022	.....	756,022
1880	5,221,511	.....	1,439,447	15,601	.....	22,799	835,496	911,144	.....	1,997,024	749,866	.....	749,866
1879	3,222,479	.....	595,070	11,110	.....	6,527	699,459	575,549	.....	1,334,764	768,644	.....	768,644
1878	3,845,149	.....	812,612	7,168	.....	5,685	885,823	572,066	.....	1,061,795	869,682	.....	869,682
1877	3,936,786	.....	1,006,456	8,482	.....	14,405	1,263,864	552,899	.....	1,090,680	658,061	.....	658,061
1876	4,806,948	.....	1,292,020	5,448	.....	29,069	1,358,881	773,423	.....	1,348,107	628,121	.....	628,121
1875	5,805,115	.....	1,656,040	21,166	.....	47,265	1,620,032	887,847	.....	1,572,765	691,310	.....	691,310
1874	6,257,964	.....	1,881,368	14,933	.....	34,237	1,655,909	901,512	.....	1,710,005	631,827	.....	631,827
1873	7,420,044	.....	2,759,728	21,217	.....	34,180	1,550,857	823,076	.....	2,230,986	627,562	.....	627,562
1872	5,834,712	.....	2,103,827	23,931	.....	17,697	1,063,810	803,487	.....	1,821,960	547,112	.....	547,112
1871	4,269,620	.....	1,447,292	16,738	.....	26,191	919,435	651,487	.....	1,208,477	466,447	.....	466,447
1870	4,157,634	.....	1,459,067	18,501	.....	24,684	820,252	615,347	.....	1,219,783	580,654	.....	580,654
1869	3,895,739	.....	1,466,138	25,885	.....	22,173	717,952	625,388	.....	1,038,253	580,718	.....	580,718

[1] Reports of United States Treasury, Bureau of Statistics.
[2] Included in "all other" glass and glassware imported previous to 1884.
[3] Included in "unsilvered cylinder and crown glass, polished" previous to 1885.
[4] Not separately reported previous to 1886.
[5] Included in "all other" glass and glassware exported previous to 1884.

The import figures presented in Table 11 for "cylinder and crown glass, polished," and plate glass, silvered and unsilvered, show the great victory the American manufacturers of polished plate glass have gained in superseding the foreign article, particularly the foreign mirror plate, by glass of domestic manufacture. The silvered, polished crown glass is styled German looking-glass plate, while the silvered polished plate glass is what is commonly known as French mirror plate. The German plate is lighter and inferior to the French plate and is nearly all imported under 5 square feet in dimensions, while the French plate is of larger sizes. From 1869 to 1889, inclusive, the value of importations of French mirror plate was nearly equal to the imports of polished plate glass unsilvered, the aggregate value of the French mirror plate during the twenty-one years being $20,557,075 while the value of the unsilvered polished plate was $22,901,144. Previous to 1885 the importations of the German mirror plate are included in the table with the unsilvered polished cylinder and crown glass, the larger part of the polished cylinder and crown imported to that date being employed for car windows and similar uses where a glass thinner than ordinary plate and of better quality than common window glass was desired. The importations of silvered German mirror plate previous to 1889 were inconsiderable, but in that year their value increased from $59,208 in 1888 to $756,577, or 1,177.8 per cent.

The year 1889 marked the beginning of the decline of the importations of French mirror plate and the growth of the importations of German plate. The value of imported French silvered plate in 1890 was only $249,819, a decrease of 79.9 per cent from the previous year; this was due in part to the introduction of American plate, but more to the remarkable increase in importations of the cheaper German plate.

The value of the German silvered plate imported in the same year increased $772,824, or 102.2 per cent over 1889. For the next seven years, German silvered plate importations exceeded in value the combined value of silvered and unsilvered polished or French plate. The plate glass manufacturers of the United States during this time were directing their competition against the more profitable field filled by the French silvered and unsilvered plate, so that the German plate had nearly a clear field. However, an increase of plate glass productive capacity in the United States in 1894 produced a period of low prices that caused large reductions in the value and number of square feet of all foreign plate imports, reducing the value of imported French mirror plate 51.4 per cent from 1893 to 1894; German silvered plate 53.2 per cent; polished plate and rough plate, each 45.4 per cent; and unsilvered polished cylinder and crown glass 75.6 per cent. From this period of low prices a better organization of the American plate glass manufacture developed, a consolidation of individual companies controlling a large percentage of the capacity being formed; and the fight against foreign glass was carried on so successfully that from 1894 French mirror imports have dwindled to insignificant proportions, being, in 1900, 83.5 per cent less than in 1894 and 95 per cent less than in 1890. During 1895 and 1896 imports of polished plate, unsilvered, increased to some extent, caused largely by the sale in the United States at low prices of surplus foreign stock. After 1896, however, the American manufacturing interests lined up more closely against the foreign trade, and since then the value of imported polished plate has been gratifyingly small, showing in 1900 a decrease of 70.4 per cent from 1896 and 79.8 per cent under the total value of 1890.

While German mirror import values received a decided check in 1894 and 1895, the next two years witnessed a revival and a change in the form of importation, an increased quantity being imported unsilvered, to be silvered by American mirror makers. Table 11 shows a marked decrease in the value of silvered German plate imports in 1897 and a considerable increase in the unsilvered imports. American competition has made it advantageous to have the silvering done in this country. With French mirror plate practically excluded, the plate-glass manufacturers of the United States took up the German mirror plate problem, and by selling superior polished plate to the mirror trade at cost, or less, reduced the value of German plate imports, unsilvered and silvered, nearly one-half in 1897, and at present have stopped the importation of the German silvered plate even more completely than they have the French product. In 1900 practically all the German plate was imported unsilvered, and was much less than the total quantity, silvered and unsilvered, annually imported from 1890 to 1897.

A portion of the imported polished cylinder and crown glass comes in competition with domestic window glass for car windows, but the expected development of the manufacture of thin polished plate glass in this country may probably supplant the foreign article for high-quality and light-weight glazing purposes. Ninety-five and five-tenths per cent of the total quantity of unsilvered polished cylinder and crown glass imported in 1900 was shipped from Germany, the remainder being divided among Austria-Hungary, Belgium, France, Netherlands, and the United Kingdom. Of the total quantity of fluted, rolled, and rough plate imported in 1900, the United Kingdom supplied 91.3 per cent and France, Belgium, and Germany, the remainder. The importation of polished plate glass is controlled by an European syndicate, and is apportioned among the various producing countries; Belgium furnishing, in 1900, 80.2 per cent of the total quantity; Germany, 8.1 per cent; and the United Kingdom and France, practically all the remainder. The extent of the importation is determined largely by trade conditions abroad, this market being used for the disposal of surplus products, with slight regard to price. New York is the principal port of entry for plate glass.

The value of importations of fluted, rolled, and rough plate has steadily decreased, being, in 1900, 90.7 per cent less than in 1890. The total value of such imports in 1900 was nearly equaled by the direct export shipments of one American skylight factory.

Window glass importation values have maintained comparative regularity during the last thirty years. The total value of window glass imported during the decade ending with 1880 was $14,993,860; from 1880 to 1890, $15,686,308; and from 1890 to 1900 the value was $12,583,779. While the total value of window glass imported during the last decade was less than that of each of the two preceding decades, the value in 1900 exceeded that in 1890 by 6.4 per cent; 1880 by 8.1 per cent; and 1870, by 6.6 per cent. The number of pounds imported in 1900, as reported by the United States Treasury Bureau of Statistics, was 51,343,339, which, estimating 70 pounds to the 50-foot box, 25 per cent double strength, equals 733,476 boxes, or 16.9 per cent of the quantity manufactured in the United States in that year. The number of pounds imported during each of the preceding ten years was as follows: 1899, 47,202,267; 1898, 38,908,992; 1897, 55,961,813; 1896, 53,182,301; 1895, 40,786,279; 1894, 52,437,068; 1893, 63,715,989; 1892, 72,682,127; 1891, 58,932,738; 1890, 73,112,550. The imports, 92.7 per cent of which come from Belgium and the remainder from the United Kingdom, Germany, and France, are regulated largely, as in plate glass, by the condition of the foreign market. The Continental and far Eastern markets are the most profitable fields for Belgian window glass, and if the demand in these markets is weak and a surplus stock accumulates in Belgium, increased shipments to the United States follow. Belgian glass, the product of

cheaper labor, constantly acts as a check on window-glass prices in the United States, for unless the demand abroad is unusually strong, the first announcement of high prices in this country results in an increase of exports. The foreign window glass, as in the case of plate glass, was for a long time credited with superior quality, especially as to finish, but in both cases that claim has been disproven in the progress of the American plate and window glass manufacture during the last decade. In 1900 Boston, Mass., was the principal entry port for foreign window glass, followed by New York, N. Y. The entry ports for the South are St. Louis, Mo.; Baltimore, Md.; Newport News, Va.; and New Orleans, La. Previous to 1901 most of the window glass used on the Pacific coast was of foreign manufacture, entering principally at San Francisco. The cheapness of ballast freight rates of wheat-carrying ships returning to the Pacific coast, compared with the expensive overland freight rates from the domestic window-glass factories, gave the foreign glass a great advantage, but American manufacturers, by a decided differential in price and systematic distributing arrangements, have succeeded lately in steadily reducing the importations to that section of the country.

The value of imports of bottles, vials, carboys, etc., has shown an almost constant decrease from year to year during the last ten years. The total value in 1900 was $464,483, or 49.1 per cent less than in 1890. About one-half of the total importation consists of bottles filled with liquors, mineral waters, etc., and the principal exporting countries are Germany, France, Austria-Hungary, and the United Kingdom, in the order named. The importation of empty bottles, therefore, is very small in comparison with the domestic output. New York and Baltimore are the chief entry ports, but many unfilled bottles enter at San Francisco, coming over at cheap rates in returning wheat-carrying ships. Boston, New Orleans, and Philadelphia, also have large receipts.

The importation of optical glass has steadily increased, the development of the photographic camera being a strong stimulant. A large portion of the total importation enters in the New York camera district at Rochester, N. Y. Germany furnished 43.7 per cent of the total value in 1900; the United Kingdom, 33.7 per cent; and France, 22.6 per cent. Attempts have been made in this country to make optical glass, but the manufacture has never passed beyond the experimental stage, and at present even experimenting has ceased. The time and care required and the uncertainty as to results attending every melt, in face of the free entry of these products from countries long skilled in the art, make the manufacture of optical glass an unattractive proposition to glass manufacturers in the United States.

A large proportion of the $2,106,084 reported as the value of "all other" glass imports in 1900, was that of fancy decorated Bohemian glassware, much of it made to sell at low prices. The fancy colored and decorated ware, of the Bohemian order, is as yet but a small item in glass manufacture in the United States, although a large quantity is purchased. Increased attention is being given to it, and such success was achieved in its manufacture during the census year by at least one firm, that it will very likely have a vigorous growth during the next few years. Decorated opal or porcelain glass has met with great favor in this country for several years, and in addition to the large quantity of home manufacture, a considerable quantity has been imported, mostly from Germany. Germany has a large trade in chemical glassware for laboratory use, and, with England and France, is finding a rich and almost undisputed field here for that class of ware. The manufacture of chemical ware has been carried on in the United States in a small way, but a recent movement among American chemists in favor of home manufacture has caused more or less agitation among glass manufacturers, and gives promise of leading to a determined attempt on the part of one or two firms, to establish the industry on a larger scale in this country.

Great progress has been made in recent years in the manufacture of expensive "art glass" of the highest order. One of the exhibits which attracted considerable attention from glass men of all countries at the Paris Exposition was a new art glass manufactured by a firm in New York city. High-grade lamps, unsurpassed by any manufactured, have been produced in this country. Watch crystals, which are not manufactured in the United States, although it was attempted recently in West Virginia, are imported in large numbers of small aggregate value. The process of manufacture is simple, and it will in time probably form a part of the American industry. A thin round ball or bubble of glass is blown, and from this, with diamond-pointed compasses, the circular disks are cut, which are then placed on properly shaped blocks and bent to the required shape by reheating. Of the total value of "all other" glass imports, 33 per cent comes from Germany, 28.1 per cent from Austria-Hungary, 23.1 per cent from France, 7.8 per cent from the United Kingdom, and 6.3 per cent from Belgium.

Table 11 presents, in addition to the value of imported glass, the value of glass of domestic manufacture exported annually, from 1869 to 1900, inclusive.

The exportation of all other than window glass has almost constantly increased from year to year since 1869, gaining 227.2 per cent in value during that period, and 117.4 per cent during the last decade. The gain in the ten years ending with 1890 over the ten preceding years was $1,830,612, and between 1890 and 1900 over the ten preceding years, $2,922,065. American glassware is exported to nearly every civilized country, 68 countries being reported by the Bureau of Statistics of the Treasury Department in 1900. Canada received 30 per cent of the total value in 1900; Mexico, 14.6 per cent; Australia, 12.8 per cent; Cuba, 8.2 per cent;

and the United Kingdom, 7.3 per cent. An inquiry as to exports was incorporated in the schedule used for the purpose of eliciting complete information as to the articles exported and their destinations; but as the largest part of the exporting is done through regular exporting houses, a very small portion goes direct from the factory with its destination known. The returns from factories, therefore, are very meager, but as far as they go, furnish an idea of the comprehensive scope of the glass export business. Beer and soda bottles, and plain and lettered prescription bottles, pressed tableware, lamp chimneys, and lantern globes constitute the bulk of the exports reported direct from factories. Bottles to the value of $161,300 were reported as exported during the census year by 12 firms, $66,333 of which was the value of beer and soda-water bottles exported to Mexico, where a fair trade has been developed recently in that line of ware. Plain and lettered prescription bottles are a large item in the exports, and 6 firms reported direct shipments to Canada, South and Central America, Mexico, West Indies, Great Britain, France, East Indies, Australia, China, and Japan. The bottle trade with the Philippines and Cuba is very large, principally in the form of bottles filled with beer and liquor. Direct tableware exports were reported by 16 establishments, amounting to $137,982.

American pressed tableware is unexcelled in the markets of the world for color, workmanship, and finish, which make it the closest imitation of real cut ware, at such prices as, quality considered, place it in a class by itself. Export trade is receiving special consideration from some of the largest manufacturers of pressed ware, and the American sample room and traveling agent for pressed glassware are becoming more general abroad. The largest part of the lamp chimney exportation is done by jobbing houses, yet 4 factories reported direct shipments valued at $111,560. About four-fifths of the quantity reported went to South America, where lamp chimneys made in the United States are in high favor. As a result of a recent systematic introduction of the American lamp chimney in England and some of the continental countries, the exports in that direction are steadily increasing and have already reached a very satisfactory figure. American lantern globes are largely used in Central and South America. Canada, South America, and Australia are steadily increasing their consumption of American gas and electric glassware, such as globes and shades. Cathedral or opalescent glass valued at $13,432 was reported as shipped direct from factory to Canada, Germany, England, and France, where, by reason of its superior colors and texture, it is preferred in the construction of art windows.

Exports of window glass show some increase during the last few years, but the lower cost of production in Belgium will, no doubt, continue to restrict, as in the past, the foreign trade of the United States in this commodity. The exports are confined largely to Mexico, British America, and the West Indies. A plan has been discussed to operate the American window factories an extra time during the year at reduced wages to manufacture glass for export exclusively, but it has not met with favor from the workmen and from some of the manufacturers.

FURNACE IMPROVEMENT.

The greatest advance made in the American glass industry in the past decade has been in the improvement of the melting furnace in the direction of greater economy and rapidity in operation. The great feature of this development has been the widespread substitution of the tank for the pot furnace, 48.8 per cent of the total melting capacity of active plants reported during the census year being contained in tank furnaces. In the United States the tank is practically a creation of the last ten years, its standing prior to that time being experimental, though it had been used successfully abroad for a much longer period. So far Germany and Belgium have set the pace for American glass furnace construction.

The glass-melting furnace is a modification of the reverberatory furnace, the materials to be melted being exposed to the action of the flame, but not to the contact of the burning fuel. While numerous modifications exist, the furnaces generally used are of two styles, the pot furnace and the tank furnace. The former is adapted either for the use of open pots or for covered pots, and the latter is either a day tank, intermittent in its melting action, or a continuous tank in which the melting is continuous. The pot furnace contains a number of melting pots, large clay crucibles, each holding, on an average, a ton of molten glass. These pots are arranged immediately inside the breast wall of the furnace with room in the center of the furnace for combustion space. The batch, or mixture of the raw materials, is filled into these pots through an opening in the side of the furnace opposite each pot, and after the melting process is completed, the glass is gathered from the pots through these openings. The pot furnace used in the manufacture of plate glass is an exception in this respect, as the pots are removed bodily from the furnace by a crane and their contents poured on the casting table. In the tank furnace, pots are entirely dispensed with, the glass being melted and held on the hearth of the furnace itself, the flame sweeping across its surface. In the continuous tank there is a supply of molten glass at all times, the batch being filled in at one end and the glass worked out continuously at the other end. The day tank requires a night or day to melt the glass, when it is worked out and the tank again filled with the batch, the operation being similar to the working of a pot furnace. The pot furnaces used in the manufacture of window glass,

plate glass, and bottles and jars are either square or oblong in form, and those for flint glass, tableware, etc., are round or oval.

The open-pot furnace for window glass and bottles and jars varies in length according to the number of pots used, its width being about three times the diameter of the pot. The pots vary in number from 4 to 12, generally being 6 or 10, placed in the furnace in 2 rows. Openings at the ends of the furnace permit the removal and replacement of broken pots. The crown of the furnace, forming the top of the combustion chamber, is preferably rather flat, but set high enough to allow adequate flame development and good distribution of the heat between and above the pots. In the direct-fired furnace, the fuel is on a grate set in the space between the 2 rows of pots, somewhat below the level of the bench on which the pots are placed. An arched passage—the cave—runs beneath the furnace for the admission of air to the grate, and there are frequently 2 caves crossing at right angles, so as to admit air from all directions. Neither flues nor regenerators are used when the fuel is fired direct, the draft being regulated by the height of the stack of the furnace, which varies with different fuels employed. In the regenerative gas-fired furnace, the regenerators are so placed that in the event of a pot breaking, the molten glass can not reach them and obstruct the draft. The hot escaping gases from combustion pass from the combustion chamber through the checkerwork of bricks, which take up their heat and soon become very hot. The direction of the flame is reversed and the air for combustion enters through the hot regenerator, while the waste gases pass out through another regenerator. By a reversal of the direction of the flame every twenty or thirty minutes, the hot outgoing waste gases are constantly giving off their heat to the regenerators and the incoming air is constantly returning it to the furnace. In what is styled a recuperative gas-fired furnace, no reversal of the current occurs. The waste gases pass out through a series of thin-walled flues, while the incoming air is admitted through a second series of thin-walled flues, and coming in contact with the first series of flues, absorbs the waste heat. In the gas-fired furnace the air and gas flues rise vertically at either end and terminate in ports at or below the hearth level. The flame traverses the furnace from one end to the other, describing the arc of a circle, or by lessening the draft, it can be made to completely fill the furnace. The open-pot furnace for plate glass is longer than that for window or bottle glass, as it usually holds 20 large pots. There is an opening in the wall of the furnace opposite each pot to allow its removal, bodily, for casting purposes. All plate-glass furnaces are gas fired, the air and gas flues ascending and terminating vertically or coming up vertically and turning so as to enter the furnace horizontally. With the use of the lehr in plate-glass manufacture, the tendency is now toward smaller pots, which increases the number that may be placed in the furnace.

The covered pot furnace for flint glass is generally circular in form. The pots have a hood-like top, which projects to the opening in the breast wall of the furnace and through which the batch is filled in and the glass worked out. This hooded top entirely shields the contents of the pot from the flame. When old or broken pots are to be replaced, the wall of the furnace is removed enough to allow for the passage of the pot. The average life of the covered pot is several months, while that of the open pot is about six weeks; the length of time, however, in each case, may be more or less. It is possible to melt a much better quality of glass in the covered pot than in the open pot, as the hooded top excludes many impurities caused by combustion. The number of covered pots in a furnace is from 8 to 16. In firing the open-pot furnace the aim is to develop in the combustion space between the pots and above them a solid flame, but with the covered pots, the flame must be divided so as to play close around each pot. To this end the flame is drawn from the center of the furnace to a series of flues at the breast wall, a flue being placed between each pot and the adjoining pot. The crown of the furnace comes just above the pots and the stack widens at the base sufficiently to take in the entire diameter of the furnace. The draft flues empty into the stack through the breast wall or through the crown. These furnaces are adapted for recuperative gas firing or direct coal firing. In the oval covered pot furnace the stack is at one side, as with the regenerative tank; greater economy of space in setting the pots is secured as well as better heating results. One method of treatment of the waste heat in a furnace of this kind is to convey it by a series of flues so as to heat the water system that heats the entire factory plant.

The first successful gas-fired glass-melting pot furnace was developed abroad in 1861, the solid fuel being converted into gas in a producer outside of the furnace. Several years were required to introduce this improvement into glass manufacture in this country. This application of gas is one of the chief improvements in modern glass making, making possible a saving in the cost of fuel of fully 50 per cent over the cost with the direct-fired furnace, greatly reducing the time of melt, improving the quality of the glass, and lengthening the life of the pot. However, the disadvantages attending the pot system of melting created a demand for a system to melt and blow the glass continuously; these disadvantages were the time lost with the pot system (fully one-half the time being spent in cooling and settling the metal, working out the glass, and reheating the furnace), and the constant loss incurred by breaking pots, one broken pot so disturbing the rest of the furnace that the full capacity is frequently unavailable for a considerable time. This led to the development of the tank furnace, which was used in Europe in 1861 and improved

in 1872. However, the general introduction of the tank into glass manufacture in the United States did not occur until 1888, the successful operation of the continuous tank for window glass at Jeannette, Pa., in that year probably marking its actual introduction into the glass industry of this country. The chief advantages of the tank over the pot furnace are increased production, economy in operation, durability of furnace, regularity of working, and intensity of heat.

The day or intermittent tank is practically a pot furnace with one large open pot comprising the entire hearth, which is a square or oblong box built up of fire clay blocks and well ventilated on the bottom to prevent excessive wear and leakage occurring when the glass gets too hot or soft on the bottom. The air and gas are brought up through flues at one end and the products of combustion are discharged through flues at the other end. Either the regenerative or recuperative system can be used. There were 130 day tanks reported in operation during the census year, 117 of which were in establishments manufacturing bottles and jars and flint ware of all varieties, the average capacity of the tank in such establishments being 6 tons, equal to 6 pots; and 13 in establishments manufacturing skylight glass, glass tiling, rolled glass, and window glass. The greatest obstacle to the successful use of the day tank on flint glass has been the maintenance of color caused by the glass melting principally from the top, leaving the glass at the bottom of the tank less fluid and more refractory, but during the past decade this tank has been so improved that, at present, a very fair grade of so-called flint glass is in many cases being produced, at a great saving in cost over the pot-melting method. With these small tanks the use of gas for fuel probably produces the best results, but oil is being introduced for this purpose with a marked degree of success.[1]

The glass melting capacity of continuous tanks reported active in 1900 was 42.4 per cent of the total for the United States; pot furnaces with a total capacity of 4,300 pots were reported, day tanks of a capacity equivalent to 818 pots, and continuous tanks of a capacity equivalent to 3,775 pots, 2,476 of which were operated on bottles and jars and pressed and blown ware, and 1,299 on building glass. The continuous tank is confined largely to the manufacture of bottles and jars and window glass, 2 shifts being worked in the bottle trade and 3 in the window. The continuous regenerative melting tank contains an immense quantity of molten glass and is always full or nearly so. The window tank is oblong, four or five times as long as the width, with a capacity varying from 6 to 20 rings, each ring being equivalent to a capacity of 3 pots. The bottle tank is much shorter and wider than the window tank, and has an average of about 10 rings, each ring being equivalent to a capacity of 2 pots. The average window tank has 8 rings, or a capacity of 24 blowers or pots. Inside it is 14 feet wide, 70 feet long, and 5 feet deep, and will contain about 425 tons of molten metal. The batch is filled in continuously at one end and drawn, melting as it goes, to the working holes at the other end, where it is worked out. Near the working end of the tank is a floating bridge of prepared clay, extending down about one-fourth of the depth of the tank, which breaks the surface of the mass of glass and acts as a purifier, the completely melted glass passing beneath the floater into the working end of the tank, while the impure glass, which rises to the top, is held in check until properly melted. The wall of the working end of the tank is pierced by working holes through which the glass is gathered, in front of each hole being a deep clay ring stationed in the glass, the refined metal coming into this ring through the bottom and being gathered from the ring by the workman. The bottom and sides of the tank are well ventilated, to lessen the strain on the structure. The regenerators are at either side of the tank foundations, and the flues lead to ports in the side walls or to ports that open through the crown, the flame entering the furnace above the surface of the glass and just beneath the crown. All arrangements are made with a view to developing a nearly continuous sheet of flame.

A modification of the continuous tank for window glass, styled the blow-over tank, was introduced into this country in 1900, though in use abroad for a number of years. There were three or four such plants erected. By the use of the blow-over tank the blow furnace for "warming in" the roller of glass during the blowing operation is dispensed with, as the roller is "warmed in" directly over the mass of molten glass in the tank, the heat of the tank accomplishing this purpose, which effects a saving in fuel of about 50 per cent, for as much fuel is often required for the blow furnaces as for the melting tank. This improvement is made by lengthening the working end of the tank to permit a series of warming-in holes on each side between the floaters and the gathering holes. The results so far obtained with the blow-over tank will probably lead to its general introduction, as, in addition to the great saving in fuel cost, the heat is much more constant and uniform than with the blow furnace.

The use of oil as a fuel for glass melting has greatly increased during the last ten years. One of the most successful methods of oil firing is the use of the cheap, heavy oil of 34 to 40 specific gravity, practically a refinery by-product, with an air pressure of from 2 to 7 ounces per square inch. The air meets the flow of oil at the end of the burner and completely atomizes it in a spray, furnishing just enough oxygen to perfect combustion. Oil is advantageous as a clean fuel of high calorific value and perfect safety, but the cost restricts its general use. Benzine is largely used in certain

[1] Elements of Glass and Glass Making, Biser, 1900, page 62.

branches of the glass industry as fuel, being especially well adapted for fuel for glory holes, particularly in the manufacture of bottles, producing an intense uniform heat and requiring but little attention.

DETAILED STATISTICS OF GLASS MANUFACTURE.

The detailed statistics for the industry as reported are shown in Tables 12, 13, and 14; Table 12 presenting statistics of the entire industry; Table 13, of the manufacture of building glass; and Table 14, of the manufacture of pressed and blown glass, and bottles and jars. These tables present separate totals for each state in which there were 3 or more establishments, and group the statistics for other states, so as not to disclose the operations of individual establishments. The establishments are classified according to the character of the ownership, which shows that in the building glass branch of the industry, 6 were owned by individuals, 11 by partnerships, 102 by corporations, and 5 were of a miscellaneous character; and in the manufacture of pressed and blown glass, and bottles and jars, 23 were owned by individuals, 49 by partnerships, 157 by corporations, and 2 were of a miscellaneous character. The employees are classified so as to show for salaried officials, clerks, etc., and for wage-earners separately the number and salaries or wages of men, women, and children, respectively, and also the average number of wage-earners employed during each month of the year. Separate totals are shown for the different materials, presenting the quantity and cost of each; and the quantity and value of the several products manufactured, and the value of all other products, are given. The number of engines, water wheels, electric motors, and other forms of power in use, with their horsepower, are shown. The establishments are grouped in the tables according to the number of employees in each.

TABLE 12.—GLASS MANUFACTURE, BY STATES: 1900.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	Missouri.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states.[1]
Number of establishments	355	6	110	7	5	3	26	27	28	119	16	8
Character of organization:												
Individual	29	.....	7	1	.....	.....	4	3	3	10	1	.....
Firm and limited partnership	60	1	5	2	1	.....	4	6	4	31	8	3
Incorporated company	259	5	93	4	4	3	18	17	21	77	12	5
Miscellaneous	7	.....	5	.....	.....	.....	.....	1	.....	1	.....	.....
Capital:												
Total	$61,423,903	$2,181,801	$12,775,389	$581,086	$258,949	$2,198,316	$5,397,662	$2,242,834	$5,451,513	$28,287,187	$1,388,084	$711,082
Land	$4,771,476	$66,657	$626,095	$49,618	$33,000	$251,081	$330,136	$242,675	$440,375	$2,589,897	$75,142	$66,800
Buildings	$16,954,293	$524,764	$4,132,329	$144,576	$50,047	$668,346	$1,164,071	$397,004	$1,310,859	$8,021,796	$397,301	$143,200
Machinery, tools, and implements	$14,247,283	$118,289	$2,936,890	$66,559	$35,150	$378,589	$353,600	$300,232	$1,491,631	$7,683,311	$234,532	$148,500
Cash and sundries	$25,450,851	$1,472,091	$5,080,075	$320,333	$140,752	$400,300	$3,549,855	$1,302,923	$2,208,648	$9,992,183	$631,109	$352,582
Proprietors and firm members	170	1	24	4	2	.....	18	17	9	81	6	8
Salaried officials, clerks, etc.:												
Total number	2,268	75	509	31	39	26	317	117	199	842	86	28
Total salaries	$2,792,376	$110,100	$649,227	$38,976	$28,060	$47,448	$284,960	$139,698	$249,029	$1,110,383	$97,551	$36,944
Officers of corporations—												
Number	389	12	119	6	8	4	51	29	30	107	19	4
Salaries	$936,835	$36,260	$271,147	$9,710	$9,869	$17,400	$83,540	$56,054	$68,689	$345,816	$31,100	$7,300
General superintendents, managers, clerks, etc.—												
Total number	1,879	63	390	25	31	22	266	88	169	735	66	24
Total salaries	$1,855,541	$73,840	$378,080	$29,266	$18,191	$30,048	$201,420	$83,644	$180,390	$764,567	$66,451	$29,644
Men—												
Number	1,647	59	342	23	22	19	234	81	139	651	53	24
Salaries	$1,745,140	$71,320	$353,093	$27,944	$15,326	$28,588	$188,740	$80,082	$167,888	$722,108	$60,457	$29,644
Women—												
Number	232	4	48	2	9	3	32	7	30	84	13	.....
Salaries	$110,401	$2,520	$24,987	$1,322	$2,865	$1,510	$12,680	$3,562	$12,502	$42,459	$5,994	.....
Wage-earners, including piece-workers, and total wages:												
Greatest number employed at any one time during the year	71,713	3,904	18,523	990	534	1,051	7,421	3,499	6,233	26,048	2,375	1,140
Least number employed at any one time during the year	53,660	3,654	14,669	751	373	720	4,637	2,373	4,307	19,154	2,000	1,022
Average number	52,818	3,804	13,015	742	387	650	5,383	2,556	4,546	19,420	1,949	866
Total wages	$27,084,710	$1,621,286	$7,226,047	$339,518	$188,674	$341,875	$2,462,745	$1,305,264	$2,067,384	$10,287,491	$789,422	$455,504
Men, 16 years and over—												
Average number	42,178	2,607	10,910	562	343	648	4,366	2,201	3,505	15,136	1,319	576
Wages	$24,901,233	$1,496,891	$6,808,042	$313,920	$179,236	$340,825	$2,278,306	$1,239,971	$1,844,958	$9,338,261	$657,984	$402,839
Women, 16 years and over—												
Average number	3,529	148	634	54	19	.....	170	73	405	1,546	468	12
Wages	$840,001	$28,456	$129,808	$8,673	$4,392	.....	$32,726	$17,831	$96,017	$414,250	$103,748	$4,100
Children, under 16 years—												
Average number	7,116	549	1,471	126	25	2	847	282	636	2,738	162	278
Wages	$1,343,476	$95,939	$288,197	$16,925	$5,046	$550	$151,713	$47,462	$126,409	$534,980	$27,690	$48,565
Average number of wage-earners, including piece-workers, employed during each month:												
Men, 16 years and over—												
January	51,282	3,023	13,956	686	390	526	5,344	2,488	4,132	18,680	1,407	700
February	51,730	3,020	14,140	648	368	518	5,384	2,393	4,169	18,928	1,462	700
March	52,146	3,015	13,847	699	330	516	5,410	2,607	4,488	19,038	1,467	734
April	52,044	2,995	14,017	713	303	716	4,848	2,720	4,527	19,023	1,462	720
May	50,662	2,954	13,728	710	323	969	5,014	2,671	4,290	17,972	1,414	617
June	45,847	2,806	12,687	668	310	964	4,641	2,348	3,244	16,483	1,150	546
July	17,829	662	3,921	193	222	649	1,419	968	1,209	7,874	507	205
August	20,468	665	4,183	225	289	693	969	1,033	1,632	9,410	1,214	205
September	35,245	3,040	8,165	481	344	588	3,931	1,841	3,262	11,773	1,377	493
October	40,878	3,035	10,306	573	373	558	4,765	2,244	3,531	13,502	1,431	560
November	43,042	3,051	10,861	564	449	555	5,316	2,501	3,541	14,042	1,448	714
December	44,903	3,018	11,112	634	465	578	5,352	2,593	4,032	14,914	1,487	718

[1] Includes establishments distributed as follows: California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1.

TABLE 12.—GLASS MANUFACTURE, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	Missouri.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states.[1]
Average number of wage-earners, including piece-workers, employed during each month—Continued.												
Women, 16 years and over—												
January	3,820	179	792	53	15	.....	158	71	431	1,665	448	13
February	3,879	177	758	58	19	.....	159	67	439	1,731	458	13
March	3,984	177	810	62	19	.....	166	83	487	1,704	463	13
April	3,890	177	806	57	20	.....	160	90	479	1,625	463	13
May	3,486	167	625	58	20	.....	181	93	427	1,469	433	13
June	3,343	152	623	54	18	.....	182	84	402	1,384	428	16
July	1,850	24	197	25	8	.....	147	44	193	1,020	176	16
August	2,530	24	253	50	14	.....	93	60	251	1,262	508	15
September	3,428	172	442	59	21	.....	135	56	414	1,572	557	.....
October	3,907	171	715	61	20	.....	175	67	447	1,694	557	.....
November	4,135	177	801	61	24	.....	261	80	451	1,699	565	16
December	4,096	177	782	56	24	.....	223	79	445	1,733	561	16
Children, under 16 years—												
January	8,301	667	1,813	132	34	.....	996	300	829	3,040	160	330
February	8,463	659	1,878	136	35	.....	993	286	840	3,139	167	330
March	8,537	659	1,884	138	24	.....	983	300	832	3,142	176	349
April	8,644	661	1,911	197	24	.....	965	334	819	3,210	176	347
May	7,341	646	1,306	136	25	6	986	350	549	2,749	171	367
June	7,082	646	1,196	199	25	6	963	333	585	2,663	169	297
July	2,397	.....	524	5	6	8	169	116	82	1,325	77	85
August	3,350	.....	694	5	6	6	157	141	246	1,871	139	85
September	6,146	650	1,101	60	24	.....	789	239	464	2,393	182	244
October	8,091	660	1,748	137	30	.....	969	292	789	3,042	180	244
November	8,496	671	1,802	128	32	.....	1,124	329	797	3,107	177	329
December	8,544	667	1,800	136	35	.....	1,071	366	796	3,169	173	331
Miscellaneous expenses—												
Total	$3,588,641	$210,588	$690,165	$26,065	$14,243	$98,119	$241,655	$145,505	$155,512	$1,867,879	$112,791	$26,119
Rent of works	$29,195	.....	$780	.....	$500	$154	$683	$8,945	$68	$12,465	$400	$5,200
Taxes, not including internal revenue	$236,338	$9,556	$59,550	$2,040	$3,155	$6,242	$21,663	$8,122	$17,260	$100,838	$4,804	$3,108
Rent of offices, insurance, interest, and all sundry expenses not hitherto included	$3,264,149	$201,032	$625,835	$24,025	$10,588	$91,723	$212,900	$115,369	$138,184	$1,723,445	$105,637	$15,411
Contract work	$58,959	.....	$4,000	.....	.....	.....	$6,409	$13,069	.....	$31,131	$1,950	$2,400
Materials used:												
Aggregate cost	$16,731,009	$674,008	$4,582,141	$151,500	$137,185	$231,515	$1,488,700	$899,590	$1,253,164	$6,435,463	$593,251	$284,492
Glass sand, tons	581,720	32,978	179,367	3,493	1,622	10,366	81,260	22,820	37,707	191,859	10,025	10,223
Cost	$846,822	$33,381	$241,075	$6,166	$6,355	$8,613	$78,521	$46,117	$67,035	$329,465	$14,203	$15,891
Soda ash (carbonate of soda), tons	157,779	12,017	48,629	1,601	194	3,048	20,630	7,508	11,072	46,398	2,847	3,835
Cost	$2,259,939	$164,827	$686,471	$23,276	$5,342	$47,554	$310,641	$113,586	$156,797	$639,152	$43,724	$68,569
Salt cake (sulphate of soda), tons	53,257	.....	14,371	.....	125	226	697	1,453	1,751	34,297	337	.....
Cost	$518,590	.....	$133,232	.....	$1,625	$2,311	$7,478	$13,605	$18,428	$287,311	$4,600	.....
Nitrate of soda, tons	10,770	440	2,329	149	24	.....	1,314	548	1,259	4,330	307	70
Cost	$320,937	$13,720	$75,243	$5,000	$830	.....	$21,165	$19,174	$39,634	$132,389	$10,982	$2,800
Limestone, tons	91,015	4,815	27,993	185	100	4,112	8,577	2,462	3,356	38,309	450	656
Cost	$181,717	$9,912	$47,882	$578	$225	$8,566	$25,471	$6,826	$6,536	$71,110	$825	$3,785
Lime, hundredweight	794,679	45,387	230,148	15,128	559	610	198,923	32,819	75,638	147,975	15,728	31,764
Cost	$147,901	$10,175	$37,599	$1,492	$112	$140	$26,873	$8,885	$14,712	$37,946	$4,057	$5,910
Arsenic, pounds	2,349,261	45,607	837,487	4,621	7,789	24,233	102,490	101,570	228,587	896,074	80,503	20,300
Cost	$112,630	$2,173	$40,848	$207	$370	$1,217	$4,912	$4,942	$11,751	$41,295	$3,837	$1,078
Carbon, tons	4,155	90	1,883	.....	15	18	20	51	133	1,926	13	6
Cost	$17,000	$1,018	$6,557	.....	$100	$640	$406	$544	$660	$6,950	$155	$70
Manganese, pounds	1,493,638	59,838	521,980	11,167	8,101	33,000	143,465	90,721	76,117	457,581	58,944	32,624
Cost	$57,493	$1,960	$19,655	$566	$207	$825	$5,674	$3,800	$3,672	$17,474	$2,239	$1,421
Litharge (red lead), pounds	8,386,106	115,600	1,482,887	36,982	364,448	.....	72,049	822,130	2,063,000	3,143,727	285,283	.....
Cost	$490,200	$6,242	$76,215	$1,857	$24,497	.....	$3,918	$48,137	$117,035	$191,716	$20,583	.....
Potash or pearlash, pounds	4,406,211	.....	453,481	75,000	207,967	.....	60,270	469,186	850,171	1,938,334	351,802	.....
Cost	$186,847	.....	$18,564	$3,000	$8,994	.....	$2,866	$20,503	$34,129	$82,284	$16,557	.....
Grinding sand, tons	265,438	.....	71,152	.....	.....	4,743	433	50	6,897	182,117	46	.....
Cost	$166,040	.....	$37,533	.....	.....	$1,897	$519	$120	$2,520	$123,186	$265	.....
Rouge, pounds	837,536	.....	267,845	.....	.....	20,980	1,300	.....	14,987	532,524	400	.....
Cost	$24,747	.....	$9,061	.....	.....	$693	$41	.....	$897	$13,971	$84	.....
Plaster of paris, tons	23,066	.....	7,660	.....	.....	596	.....	10	611	14,184	4	1
Cost	$108,531	.....	$35,104	.....	.....	$3,799	.....	$71	$1,311	$68,171	$57	$18
Fire clay, [or pot clay], pounds	32,151,017	642,000	8,624,298	245,900	66,158	426,520	2,108,845	1,033,200	2,549,910	15,926,246	154,940	373,000
Cost	$221,183	$5,687	$64,394	$1,890	$720	$2,795	$13,875	$8,378	$7,055	$113,822	$1,587	$1,485
Pots, not including those made at works, number	8,941	309	2,429	164	110	58	366	475	1,199	3,461	350	20
Cost	$381,147	$17,680	$101,884	$7,286	$5,175	$2,030	$12,517	$17,520	$61,971	$135,765	$17,999	$1,320
Flattening stones, number	272	.....	79	.....	4	.....	14	1	24	146	4	.....
Cost	$16,344	.....	$5,010	.....	$200	.....	$315	$60	$1,550	$9,049	$160	.....
Fuel—												
Total cost	$3,203,146	$155,400	$355,300	$47,980	$33,047	$75,689	$445,828	$227,158	$249,405	$1,421,710	$88,905	$102,724
Natural gas	$1,575,278	.....	$351,553	.....	.....	.....	.....	$9,190	$110,616	$1,016,903	$87,016	.....
Oil, gallons	12,090,856	1,663,301	624	293,107	371,867	50,000	5,098,181	1,347,692	1,250,750	1,116,129	18,650	1,480,555
Cost	$409,158	$41,084	$115	$10,051	$15,619	$2,000	$159,327	$48,345	$31,899	$50,227	$585	$49,906
Coal, tons	755,463	114,675	952	17,395	4,136	45,293	104,926	68,959	77,409	300,484	1,271	19,963
Cost	$1,074,074	$95,312	$2,616	$32,804	$14,942	$71,719	$219,362	$158,752	$102,461	$326,369	$1,304	$48,433
All other fuel	$144,636	$19,004	$1,016	$5,125	$2,486	$1,970	$67,139	$10,871	$4,429	$28,211	.....	$4,385
Rent of power and heat	$62	.....	.....	.....	.....	.....	.....	.....	.....	$62	.....	.....
Lumber, casks, barrels, boxes, and nails	$2,778,025	$104,589	$941,834	$15,868	$12,191	$17,840	$193,850	$127,827	$211,651	$1,026,513	$107,050	$18,812
Cartons, wrapping paper, straw, and hay	$612,602	$22,571	$290,525	$3,026	$4,193	$2,773	$22,390	$22,305	$49,770	$161,012	$32,562	$1,475
Caps, metal trimmings, and rubber supplies	$1,522,917	$31,073	$747,574	$10,494	$6,816	.....	$79,359	$67,111	$61,212	$405,045	$101,983	$12,250
Supplies used in repairs on tanks and furnaces	$531,916	$36,659	$145,667	$2,107	$2,803	$14,073	$47,089	$30,524	$19,174	$205,665	$16,422	$11,733
Mill supplies	$138,434	$1,126	$56,846	$2,567	$692	$1,938	$3,707	$3,528	$9,064	$49,169	$8,690	$1,107
All other materials	$991,751	$31,672	$137,133	$12,463	$20,679	$30,906	$109,335	$78,950	$43,746	$458,507	$63,628	$4,732
Freight	$894,088	$24,143	$220,935	$6,177	$2,012	$7,316	$71,950	$29,924	$63,449	$406,774	$32,097	$29,311

[1] Includes establishments distributed as follows: California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1.

TABLE 12.—GLASS MANUFACTURE, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	Missouri.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states.[1]
Products:												
Aggregate value	$56,539,712	$2,834,398	$14,757,883	$557,895	$418,458	$765,564	$5,093,822	$2,756,978	$4,547,083	$22,011,130	$1,871,795	$924,706
Building glass—												
Total value	$17,096,234	$24,000	$5,711,948	$103,262	$16,200	$505,564	$274,011	$346,790	$671,422	$9,213,545	$101,242	$128,250
Window glass, 50-foot boxes	4,341,282	4,000	1,701,729	49,669	6,000	.....	124,541	89,522	200,854	2,068,340	40,144	56,483
Value	$10,879,355	$24,000	$4,176,587	$103,262	$16,000	.....	$267,611	$243,085	$519,187	$5,301,131	$101,242	$128,250
Plate glass—												
Total cast, square feet	34,758,994	.....	8,553,338	.....	.....	5,628,860	.....	543,282	486,340	19,546,674	.....	.....
Rough sold, square feet	628,684	.....	31,917	.....	.....	16,862	.....	.....	.....	579,905	.....	.....
Value	$75,887	.....	$4,780	.....	.....	$3,075	.....	.....	.....	$68,032	.....	.....
Polished plate made, square feet	16,883,578	.....	5,177,160	.....	.....	455,222	.....	.....	373,946	10,877,250	.....	.....
Value	$5,158,598	.....	$1,415,224	.....	.....	$162,062	.....	.....	$149,578	$3,441,734	.....	.....
Cathedral, square feet	8,846,361	.....	2,000,000	.....	.....	5,103,079	.....	543,282	.....	1,200,000	.....	.....
Value	$567,252	.....	$100,000	.....	.....	$349,558	.....	$46,694	.....	$71,000	.....	.....
Skylight, square feet	3,679,694	.....	5,616	.....	.....	10,976	.....	.....	26,566	3,636,536	.....	.....
Value	$165,086	.....	$357	.....	.....	$869	.....	.....	$2,657	$161,203	.....	.....
Wire, square feet	1,295,504	.....	.....	.....	.....	.....	.....	.....	.....	1,295,504	.....	.....
Value	$129,051	.....	.....	.....	.....	.....	.....	.....	.....	$129,051	.....	.....
All other building glass	$121,005	.....	$15,000	.....	$1,200	.....	$6,400	$57,011	.....	$41,394	.....	.....
Pressed and blown glass—												
Total value	$17,076,125	$131,618	$2,691,787	$100,000	$382,091	.....	$21,300	$1,178,784	$2,738,289	$8,453,550	$1,379,706	$4,000
Tableware, 100 pieces	655,141	.....	126,162	.....	.....	.....	.....	.....	150,992	364,770	13,217	.....
Value	$2,617,784	.....	$291,060	.....	.....	.....	.....	.....	$668,469	$1,585,870	$72,385	.....
Jellies, tumblers, and goblets, dozens	8,544,050	.....	3,050,595	340,000	.....	.....	.....	.....	1,681,584	3,112,588	359,283	.....
Value	$2,007,386	.....	$630,485	$100,000	.....	.....	.....	.....	$392,612	$793,902	$90,387	.....
Lamps, dozens	807,765	.....	81,972	.....	2,020	.....	.....	15,599	191,084	455,543	61,547	.....
Value	$1,498,675	.....	$43,116	.....	$4,000	.....	.....	$7,447	$185,297	$983,452	$275,363	.....
Chimneys, dozens	6,901,192	173,931	3,113,228	.....	84,000	.....	.....	186,800	1,508,114	1,835,119	.....	.....
Value	$2,719,583	$131,618	$1,196,996	.....	$33,000	.....	.....	$96,707	$622,721	$638,541	.....	.....
Lantern globes, dozens	1,044,816	.....	547,971	.....	2,000	.....	.....	162,038	142,800	58,275	131,732	.....
Value	$497,021	.....	$176,150	.....	$1,800	.....	.....	$180,629	$69,589	$26,920	$32,933	.....
Shades, globes, gas and electric goods, dozens	2,673,854	.....	15,052	.....	23,300	.....	41,666	312,500	1,397,824	856,125	27,387	.....
Value	$2,497,885	.....	$19,044	.....	$40,000	.....	$6,500	$520,000	$398,420	$1,462,248	$61,673	.....
Blown tumblers, stemware, and bar goods, dozens	6,127,367	.....	112,163	.....	.....	.....	.....	.....	214,072	3,512,552	2,288,580	.....
Value	$1,598,652	.....	$37,701	.....	.....	.....	.....	.....	$53,308	$1,107,489	$400,094	.....
Opal ware, dozens	3,750,443	.....	244,878	.....	3,000	.....	.....	1,000	96,597	2,925,545	479,428	.....
Value	$1,581,731	.....	$90,322	.....	$4,000	.....	.....	$1,500	$51,656	$1,214,472	$219,781	.....
Cut glass, dozens	134,726	.....	325	.....	3,332	.....	.....	.....	2,900	56,800	71,369	.....
Value	$672,463	.....	$600	.....	$146,613	.....	.....	.....	$126,000	$311,189	$88,061	.....
All other pressed and blown glass	$1,384,945	.....	$206,313	.....	$152,678	.....	$14,800	$358,501	$170,157	$339,467	$139,029	$4,000
Bottles and jars—												
Total value	$21,676,791	$2,678,780	$6,327,468	$346,633	$20,167	$260,000	$4,452,219	$1,195,276	$1,058,955	$4,162,990	$381,847	$792,456
Prescription vials and druggists' wares, gross	2,423,932	265,918	624,128	20,000	.....	.....	731,107	81,803	76,409	551,236	4,004	69,327
Value	$4,665,697	$404,799	$1,184,397	$94,633	.....	.....	$1,306,316	$203,734	$155,377	$1,170,061	$8,889	$137,491
Beers, sodas, and minerals, gross	1,351,118	406,037	109,194	13,004	128	70,000	108,247	134,364	219,422	147,145	25,000	118,577
Value	$5,075,068	$1,332,842	$347,836	$120,212	$626	$260,000	$408,661	$496,398	$637,428	$01,129	$92,000	$478,936
Liquors and flasks, gross	985,374	31,168	604,798	5,000	6,298	.....	64,140	44,171	16,400	142,518	43,058	27,823
Value	$2,403,447	$131,869	$1,207,519	$20,000	$19,541	.....	$153,165	$110,221	$57,350	$448,182	$169,852	$85,748
Milk jars, gross	146,142	7,500	19,661	.....	.....	.....	19,798	6,938	6,000	80,485	4,600	1,260
Value	$729,008	$37,500	$55,344	.....	.....	.....	$107,431	$33,863	$30,000	$434,310	$23,000	$7,560
Fruit jars, gross	789,298	1,500	559,549	.....	.....	.....	61,871	31,235	2,000	115,000	14,643	3,500
Value	$2,935,036	$9,000	$2,106,250	.....	.....	.....	$192,467	$128,965	$8,000	$436,104	$43,750	$10,500
Patent and proprietary, gross	1,296,131	302,708	244,343	500	.....	.....	601,276	57,224	20,000	55,080	.....	15,000
Value	$2,602,976	$495,597	$378,301	$1,500	.....	.....	$1,399,042	$120,543	$35,800	$142,193	.....	$30,000
Packers and preservers, gross	784,588	80,739	247,731	5,007	.....	.....	278,960	11,430	25,000	113,546	10,242	11,933
Value	$2,119,221	$195,691	$686,092	$15,021	.....	.....	$620,869	$33,706	$100,000	$419,947	$20,356	$27,589
Demijohns and carboys, dozens	83,243	29,136	.....	.....	.....	.....	18,689	10,929	.....	17,815	.....	6,674
Value	$206,061	$48,984	.....	.....	.....	.....	$86,645	$18,896	.....	$36,854	.....	$14,682
All other bottles and jars	$940,277	$22,498	$361,729	$95,267	.....	.....	$177,623	$49,950	$35,000	$174,210	$24,000	.....
Value of all other products	$690,562	.....	$26,680	$8,000	.....	.....	$346,292	$41,128	$78,417	$181,045	$9,000	.....
Comparison of products:												
Number of establishments reporting for both years	252	6	63	7	3	3	23	23	21	88	10	5
Value for census year	$47,184,649	$2,834,398	$11,157,894	$557,895	$382,091	$765,564	$4,927,447	$2,638,902	$4,138,150	$17,347,849	$1,628,027	$806,432
Value for preceding business year	$41,959,668	$2,297,679	$10,056,153	$532,723	$430,549	$1,034,263	$4,539,963	$2,350,494	$3,316,665	$15,384,075	$1,871,352	$645,762
Equipment and characteristics of works:												
Pot furnaces—												
Operated, number	391	9	116	10	4	4	27	24	37	143	14	3
Pots, number	4,300	117	1,220	91	38	60	200	200	444	1,758	144	28
Idle, number	60	1	9	2	3	3	6	5	5	25	1	.....
Pots, number	807	12	134	16	27	50	55	47	95	359	12	.....
Tanks—												
Continuous—												
Operated, number	192	11	71	.....	.....	3	31	14	12	43	.....	7
Rings, number	1,671	133	564	.....	.....	20	298	115	95	404	.....	47
Pot capacity, number	3,775	266	1,307	.....	.....	43	610	280	212	1,013	.....	94
Idle, number	14	.....	4	.....	.....	2	6	.....	.....	1	.....	1
Rings, number	79	.....	12	.....	.....	15	40	.....	.....	8	.....	4
Pot capacity, number	158	.....	24	.....	.....	30	80	.....	.....	16	.....	8

[1] Includes establishments distributed as follows: California, 1; Colorado, 1: Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1.

TABLE 12.—GLASS MANUFACTURE, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	Missouri.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states.[1]
Equipment and characteristics of works—Continued.												
Intermittent or day—												
Operated, number	130	7	33	1	1	.....	12	7	3	44	19	3
Tons capacity, number	818	40	208	6	90	.....	72	49	13	232	85	23
Pot capacity, number	818	40	208	6	90	.....	72	49	13	232	85	23
Idle, number	17	.....	4	.....	.....	.....	2	1	3	5	1	1
Tons capacity, number	83	.....	12	.....	.....	.....	7	3	12	42	5	2
Pot capacity, number	83	.....	12	.....	.....	.....	7	3	12	42	5	2
Building glass—												
Flattening ovens, number	285	1	116	2	1	.....	6	5	12	138	2	2
Monkey ovens, number	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blow furnaces, number	259	.....	135	.....	1	.....	.....	10	15	94	4	.....
Casting tables, number	100	4	17	.....	.....	14	.....	5	3	57	.....	.....
Annealing ovens, number	869	.....	258	.....	.....	98	.....	5	23	485	.....	.....
Bending ovens, number	9	.....	5	.....	.....	.....	.....	.....	.....	4	.....	.....
Lehrs, number	302	.....	115	2	1	2	5	12	13	147	3	2
Clay grinding mills, number	63	.....	22	2	1	1	3	6	3	23	1	1
Grinding machines, number	227	.....	61	1	.....	21	.....	3	12	129	.....	.....
Polishing machines, number	294	.....	86	.....	.....	24	.....	.....	10	174	.....	.....
Sand-blastmachines, number	5	.....	1	.....	.....	.....	.....	1	.....	3	.....	.....
Glassware and bottles—												
Shops, number	3,978	427	1,397	67	38	26	718	312	613	144	158	78
Glory holes, number	1,419	146	351	24	16	6	301	66	93	351	28	37
Annealing ovens, number	1,540	289	161	21	15	32	266	126	121	395	18	96
Lehrs, number	1,025	31	321	18	12	.....	95	55	102	323	59	9
Decorating kilns, number	105	.....	6	1	8	.....	.....	1	27	55	7	.....
Decorating lehrs, number	23	.....	1	.....	.....	.....	.....	.....	4	15	3	.....
Presses, hand, number	915	13	197	7	9	.....	55	49	125	402	57	1
Presses, mechanical, number	49	.....	4	.....	.....	.....	.....	.....	.....	42	3	.....
Blowing machines, number	169	1	80	.....	.....	.....	4	1	18	65	.....	.....
Finishing machines, number	140	2	33	.....	.....	.....	1	2	59	42	1	.....
Crimping machines, number	494	1	169	.....	5	.....	.....	32	35	252	.....	.....
Mechanical polishers, number	16	.....	.....	.....	1	.....	1	1	1	12	.....	.....
Sand-blastmachines, number	68	1	8	.....	3	.....	1	9	10	27	9	.....
Grinding machines for fruit-jar tops, number	137	3	29	4	.....	.....	22	9	5	54	10	1
Clay-grinding mills, number	8	.....	1	.....	.....	.....	1	.....	2	4	.....	.....
Mechanical stokers, number	79	.....	.....	.....	.....	.....	3	14	8	52	.....	2
Horses and mules, number	409	23	21	13	8	9	98	49	18	184	6	30
Wagons, carts, and drays, number	407	24	23	17	9	7	111	47	18	126	6	19
Power:												
Number of establishments reporting	330	6	99	7	4	3	25	25	27	112	14	8
Total horsepower	58,929	700	11,386	240	199	3,592	1,756	1,127	7,826	30,956	958	689
Owned—												
Engines—												
Steam, number	753	14	187	9	4	17	69	33	38	353	17	12
Horsepower	49,791	700	10,333	230	100	3,110	1,681	1,017	3,426	27,732	773	689
Gas, or gasoline, number	84	.....	23	.....	1	.....	1	1	13	41	4	.....
Horsepower	2,364	.....	585	.....	7	.....	5	50	285	1,322	160	.....
Water wheels, number	2	.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....
Horsepower	27	.....	.....	.....	12	.....	.....	.....	.....	15	.....	.....
Electric motors, number	178	.....	18	1	1	15	.....	.....	45	97	1	.....
Horsepower	5,986	.....	468	10	40	482	.....	.....	3,605	1,361	20	.....
Other power, number	25	.....	.....	.....	.....	.....	4	4	6	10	1	.....
Horsepower	705	.....	.....	.....	.....	.....	70	60	60	510	5	.....
Rented—												
Electric, horsepower	44	.....	.....	.....	40	.....	.....	.....	.....	4	.....	.....
Other kind, horsepower	12	.....	.....	.....	.....	.....	.....	.....	.....	12	.....	.....
Furnished to other establishments, horsepower	10	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	.....
Establishments classified by number of persons employed, not including proprietors and firm members:												
Total number of establishments	355	6	110	7	5	3	26	27	28	119	16	8
Under 5	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
5 to 20	5	1	2	.....	.....	.....	.....	.....	1	1	.....	.....
21 to 50	33	.....	7	.....	1	.....	3	9	2	8	3	.....
51 to 100	93	.....	39	3	2	.....	5	7	3	24	5	5
101 to 250	139	1	43	3	2	1	11	7	12	55	3	1
251 to 500	58	2	14	1	.....	2	3	4	8	18	4	2
501 to 1,000	21	.....	4	.....	.....	.....	3	.....	2	12	.....	.....
Over 1,000	5	2	1	.....	.....	.....	1	.....	.....	1	.....	.....

[1] Includes establishments distributed as follows: California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1.

TABLE 13.—BUILDING GLASS, BY STATES: 1900.

	United States.	Indiana.	New Jersey.	New York.	Ohio.	Pennsylvania.	All other states.[1]
Number of establishments	124	51	4	7	7	46	9
Character of organization:							
Individual	6	2	1	----	2	----	1
Firm and limited partnership	11	----	1	1	----	7	2
Incorporated company	102	45	2	6	5	38	6
Miscellaneous	5	4	----	----	----	1	----
Capital:							
Total	$26,617,122	$7,080,415	$218,990	$334,035	$2,039,134	$14,661,120	$2,283,428
Land	$2,170,678	$385,283	$28,000	$16,450	$212,194	$1,275,513	$253,238
Buildings	$9,020,800	$2,810,636	$81,000	$71,500	$486,931	$4,831,176	$739,557
Machinery, tools, and implements	$9,523,538	$2,162,680	$14,500	$38,150	$991,209	$5,425,846	$891,153
Cash and sundries	$5,902,106	$1,721,816	$95,490	$207,935	$348,800	$3,128,585	$399,480
Proprietors and firm members	25	2	4	6	2	8	3
Salaried officials, clerks, etc.:							
Total number	615	224	8	11	25	307	40
Total salaries	$811,983	$274,105	$6,326	$15,160	$22,570	$435,015	$58,807
Officers of corporations—							
Number	87	32	1	2	5	41	6
Salaries	$311,672	$105,898	$1,200	$4,700	$7,825	$173,449	$18,600
General superintendents, managers, clerks, etc.—							
Total number	528	192	7	9	20	266	34
Total salaries	$500,311	$168,207	$5,126	$10,460	$14,745	$261,566	$40,207
Men—							
Number	485	178	6	8	18	245	30
Salaries	$476,169	$159,904	$4,970	$10,096	$14,295	$248,707	$38,197
Women—							
Number	43	14	1	1	2	21	4
Salaries	$24,142	$8,303	$156	$364	$450	$12,859	$2,010
Wage-earners, including pieceworkers, and total wages:							
Greatest number employed at any one time during the year	19,343	6,512	389	313	1,021	10,031	1,077
Least number employed at any one time during the year	10,059	5,519	242	263	912	3,379	744
Average number	11,902	3,912	280	228	477	6,459	596
Total wages	$9,029,673	$3,251,819	$163,245	$164,291	$376,006	$4,706,720	$367,592
Men, 16 years and over—							
Average number	11,801	3,908	280	226	477	6,368	592
Wages	$8,999,613	$3,250,119	$163,245	$163,979	$376,006	$4,679,801	$366,463
Women, 16 years and over—							
Average number	20	----	----	----	----	20	----
Wages	$4,901	----	----	----	----	$4,901	----
Children, under 16 years—							
Average number	81	4	----	2	----	71	4
Wages	$25,159	$1,700	----	$312	----	$22,018	$1,129
Average number of wage-earners, including pieceworkers, employed during each month:							
Men, 16 years and over—							
January	16,693	5,865	357	297	787	8,840	547
February	16,919	6,012	357	293	780	8,985	492
March	16,743	5,461	357	305	955	9,175	490
April	16,987	5,457	378	292	951	9,224	690
May	17,152	5,806	384	284	932	8,803	943
June	14,408	5,370	249	91	4	7,846	848
July	6,584	1,558	37	59	4	3,243	683
August	5,717	1,545	23	45	10	3,367	727
September	5,761	1,922	18	169	192	3,218	242
October	7,578	2,447	105	285	220	4,086	426
November	8,241	2,605	240	296	229	4,402	469
December	9,823	2,845	260	297	649	5,227	545
Women, 16 years and over—							
January	25	----	----	----	----	25	----
February	24	----	----	----	----	24	----
March	27	----	----	----	----	27	----
April	22	----	----	----	----	22	----
May	18	----	----	----	----	18	----
June	18	----	----	----	----	18	----
July	18	----	----	----	----	18	----
August	15	----	----	----	----	15	----
September	17	----	----	----	----	17	----
October	21	----	----	----	----	21	----
November	18	----	----	----	----	18	----
December	24	----	----	----	----	24	----
Children, under 16 years—							
January	91	3	----	2	----	82	4
February	94	5	----	2	----	83	4
March	91	4	----	2	----	81	4
April	93	5	----	2	----	82	4
May	92	5	----	2	----	75	10
June	91	6	----	2	----	73	10
July	76	4	----	----	----	64	8
August	80	4	----	2	----	68	6
September	58	4	----	2	----	52	----
October	62	3	----	2	----	57	----
November	69	3	----	2	----	64	----
December	77	4	----	2	----	71	----
Miscellaneous expenses:							
Total	$1,365,865	$348,665	$12,141	$14,569	$19,505	$867,168	$103,817
Rent of works	$6,314	----	----	$1,200	----	$4,460	$654
Taxes, not including internal revenue	$104,969	$32,387	$841	$810	$2,291	$61,989	$6,651
Rent of offices, insurance, interest, and all sundry expenses not hitherto included	$1,248,457	$316,278	$11,300	$11,882	$17,214	$790,271	$98,512
Contract work	$11,125	----	----	$677	----	$10,448	----
Materials used:							
Aggregate cost	$4,679,084	$1,319,675	$86,720	$120,748	$158,526	$2,697,041	$296,374
Glass sand, tons	177,966	59,746	2,763	2,977	5,851	95,176	11,453
Cost	$298,879	$102,019	$2,833	$3,773	$7,886	$172,003	$10,415
Soda ash (carbonate of soda), tons	25,500	8,037	615	59	666	13,206	2,917
Cost	$338,534	$106,833	$11,396	$1,433	$9,669	$168,022	$41,181
Salt cake (sulphate of soda), tons	52,789	14,158	500	1,453	1,751	34,239	688
Cost	$512,835	$180,018	$5,700	$13,605	$18,428	$286,548	$8,536
Nitrate of soda, tons	614	50	----	23	----	541	----
Cost	$9,262	$1,875	----	$1,056	----	$6,331	----
Limestone, tons	60,274	18,911	350	917	1,982	34,910	3,204
Cost	$106,540	$31,987	$850	$1,621	$3,102	$62,380	$6,600
Lime, hundredweights	125,030	12,060	72,922	----	3,150	20,185	16,713
Cost	$12,315	$1,745	$2,373	----	$482	$3,919	$3,796

[1] Includes establishments distributed as follows: Illinois, 1; Maryland, 2; Massachusetts, 1: Missouri, 2; West Virginia, 2; Delaware, 1.

TABLE 13.—BUILDING GLASS, BY STATES: 1900—Continued.

	United States.	Indiana.	New Jersey.	New York.	Ohio.	Pennsylvania.	All other states.[1]
Materials used—Continued.							
Aggregate cost—Continued.							
Arsenic, pounds	1,321,130	517,839	5,085	40,552	105,243	610,807	41,604
Cost	$63,067	$25,867	$280	$2,066	$4,875	$27,923	$2,056
Carbon, tons	3,973	1,847	.....	47	133	1,912	34
Cost	$14,499	$6,135	.....	$310	$660	$6,749	$645
Manganese, pounds	68,600	13,000	.....	1,200	.....	20,400	34,000
Cost	$2,816	$735	.....	$63	.....	$643	$875
Litharge (red lead), pounds	35,521	1,000	.....	31,221	.....	2,700	600
Cost	$2,273	$60	.....	$2,023	.....	$148	$42
Potash or pearlash, pounds	70,383	10,000	.....	54,748	.....	5,635	.....
Cost	$3,704	$510	.....	$2,951	.....	$243	.....
Grinding sand, tons	263,933	70,853	.....	.....	6,800	181,537	4,743
Cost	$160,305	$36,811	.....	.....	$2,040	$119,557	$1,897
Rouge, pounds	835,749	267,345	.....	.....	14,900	532,524	20,980
Cost	$24,448	$9,061	.....	.....	$723	$13,971	$693
Plaster of paris, tons	22,980	7,626	.....	.....	600	14,157	597
Cost	$107,434	$34,610	.....	.....	$1,200	$67,807	$3,817
Fire clay or pot clay, pounds	23,510,700	7,282,228	196,840	288,750	1,603,910	13,365,852	773,120
Cost	$170,522	$57,310	$2,148	$2,438	$4,749	$97,832	$6,045
Pots (not including those made at works), number	3,830	1,482	65	332	336	1,366	249
Cost	$101,061	$45,035	$1,300	$10,395	$9,110	$25,641	$9,580
Flattening stones, number	272	79	14	1	24	146	8
Cost	$16,344	$5,010	$315	$60	$1,550	$9,049	$360
Fuel—							
Total cost	$1,119,022	$195,376	$30,343	$42,741	$35,772	$710,415	$104,375
Natural gas	$751,354	$193,590	.....	.....	$11,212	$535,070	$11,482
Oil, gallons	723,654	489	133,414	54,171	113	177,256	358,211
Cost	$23,161	$78	$4,070	$2,742	$25	$5,679	$10,667
Coal, tons	269,611	432	12,406	20,769	28,593	161,368	46,043
Cost	$335,856	$1,138	$24,905	$37,450	$24,328	$166,866	$81,174
All other fuel	$8,651	$570	$1,368	$2,549	$212	$2,800	$1,152
Lumber, casks, barrels, boxes, and nails	$727,663	$257,905	$11,340	$14,546	$33,227	$378,557	$32,088
Cartons, wrapping paper, straw, and hay	$43,897	$13,252	$785	$876	$1,247	$23,890	$3,847
Supplies used in repairs on tanks and furnaces	$247,538	$72,010	$2,650	$2,531	$7,666	$152,213	$10,468
Mill supplies	$65,616	$37,290	$240	$550	$1,460	$24,315	$1,761
All other materials	$296,155	$56,922	$4,788	$9,417	$4,995	$184,680	$35,353
Freight	$234,855	$41,299	$9,379	$8,293	$9,735	$154,205	$11,944
Products:[2]							
Total value	$17,096,234	$5,711,948	$274,011	$346,790	$671,422	$9,213,545	$878,518
Building glass—							
Window, 50-foot boxes	4,341,282	1,701,729	124,541	89,522	200,854	2,068,340	156,296
Value	$10,879,355	$4,176,587	$267,611	$243,085	$519,187	$5,301,181	$371,751
Plate—							
Total cast, square feet	34,758,994	8,553,338	.....	.....	.....	19,546,674	6,658,482
Rough sold, square feet	628,684	31,917	.....	.....	.....	579,905	16,862
Value	$75,887	$4,780	.....	.....	.....	$68,032	$3,075
Polished plate made, square feet	16,883,578	5,177,160	.....	.....	.....	10,877,250	829,168
Value	$5,158,598	$1,415,224	.....	.....	.....	$3,441,784	$301,640
Cathedral, square feet	8,846,361	.....	.....	.....	.....	.....	8,846,361
Value	$567,252	.....	.....	.....	.....	.....	$567,252
Skylight, square feet	3,679,694	.....	.....	.....	.....	3,636,536	43,158
Value	$165,086	.....	.....	.....	.....	$161,203	$3,883
Wire, square feet	1,295,504	.....	.....	.....	.....	1,295,504	.....
Value	$129,051	.....	.....	.....	.....	$129,051	.....
Value of all other products	$121,005	$15,000	$6,400	$57,011	.....	$41,394	$1,200
Comparison of products:							
Number of establishments reporting for both years	59	20	3	5	5	20	6
Value for census year	$9,574,171	$3,088,863	$204,011	$251,714	$478,017	$4,790,490	$761,076
Value for preceding business year	$9,668,452	$2,908,757	$215,388	$177,837	$368,431	$4,949,146	$1,048,893
Equipment and characteristics of works:							
Pot furnaces—							
Operated, number	164	77	3	8	9	52	15
Pots, number	1,825	735	24	60	82	780	144
Idle, number	29	5	.....	1	4	14	5
Pots, number	471	90	.....	5	80	234	62
Tanks—							
Continuous—							
Operated, number	34	12	3	.....	2	16	1
Rings, number	433	179	24	.....	22	205	3
Pot capacity, number	1,299	537	72	.....	66	615	9
Intermittent, or day—							
Operated, number	13	1	.....	.....	.....	12	.....
Tons capacity, number	124	15	.....	.....	.....	109	.....
Pot capacity, number	124	15	.....	.....	.....	109	.....
Idle, number	1	.....	.....	.....	.....	1	.....
Tons capacity, number	7	.....	.....	.....	.....	7	.....
Pot capacity, number	7	.....	.....	.....	.....	7	.....
Flattening ovens, number	285	116	6	5	12	138	8
Monkey ovens, number	2	.....	.....	.....	.....	.....	2
Blow furnaces, number	259	135	.....	10	15	94	5
Casting tables, number	100	17	.....	5	3	57	18
Annealing ovens, number	869	258	.....	5	23	485	98
Bending ovens, number	9	5	.....	.....	.....	4	.....
Lehrs, number	302	115	5	12	13	147	10
Clay-grinding mills, number	68	22	3	6	3	23	6
Grinding machines, number	227	61	.....	8	12	129	22
Polishing machines, number	294	86	.....	.....	10	174	24
Sand-blast machines, number	5	1	.....	1	.....	3	.....
Mechanical stokers, number	62	.....	.....	2	8	52	.....
Horses and mules, number	92	14	6	5	3	47	17
Wagons, carts, and drays, number	93	13	7	3	2	52	16
Power:							
Number of establishments reporting	111	45	4	7	6	41	8
Total horsepower	43,939	8,741	90	155	5,799	25,516	3,638
Owned—							
Engines—							
Steam, number	442	127	4	8	8	274	21
Horsepower	37,161	8,280	90	155	2,250	23,292	3,144
Gas or gasoline, number	25	7	.....	.....	3	15	.....
Horsepower	685	148	.....	.....	29	518	.....

[1] Includes establishments distributed as follows: Illinois, 1; Maryland, 2; Massachusetts, 1; Missouri, 2; West Virginia, 2; Delaware, 1.

[2] While the aggregate value for the respective states is the aggregate value of products reported for building glass manufacture, this total can not be obtained by adding the amounts given, as the report of certain products has been suppressed to avoid disclosing the operations of individual establishments.

TABLE 13.—BUILDING GLASS, BY STATES: 1900—Continued.

	United States.	Indiana.	New Jersey.	New York.	Ohio.	Pennsylvania.	All other states.[1]
Power—Continued.							
Total horsepower—Continued.							
Owned—Continued.							
Water wheels, number	1	.....	.....	.....	.....	.....	1
Horsepower	12	.....	.....	.....	.....	.....	12
Electric motors, number	134	14	.....	.....	39	66	15
Horsepower	5,628	368	.....	.....	3,520	1,258	482
Other power, number	6	.....	.....	.....	.....	6	.....
Horsepower	440	.....	.....	.....	.....	440	.....
Rented—							
Electric, horsepower	1	.....	.....	.....	.....	1	.....
Other, horsepower	12	.....	.....	.....	.....	12	.....
Establishments classified by number of persons employed, not including proprietors and firm members:							
Total number of establishments	124	51	4	7	7	46	9
5 to 20	3	2	.....	.....	.....	.....	1
21 to 50	16	4	1	5	2	2	2
51 to 100	43	24	1	2	.....	12	4
101 to 250	41	15	2	.....	4	19	1
251 to 500	13	4	.....	.....	1	7	1
501 to 1,000	8	2	.....	.....	.....	6	.....

[1] Includes establishments distributed as follows: Illinois, 1; Maryland, 2; Massachusetts, 1; Missouri, 2; West Virginia, 2; Delaware, 1.

TABLE 14.—PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1900.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states.[1]
Number of establishments	231	5	59	5	4	22	20	21	73	14	8
Character of organization:											
Individual	23	.....	5	.....	.....	3	3	1	10	1	.....
Firm and limited partnership	49	.....	6	1	1	3	4	4	24	3	3
Incorporated company	157	5	47	4	3	16	12	16	39	10	5
Miscellaneous	2	.....	1	.....	.....	.....	1	.....	.....	.....	.....
Capital:											
Total	$34,806,781	$2,143,658	$5,694,974	$479,584	$255,949	$5,178,672	$1,908,799	$3,412,379	$13,626,067	$1,265,624	$841,125
Land	$2,600,798	$65,157	$240,812	$32,061	$33,000	$302,136	$226,225	$228,181	$1,314,384	$72,042	$86,800
Buildings	$7,933,493	$520,764	$1,321,693	$104,365	$50,047	$1,083,071	$325,504	$823,928	$3,190,620	$348,801	$165,200
Machinery, tools, and implements	$4,723,745	$108,289	$774,210	$61,495	$34,150	$339,100	$262,082	$500,422	$2,257,465	$230,532	$156,000
Cash and sundries	$19,548,745	$1,449,448	$3,358,259	$281,613	$133,752	$3,454,365	$1,094,988	$1,859,848	$6,863,598	$614,749	$438,125
Proprietors and firm members	145	.....	22	2	2	14	11	7	73	6	8
Salaried officials, clerks, etc.:											
Total number	1,653	71	285	28	38	309	106	174	535	80	27
Total salaries	$1,980,393	$106,600	$375,122	$36,576	$27,660	$278,684	$124,588	$226,459	$675,368	$93,016	$36,420
Officers of corporations—											
Number	302	12	87	6	7	50	27	25	66	17	5
Salaries	$625,168	$36,260	$165,249	$9,710	$9,469	$82,340	$51,354	$60,814	$172,367	$27,900	$9,700
General superintendents, managers, clerks, etc.—											
Total number	1,351	59	198	22	31	259	79	149	469	63	22
Total salaries	$1,355,230	$70,340	$209,873	$26,866	$18,191	$196,294	$73,184	$165,645	$503,001	$65,116	$26,720
Men—											
Number	1,162	56	164	20	22	228	73	121	406	50	22
Salaries	$1,268,971	$68,320	$193,189	$25,544	$15,326	$183,770	$69,986	$158,593	$478,401	$59,122	$26,720
Women—											
Number	189	3	34	2	9	31	6	28	63	13	.....
Salaries	$86,259	$2,020	$16,684	$1,322	$2,865	$12,524	$3,198	$12,052	$29,600	$5,994	.....
Wage-earners, including piece-workers, and total wages:											
Greatest number employed at any one time during the year	52,370	3,889	12,011	870	486	7,032	5,186	5,212	16,012	2,266	1,406
Least number employed at any one time during the year	37,601	3,639	9,150	631	327	4,895	2,110	3,395	10,775	1,891	1,288
Average number	40,916	3,291	9,103	657	375	5,158	2,328	4,069	12,961	1,886	1,093
Total wages	$18,055,037	$1,615,786	$3,974,228	$275,354	$179,329	$2,299,500	$1,140,973	$1,691,378	$5,580,771	$734,676	$563,042
Men, 16 years and over—											
Average number	30,372	2,594	7,002	477	331	4,186	1,975	3,028	8,768	1,258	803
Wages	$15,901,620	$1,491,391	$3,557,923	$249,756	$169,891	$2,115,061	$1,076,992	$1,468,952	$4,658,460	$603,817	$510,377
Women, 16 years and over—											
Average number	3,509	148	634	54	19	170	73	405	1,526	468	12
Wages	$835,100	$28,456	$129,808	$8,673	$4,892	$32,726	$17,831	$96,017	$409,349	$103,748	$4,100
Children, under 16 years—											
Average number	7,035	549	1,467	126	25	847	280	636	2,667	160	278
Wages	$1,318,317	$95,930	$286,497	$16,925	$5,046	$151,713	$47,150	$126,409	$512,962	$27,111	$48,565
Average number of wage-earners, including pieceworkers, employed during each month:											
Men, 16 years and over—											
January	34,589	3,008	8,091	516	343	4,987	2,191	3,345	9,840	1,302	966
February	34,811	3,005	8,128	528	368	5,027	2,100	3,389	9,943	1,357	966
March	35,403	3,000	8,386	579	330	5,053	2,302	3,533	9,858	1,302	1,000
April	35,057	2,980	8,560	593	303	4,475	2,428	3,676	9,799	1,357	986
May	33,510	2,939	7,922	590	323	4,630	2,387	3,358	9,169	1,309	883
June	31,439	2,791	7,317	588	310	4,392	2,257	3,240	8,637	1,095	812
July	12,245	657	2,368	164	222	1,382	909	1,205	4,631	507	205
August	14,751	660	2,688	196	289	946	988	1,622	6,043	1,214	205
September	29,484	3,025	6,243	457	344	3,913	1,672	3,070	8,555	1,377	828
October	33,300	3,020	7,869	504	373	4,660	1,959	3,302	9,416	1,381	826
November	34,801	3,036	8,256	495	408	5,076	2,205	3,312	9,641	1,397	980
December	35,080	3,003	8,267	514	417	5,092	2,296	3,383	9,687	1,487	984
Women, 16 years and over—											
January	3,795	179	792	53	15	153	71	431	1,640	448	13
February	3,855	177	758	58	19	159	67	439	1,707	458	13
March	3,957	177	810	62	19	166	83	487	1,677	463	13
April	3,868	177	806	57	20	160	90	479	1,603	463	13

[1] Includes establishments distributed as follows: California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1.

TABLE 14.—PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states.[1]
Average number of wage-earners, including pieceworkers, employed during each month—Continued.											
Women, 16 years and over—Con.											
May	3,468	167	625	58	20	181	93	427	1,451	433	13
June	3,325	152	623	54	18	182	84	402	1,366	428	16
July	1,837	24	197	25	8	147	44	193	1,007	176	16
August	2,515	24	253	50	14	93	60	251	1,247	503	15
September	3,411	172	442	59	21	135	56	414	1,555	557	.....
October	3,386	171	715	61	20	175	67	447	1,673	557	.....
November	4,117	177	801	61	24	261	80	451	1,681	565	16
December	4,072	177	782	56	24	223	79	445	1,709	561	16
Children, under 16 years—											
January	8,210	667	1,810	132	34	996	298	829	2,958	156	330
February	8,369	659	1,873	136	35	993	284	840	3,056	163	330
March	8,446	659	1,880	138	24	983	298	832	3,061	172	349
April	8,551	661	1,906	197	24	965	332	819	3,128	172	347
May	7,249	646	1,301	186	25	986	348	549	2,674	167	367
June	6,991	646	1,190	199	25	963	331	585	2,590	165	297
July	2,321	.....	520	5	6	169	116	82	1,261	77	85
August	3,270	.....	690	5	6	157	139	246	1,803	139	85
September	6,088	650	1,097	60	24	789	237	464	2,341	182	244
October	8,029	660	1,745	137	30	969	290	789	2,985	180	244
November	8,427	671	1,799	128	32	1,124	327	797	3,043	177	329
December	8,467	667	1,796	136	35	1,071	364	796	3,098	173	331
Miscellaneous expenses:											
Total	$2,222,776	$210,329	$341,500	$22,313	$13,483	$229,514	$130,986	$136,007	$1,000,711	$109,904	$28,079
Rent of works	$22,881	.....	$780	.....	.....	$683	$7,745	$68	$8,005	$400	$5,200
Taxes, not including internal revenue	$131,369	$9,426	$27,168	$1,480	$2,915	$20,822	$7,312	$14,969	$38,849	$4,622	$3,811
Rent of offices, insurance, interest, and all sundry expenses not hitherto included	$2,020,692	$200,903	$309,557	$20,833	$10,568	$201,600	$103,487	$120,970	$933,174	$102,932	$16,668
Contract work	$47,834	.....	$4,000	.....	.....	$6,409	$12,392	.....	$20,683	$1,950	$2,400
Materials used:											
Aggregate cost	$12,051,925	$664,858	$3,262,466	$120,759	$130,095	$1,401,980	$778,842	$1,094,638	$3,738,422	$557,368	$302,497
Glass sand, tons	403,754	32,778	119,621	2,076	1,322	78,497	19,843	31,856	95,683	9,205	11,873
Cost	$547,943	$33,231	$139,056	$3,929	$6,265	$75,688	$42,344	$59,199	$157,462	$12,958	$17,811
Soda ash (carbonate of soda), tons	132,279	11,942	40,592	1,263	189	20,015	7,449	10,406	33,192	2,796	4,435
Cost	$1,921,405	$163,694	$579,638	$19,080	$5,217	$299,245	$112,153	$147,128	$471,130	$42,751	$81,369
Salt cake (sulphate of soda), tons	468	.....	213	.....	.....	197	.....	.....	58	.....	.....
Cost	$5,755	.....	$3,214	.....	.....	$1,778	.....	.....	$763	.....	.....
Nitrate of soda, tons	10,156	440	2,279	149	24	1,314	525	1,259	3,789	307	70
Cost	$311,675	$13,720	$73,368	$5,000	$830	$21,165	$18,118	$39,684	$126,058	$10,982	$2,800
Limestone, tons	30,741	4,815	9,082	118	.....	8,227	1,545	1,374	3,399	325	1,856
Cost	$75,177	$9,912	$15,895	$319	.....	$24,621	$5,205	$3,434	$8,730	$575	$6,486
Lime, hundredweights	669,649	45,387	218,088	14,725	559	126,001	32,819	72,488	127,790	11,228	20,564
Cost	$135,586	$10,175	$35,854	$1,233	$112	$24,500	$8,885	$14,230	$34,027	$2,820	$3,750
Arsenic, pounds	1,028,131	45,207	319,648	1,650	6,789	97,405	61,018	123,344	285,267	69,303	18,500
Cost	$49,563	$2,153	$14,981	$83	$330	$4,632	$2,876	$6,876	$13,372	$3,295	$965
Carbon, tons	182	90	36	.....	.....	20	4	.....	14	12	6
Cost	$2,501	$1,018	$422	.....	.....	$406	$234	.....	$201	$160	$79
Manganese, pounds	1,424,938	58,338	508,980	11,167	8,101	143,465	89,521	76,117	487,181	58,944	32,624
Cost	$55,177	$1,910	$18,920	$566	$207	$5,674	$3,737	$3,672	$16,831	$2,239	$1,421
Litharge (red lead), pounds	8,350,585	115,000	1,481,887	36,982	364,448	72,049	790,909	2,063,000	3,141,027	285,283	.....
Cost	$487,927	$6,200	$76,155	$1,857	$24,497	$3,918	$46,114	$117,035	$191,568	$20,583	.....
Potash or pearlash, pounds	4,335,828	.....	443,481	75,000	207,967	60,270	414,438	850,171	1,932,699	351,802	.....
Cost	$183,143	.....	$18,054	$3,000	$8,994	$2,866	$17,552	$34,129	$81,991	$16,557	.....
Grinding sand, tons	1,505	.....	299	.....	.....	433	50	97	580	46	.....
Cost	$5,735	.....	$722	.....	.....	$519	$120	$480	$3,629	$265	.....
Rouge, pounds	1,787	.....	.....	.....	.....	1,300	.....	87	.....	400	.....
Cost	$299	.....	.....	.....	.....	$41	.....	$174	.....	$84	.....
Plaster of Paris, tons	86	.....	34	.....	.....	.....	10	11	27	4	.....
Cost	$1,097	.....	$494	.....	.....	.....	$71	$111	$364	$57	.....
Fire clay or pot clay, pounds	8,640,317	562,000	1,342,070	141,300	26,158	1,912,005	744,450	946,000	2,560,394	134,940	271,000
Cost	$50,661	$4,960	$7,084	$717	$120	$11,727	$5,985	$2,306	$16,990	$1,437	$385
Pots, not including those made at works, number	5,111	284	947	164	110	301	143	863	2,095	184	20
Cost	$280,086	$16,930	$56,849	$7,286	$5,175	$11,217	$7,125	$52,861	$110,124	$11,199	$1,320
Fuel—											
Total cost	$2,084,124	$154,020	$159,924	$33,416	$30,287	$415,485	$184,417	$213,633	$711,295	$77,423	$104,224
Natural gas	$823,924	.....	$157,963	.....	.....	.....	$9,190	$99,404	$481,833	$75,534	.....
Oil, gallons	11,967,202	1,663,301	135	148,396	371,867	4,964,767	1,293,521	1,250,637	938,873	18,650	1,317,955
Cost	$385,997	$41,084	$37	$6,234	$15,619	$155,257	$45,603	$31,874	$44,548	$585	$45,156
Coal, tons	485,852	113,475	520	12,315	3,416	92,520	48,190	48,816	139,116	1,271	26,213
Cost	$738,218	$94,232	$1,478	$22,089	$12,782	$194,457	$121,802	$78,138	$159,503	$1,304	$52,933
All other fuel	$135,985	$18,704	$446	$5,093	$1,886	$65,771	$8,822	$4,217	$25,411	.....	$6,135
Rent of power and heat	$62	.....	.....	.....	.....	.....	.....	.....	$62	.....	.....
Lumber, casks, barrels, boxes, and nails	$2,050,362	$103,089	$683,929	$12,239	$11,851	$182,510	$113,281	$178,424	$647,956	$100,424	$16,659
Cartons, wrapping paper, straw, and hay	$568,705	$22,571	$277,273	$2,326	$4,193	$21,605	$21,429	$48,523	$137,122	$32,513	$1,150
Caps, metal trimmings, and rubber supplies	$1,522,917	$31,073	$747,574	$10,494	$6,816	$79,359	$67,111	$61,212	$405,045	$101,983	$12,250
Supplies used in repairs on tanks or furnaces	$284,378	$35,559	$73,657	$2,107	$2,723	$44,439	$27,993	$11,508	$53,452	$16,140	$16,800
Mill supplies	$72,818	$1,076	$19,556	$2,486	$687	$3,467	$2,978	$7,604	$24,854	$8,680	$1,430
All other materials	$695,596	$30,672	$80,211	$8,444	$20,679	$104,547	$69,533	$38,751	$273,827	$63,625	$5,307
Freight	$659,233	$22,895	$179,636	$6,177	$1,112	$62,571	$21,631	$53,714	$252,569	$30,628	$28,300
Products:											
Aggregate value	$39,443,478	$2,810,398	$9,045,985	$454,633	$402,258	$4,819,811	$2,410,188	$3,875,661	$12,797,585	$1,770,553	$1,056,456
Pressed and blown glass—											
Total value	$17,076,125	$131,618	$2,691,787	$100,000	$382,091	$21,300	$1,17?,784	$2,738,289	$8,453,550	$1,379,706	$4,000
Tableware, 100 pieces	655,141	.....	126,162	.....	.....	.....	.....	150,992	364,770	13,217	.....
Value	$2,617,784	.....	$291,060	.....	.....	.....	.....	$668,469	$1,585,870	$72,385	.....
Jellies, tumblers, and goblets, dozens	8,544,050	.....	3,050,595	340,000	.....	.....	.....	1,681,584	3,112,588	359,283	.....
Value	$2,007,386	.....	$630,485	$100,000	.....	.....	.....	$392,612	$793,902	$90,387	.....
Lamps, dozens	807,765	.....	81,972	.....	2,020	.....	15,599	191,084	455,543	61,547	.....
Value	$1,498,675	.....	$43,116	.....	$4,000	.....	$7,447	$185,297	$983,452	$275,363	.....
Chimneys, dozens	6,901,192	173,931	3,113,228	.....	84,000	.....	186,800	1,508,114	1,835,119	.....	.....
Value	$2,719,583	$131,618	$1,196,996	.....	$33,000	.....	$96,707	$622,721	$638,541	.....	.....
Lantern globes, dozens	1,044,816	.....	547,971	.....	2,000	.....	162,038	142,800	58,275	131,732	.....
Value	$497,021	.....	$176,150	.....	$1,800	.....	$189,629	$69,589	$26,920	$32,933	.....

[1] Includes establishments distributed as follows: California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1.

TABLE 14.—PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states.[1]
Products—Continued.											
Pressed and blown glass—Con.											
Shades, globes, and gas and electric goods, dozens	2,673,854	.....	15,052	.....	23,300	41,666	$12,500	1,397,824	856,125	27,387	.....
Value	$2,497,885	.....	$19,044	.....	$40,000	$6,500	$520,000	$398,420	$1,452,248	$61,673	.....
Blown tumblers, stemware, and bar goods, dozens	6,127,367	.....	112,163	.....	.....	.....	.....	214,072	3,512,552	2,288,580	.....
Value	$1,598,652	.....	$37,701	.....	.....	.....	.....	$53,368	$1,107,489	$400,094	.....
Opal ware, dozens	3,750,443	.....	244,873	.....	3,000	.....	1,000	96,597	2,925,545	479,428	.....
Value	$1,581,731	.....	$90,322	.....	$4,000	.....	$1,500	$51,656	$1,214,472	$219,781	.....
Cut glass, dozens	184,726	.....	325	.....	3,332	.....	.....	2,900	56,800	71,369	.....
Value	$672,463	.....	$600	.....	$146,613	.....	.....	$126,000	$311,189	$88,061	.....
All other products for this group	$1,384,945	.....	$206,313	.....	$152,678	$14,800	$858,501	$170,157	$339,467	$139,029	$4,000
Bottles and jars—											
Total value	$21,676,791	$2,678,780	$6,327,468	$346,633	$20,167	$4,452,219	$1,195,276	$1,058,955	$4,162,990	$381,847	$1,052,456
Prescription vials, and druggists' ware, gross	2,423,932	265,918	624,128	20,000	.....	731,107	81,808	76,409	551,236	4,004	69,327
Value	$4,665,697	$404,799	$1,184,397	$94,633	.....	$1,806,316	$203,734	$155,877	$1,170,061	$8,889	$137,491
Beers, sodas, and minerals, gross	1,351,118	406,037	109,194	13,004	128	108,247	134,364	219,422	147,145	25,000	188,577
Value	$5,075,068	$1,332,842	$347,836	$120,212	$626	$408,661	$495,398	$837,428	$901,129	$92,000	$788,936
Liquors and flasks, gross	985,374	31,168	604,798	5,000	6,298	64,140	44,171	16,400	142,518	43,058	27,823
Value	$2,403,447	$131,869	$1,207,519	$20,000	$19,541	$153,165	$110,221	$57,350	$448,182	$169,852	$85,748
Milk jars, gross	146,142	7,500	19,561	.....	.....	19,798	6,988	6,000	80,485	4,600	1,260
Value	$729,008	$37,500	$55,344	.....	.....	$107,431	$33,863	$30,000	$434,310	$23,000	$7,560
Fruit jars, gross	789,298	1,500	559,549	.....	.....	61,871	31,235	2,000	115,000	14,648	3,500
Value	$2,935,036	$9,000	$2,106,250	.....	.....	$192,467	$128,965	$8,000	$436,104	$43,750	$10,500
Patent and proprietary, gross	1,296,131	302,708	244,343	500	.....	601,276	57,224	20,000	55,080	.....	15,000
Value	$2,602,976	$495,597	$378,301	$1,500	.....	$1,399,042	$120,543	$35,800	$142,193	.....	$30,000
Packers and preservers', gross	784,588	80,789	247,731	5,007	.....	278,960	11,430	25,000	118,546	10,242	11,933
Value	$2,119,221	$195,691	$686,092	$15,021	.....	$620,869	$33,706	$100,000	$419,947	$20,356	$27,539
Demijohns and carboys, dozens	83,243	29,136	.....	.....	.....	18,689	10,929	.....	17,815	.....	6,674
Value	$206,061	$48,984	.....	.....	.....	$86,645	$18,896	.....	$36,854	.....	$14,682
All other products for this group	$940,277	$22,498	$861,729	$95,267	.....	$177,623	$49,950	$35,000	$174,210	$24,000	.....
Value of all other products	$690,562	.....	$26,680	$8,000	.....	$346,292	$41,128	$78,417	$181,045	$9,000	.....
Comparison of products:											
Number of establishments reporting for both years	193	5	43	5	3	20	18	16	68	10	5
Value for census year	$37,610,478	$2,810,398	$8,069,031	$454,633	$382,091	$4,723,436	$2,387,188	$3,660,133	$12,557,359	$1,628,027	$938,182
Value for preceding business year	$32,291,216	$2,278,679	$7,147,396	$430,845	$430,549	$4,324,575	$2,172,657	$2,948,234	$10,434,929	$1,371,352	$762,000
Equipment and characteristics of works:											
Pot furnaces—											
Operated, number	227	8	39	6	3	24	16	28	91	11	1
Pots, number	2,475	105	485	67	28	176	140	362	978	122	12
Idle, number	31	1	4	1	2	6	4	1	11	1	.....
Pots, number	336	12	44	12	19	55	42	15	125	12	.....
Tanks—											
Continuous—											
Operated, number	158	11	59	.....	.....	28	14	10	27	.....	9
Rings, number	1,238	133	385	.....	.....	269	115	73	199	.....	64
Pot capacity, number	2,476	266	770	.....	.....	538	230	146	398	.....	128
Idle, number	14	.....	4	.....	.....	6	.....	.....	1	.....	3
Rings, number	79	.....	12	.....	.....	40	.....	.....	8	.....	19
Pot capacity, number	158	.....	24	.....	.....	80	.....	.....	16	.....	38
Intermittent or day—											
Operated, number	117	7	32	1	1	12	7	3	32	19	3
Tons capacity, number	694	40	193	6	90	72	49	13	123	85	23
Pot capacity, number	694	40	193	6	90	72	49	18	123	85	23
Idle, number	16	.....	4	.....	.....	2	1	3	4	1	1
Tons capacity, number	76	.....	12	.....	.....	7	3	12	35	5	2
Pot capacity, number	76	.....	12	.....	.....	7	3	12	35	5	2
Shops, number	3,978	427	1,397	67	38	718	312	613	144	158	104
Glory holes, number	1,419	146	351	24	16	301	66	93	351	28	43
Annealing ovens, number	1,540	289	161	21	15	266	126	121	395	18	128
Lehrs, number	1,025	31	321	18	12	95	55	102	323	59	9
Decorating kilns, number	105	.....	6	1	8	.....	1	27	55	7	.....
Decorating lehrs, number	23	.....	1	.....	.....	.....	.....	4	15	3	.....
Presses, hand, number	915	13	197	7	9	55	49	125	402	57	1
Presses, mechanical, number	49	.....	4	.....	.....	.....	.....	.....	42	3	.....
Blowing machines, number	169	1	80	.....	.....	4	1	18	65	.....	.....
Finishing machines, number	140	2	33	.....	.....	1	2	59	42	1	.....
Crimping machines, number	494	1	169	.....	5	.....	32	35	252	.....	.....
Mechanical polishers, number	16	.....	.....	.....	1	1	1	1	12	.....	.....
Sand blast machines, number	68	1	8	.....	3	1	9	10	27	9	.....
Grinding machines for fruit jar tops, number	137	3	29	4	.....	22	9	5	54	10	.....
Clay grinding mills, number	8	.....	1	.....	.....	1	.....	2	4	.....	.....
Mechanical stokers, number	17	.....	.....	.....	.....	3	12	.....	.....	.....	.....
Horses and mules, number	317	23	7	8	7	92	44	15	87	5	29
Wagons, carts, and drays, number	314	24	20	11	8	104	44	6	74	5	18
Power:											
Number of establishments reporting	219	5	54	5	3	21	18	21	71	13	8
Total horsepower	14,990	675	2,645	207	187	1,666	972	1,527	5,440	952	719
Owned—											
Engines—											
Steam, number	311	13	60	7	4	65	25	30	79	16	12
Horsepower	12,630	675	2,103	197	100	1,591	862	1,176	4,440	767	719
Gas or gasoline, number	59	.....	16	.....	1	1	1	10	26	4	.....
Horsepower	1,679	.....	442	.....	7	5	60	206	809	160	.....
Water wheels, number	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Horsepower	15	.....	.....	.....	.....	.....	.....	.....	15	.....	.....
Electric motors, number	44	.....	4	1	1	.....	.....	6	31	1	.....
Horsepower	358	.....	100	10	40	.....	.....	85	103	20	.....
Other power, number	19	.....	.....	.....	.....	4	4	6	4	1	.....
Horsepower	265	.....	.....	.....	.....	70	60	60	70	5	.....
Rented—											
Electric, horsepower	43	.....	.....	.....	40	.....	.....	.....	3	.....	.....
Furnished to other establishments	10	.....	.....	.....	.....	.....	10	.....	.....	.....	.....

[1] Includes establishments distributed as follows: California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1.

TABLE 14.—PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states.[1]
Establishments classified by number of persons employed, not including proprietors and firm members:											
Total number of establishments	231	5	59	5	4	22	20	21	73	14	8
Under 5	1									1	
5 to 20	2							1	1		
21 to 50	17		3			2	4		6	2	
51 to 100	50		15	1	2	4	5	3	12	4	4
101 to 250	98	1	28	3	2	9	7	8	36	3	1
251 to 500	45	2	10	1		3	4	7	11	4	3
501 to 1,000	13		2			3		2	6		
Over 1,000	5	2	1			1			1		

[1] Includes establishments distributed as follows: California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1.

TURPENTINE AND ROSIN.

TURPENTINE AND ROSIN.

By WILLIAM M. STEUART.

The gathering of resin, or crude turpentine, from the longleaf pine was among the first industries to attract the attention of the early settlers of the territory now forming the state of North Carolina. The primitive methods of gathering and shipping the resin as a raw material were followed by the manufacture of tar and pitch and the distillation of spirits of turpentine, the residuum being sold as rosin. The turpentine industry has extended to other sections, and is now found in all regions in which the longleaf pine is found in sufficient abundance, and has formed an important feature in the industrial development of the South Atlantic and Eastern Gulf states. Table 1 is a comparative summary of the statistics for the industry as returned at the censuses of 1850 to 1900, with the percentages of increase for each decade.

TABLE 1.—COMPARATIVE SUMMARY, 1850 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	DATE OF CENSUS.						PER CENT OF INCREASE.				
	1900	1890	1880	1870	1860	1850	1890 to 1900	1880 to 1890	1870 to 1880	1860 to 1870	1850 to 1860
Number of establishments	1,503	670	508	227	625	856	124.3	31.9	123.8	[1] 63.7	[1] 27.0
Capital	$11,847,495	$4,062,376	$1,866,390	$902,225	$4,013,758	$1,663,692	191.6	117.7	106.9	[1] 77.5	141.3
Salaried officials, clerks, etc., number	1,889	[2] 49	[3]	[3]	[3]	[3]	3755.1	.....	.....	.....	.....
Salaries	$778,694	[2] $26,944	[3]	[3]	[3]	[3]	2790.0	.....	.....	.....	.....
Wage-earners, average number	41,864	15,266	10,535	2,638	4,214	3,437	174.2	44.9	299.4	[1] 37.4	22.6
Total wages	$8,393,483	$2,906,547	$1,623,061	$476,284	$770,696	$447,348	188.8	79.1	240.8	[1] 38.2	72.3
Men, 16 years and over	41,375	15,031	9,955	2,526	4,079	3,369	175.3	51.0	294.1	[1] 38.1	21.1
Wages	$8,338,044	$2,891,392	[3]	[3]	[3]	[3]	188.4	.....	.....	.....	.....
Women, 16 years and over	173	141	338	81	135	68	22.7	[1] 58.3	317.3	[1] 40.0	98.5
Wages	$21,630	$10,344	[3]	[3]	[3]	[3]	109.1	.....	.....	.....	.....
Children, under 16 years	316	94	242	31	[3]	[3]	236.2	[1] 61.2	680.6	.....	.....
Wages	$33,809	$4,811	[3]	[3]	[3]	[3]	602.7	.....	.....	.....	.....
Miscellaneous expenses	$476,171	$178,662	[4]	[4]	[4]	[4]	166.5	.....	.....	.....	.....
Cost of materials used	$6,186,492	$2,874,693	$2,324,637	$2,146,090	$4,324,414	$1,484,318	115.2	23.7	8.3	[1] 50.4	191.3
Value of products	$20,344,888	$8,077,379	$5,876,983	$3,585,225	$6,468,369	$2,855,657	151.9	37.4	63.9	[1] 44.6	126.5

[1] Decrease.
[2] Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See Table 7.)
[3] Not reported separately.
[4] Not reported.

In addition to the establishments included in the above table for 1900, there were, in the states of North Carolina and South Carolina, 20 establishments each reporting a product of less than $500. The combined capital of these establishments was $6,336, and the total value of their product, $3,195.

The principal products of the industry are resin, which is the crude material obtained by tapping or bleeding the trees, spirits of turpentine, and rosin. The spirits of turpentine and the rosin are obtained by a distillation of the crude resin. Tar is obtained by the destructive distillation of the wood itself. Other products, such as oil of rosin, oil of tar, common pitch, brewers' pitch, etc., are obtained by a redistillation or combination of the products above mentioned. The early application of these products to shipbuilding gave rise to the generic term of "naval stores" as the designation of the industry, but as only a small proportion of the products are now used for this purpose, the term has become a misnomer.

Considered as a manufacture, the industry begins with the delivery of the crude resin at the distillery, but as the majority of the distillers own or lease the forests which supply the resin, it is found impossible to eliminate the capital and expenses pertaining to the care of these forests and the gathering of the resin so as to obtain statistics which relate exclusively to the operations of the distilleries. Hence the capital reported includes the total amount invested in the business; the employees comprise those engaged in all branches of the industry, including those employed in the forests; and the cost of materials consists of the amounts paid for barrels, casks, cooperage stock, cooperage, etc., and for resin and fuel purchased, if any. The cost of the crude turpentine gathered by distillers operating their own forests is included in the amounts paid as wages, miscellaneous expenses, etc.

The care of the forests, the species of trees from which resin is obtained, and the methods of tapping the trees and gathering the resin, are exhaustively

treated in the report of the division of forestry, Department of Agriculture, for 1892, and therefore will not be treated in this report.

In the early stages of the development of the industry, the crude resin was shipped to European and northern ports for distillation. "In the three years—1768 to 1770—88,111 barrels of crude turpentine, 20,646 barrels of pitch, and 88,366 barrels of tar were, on the average, annually exported to the mother country, representing a value of $215,000 in our present currency."[1] While these figures indicate that the industry was of considerable importance prior to the Revolution, it was largely confined to the district lying between the Tar and Cape Fear rivers in North Carolina, within convenient access to the ports of Wilmington and Newbern, and consisted in gathering the resin and the destructive distillation of wood for the production of tar. Resin was distilled to some extent in northern cities; later, distilleries were operated in Wilmington and in the forests of North Carolina, thus enabling the operation to be carried on in connection with the gathering of the resin. The process was at first effected in clumsy iron retorts, but the introduction of the copper still in 1834 led to a largely increased yield of volatile oil, and the industry received a strong impetus.[1] The methods of distillation have not changed materially during the one hundred years' history of the industry in the United States. The object of the operation is to obtain the largest possible quantity of spirits of turpentine from a given quantity of resin. The quantity of spirits obtained depends largely upon the character of the crude turpentine and the skill of the distiller. The crude turpentine is composed of "dip," which is the gum in a liquid state, and of "scrape," which is the solidified resin scraped from the tree. The best quality is obtained during the first year the tree is worked, and is known as "virgin dip" or soft white gum; it is almost colorless and contains the largest quantity of volatile oil. In the following year the gum is of a deeper, yellowish color, the "yellow dip," and, with each succeeding year, it becomes darker in color, more viscid, and poorer in volatile oil.[1] The results of the distillation of a given quantity of crude turpentine, and a clear description of the method employed, are given in the following statement taken from the report of the division of forestry, Department of Agriculture, for 1892:

DISTILLATION.

"The process of distillation requires experience and care in order to prevent loss in spirits of turpentine, to obtain the largest quantities of rosin of higher grades, and to guard against overheating. After heating the still somewhat beyond the melting point of crude turpentine, a minute stream of tepid water from the top of the condensing tub is conducted into the still and allowed to run until the end of the process; this end is indicated by a peculiar noise of the boiling contents of the still and the diminished quantity of volatile oil in the distillate. On reaching this point the heating of the still and the influx of water have to be carefully regulated. After all the spirits of turpentine has distilled over, the fire is removed, and the contents of the still are drawn off by a tap at the bottom. This residuum, the molten rosin, is first allowed to run through a wire cloth, and is immediately strained again through coarse cotton cloth, or cotton batting made for the purpose, into a large trough, from which it is ladled into barrels. The legal standard weight of the commercial package is 280 pounds gross, no tare being allowed.

"The finest grades of rosin are largely used in the manufacture of paper, for sizing, of soaps, and of fine varnishes; the medium qualities are mostly consumed in the manufacture of yellow soap, sealing wax, in pharmacy, and for other minor purposes; and the lower and lowest qualities are used for pitch in ship and boat building, brewers' pitch, and for the distillation of rosin-oil, which largely enters into the manufacture of lubricating agents."

* * * * *

COST OF ESTABLISHMENT OF PLANT AND OF WORKING THE CROP.

"Lands, with the privilege of boxing the timber for the term of four years, are rented at the rate of $50 per crop of 10,000 boxes (about 200 acres with 4,000 to 5,000 trees). The establishment of plant for the working of 20 crops requires an investment of about $5,000, including the still, houses, sheds, tools, wagons, and working animals, mostly mules.

"The following statement, made by an operator of many years' experience, exhibits the actual expenses incurred for the working of one crop during four years; the work is for the greatest part done by the job:

Chopping 10,000 boxes	$125.00
Inspecting and tallying the same	15.00
Cornering 10,000 boxes	12.00
Raking around the trees, at $10 per season	40.00
Chipping boxes during 111 weeks, at $5 per week	555.00
Dipping crude resin, 650 barrels, and scraping 460 stands, at 30 cents	333.00
Hauling dippings and scrapings, at 30 cents per barrel	333.00
Distilling, at 20 cents per barrel	222.00
Spirit barrels, 122, at $2.80	305.00
Making and filling 795 barrels resin, at 30 cents	238.50
Superintendence of the crop	80.00
Total working expense of one crop	2,258.50
Rent of land for one crop	50.00
Cost of one crop	2,308.50

"Total expense of operating a plant of 20 crops during four years:

Labor, rent, and materials	$46,170.00
Interest on capital invested, $5,000, at 6 per cent	1,200.00
Loss by depreciation of plant, 10 per cent per year for four years	2,000.00
Taxes and incidentals	630.00
	50,000.00

[1] Report of the Division of Forestry, Department of Agriculture, 1892.

"YIELD.—It appears that the yield of the crop of 200 acres distributes itself about as follows:

	Dip.	Scrape.	Total crude turpentine.	Total yield, per cent.	Scrape, per cent.	SPIRITS.		Rosin.
						Gallons.	Per cent.	
	Lbs.	*Lbs.*	*Lbs.*					*Bbls.*
First year	67,200	16,800	84,000	30.9	20.0	2,100	34.4	260
Second year	54,000	[1]28,000	82,800	30.5	34.8	2,000	32.8	200
Third year	28,800	24,000	52,800	[2]19.5	45.5	1,100	18.0	100
Fourth year	28,000	24,000	52,000	[3]19.1	[4]46.1	900	14.8	100
	178,000	93,600	271,600	100.0	[5]29.0	6,100	100.0	[6]669

[1] Evidently an error; should be 28,800.
[2] Evidently an error; should be 19.4.
[3] Evidently an error; should be 19.2.
[4] Evidently an error; should be 46.2.
[5] Evidently an error; should be 34.5.
[6] Evidently an error; should be 660.

"If we assume that 4,500 trees produce these amounts in four years, the yield per tree in crude turpentine is about 60 pounds. The result at the still would indicate that each tree furnishes between 1¼ and 1½ gallons of spirits, and one-eighth of a barrel, or 30 pounds, of rosin of better grade, or at best 75 cents' worth of product during the four years, which has cost 55 cents to produce, leaving 5 cents net per tree per year, or from $1 to $1.25 per acre.

"From the fact that 4,000 acres of timber land (20 crops of 200 acres each) during four years' working produce 120,000 gallons of spirits of turpentine, or 7½ gallons per acre and year, it follows that to produce the 17,000,000 gallons reported as the annual product not less than 2,250,000 acres must be in orchard; and since the yield of the first year represents 35 per cent of the total annual yield, at least 800,000 acres of virgin forest are newly invaded annually to supply the turpentine stills in operation."

Statistics of the industry were first presented in the reports of the census of 1850, but the manufacture of naval stores had become of considerable importance prior to 1850, the reports of the Treasury Department showing that large quantities of turpentine, rosin, and tar had been exported during each year from 1790 to that time. Table 2 shows the exports of spirits of turpentine, turpentine and rosin, and tar and pitch from 1850 to 1900, inclusive.

TABLE 2.—QUANTITIES AND VALUES OF SPIRITS OF TURPENTINE, TURPENTINE AND ROSIN, AND TAR AND PITCH EXPORTED EACH YEAR: 1850 TO 1900, INCLUSIVE.

YEAR.	SPIRITS OF TURPENTINE.		TURPENTINE AND ROSIN.		TAR AND PITCH.		YEAR.	SPIRITS OF TURPENTINE.		TURPENTINE AND ROSIN.		TAR AND PITCH.	
	Gallons.	Value.	Barrels.	Value.	Barrels.	Value.		Gallons.	Value.	Barrels.	Value.	Barrels.	Value.
1850	644,616	$229,741	398,111	[1]$1,142,713	133,833	(1)	1876	5,178,934	$1,672,068	824,256	$2,188,623	69,138	$164,647
1851	363,828	145,410	387,220	[1]1,063,842	112,971	(1)	1877	6,796,927	2,274,639	900,056	2,384,378	72,189	160,410
1852	358,658	137,856	449,194	[1]1,209,173	63,254	(1)	1878	7,633,568	3,333,569	1,042,183	2,329,319	73,407	158,094
1853	634,371	347,492	454,715	[1]1,406,488	59,144	(1)	1879	7,575,556	2,045,673	1,112,810	2,159,141	52,350	101,445
1854	1,669,523	1,055,720	601,280	[1]2,066,306	76,989	(1)	1880	7,091,200	2,132,154	1,040,345	2,368,180	41,221	84,728
1855	2,339,138	1,137,152	731,060	1,761,428	89,999	$288,028	1881	6,595,528	2,414,719	1,023,710	2,529,423	46,582	109,381
1856	1,844,560	839,048	524,799	1,222,066	87,765	235,487	1882	8,136,493	3,798,034	1,156,012	3,240,803	50,516	129,554
1857	1,522,177	741,346	641,517	1,544,572	95,731	208,610	1883	9,867,344	4,366,229	1,347,256	3,068,132	72,269	174,686
1858	2,457,235	1,089,282	574,573	1,464,210	42,675	100,079	1884	11,800,729	3,885,500	[2]1,568,470	[2]3,027,916	[2]43,544	[2]91,284
1859	2,682,230	1,306,035	798,083	2,248,381	64,256	141,058	1885	8,987,226	2,690,231	[2]1,285,482	[2]2,228,114	[2]37,572	[2]66,449
1860	4,072,023	1,916,289	770,652	1,818,238	60,623	151,404	1886	8,217,678	2,811,777	[2]1,144,857	[2]1,996,090	[2]19,068	[2]36,208
1861	2,941,855	1,192,787	536,207	1,060,257	55,057	143,280	1887	10,209,883	3,489,895	[2]1,379,257	[2]2,330,906	[2]20,471	[2]39,772
1862	43,507	54,691	65,441	293,400	9,765	55,884	1888	10,585,942	3,580,106	[2]1,513,017	[2]2,310,018	[2]20,306	[2]39,783
1863	58,565	143,777	17,025	237,991	11,956	102,566	1889	9,681,759	3,777,525	[2]1,434,573	[2]2,146,388	[2]22,028	[2]41,938
1864	32,548	87,988	2,418	55,551	7,156	70,782	1890	11,248,920	4,590,931	[2]1,619,704	[2]2,797,410	[2]28,806	[2]56,105
1865	51,863	106,967	11,278	158,138	11,810	77,515	1891	12,243,621	4,668,140	[2]1,798,792	[2]3,484,379	[2]17,265	[2]39,094
1866	349,325	313,086	250,462	1,504,058	37,835	147,528	1892	13,176,470	4,500,721	[2]1,958,953	[2]3,436,795	[2]22,377	[2]52,417
1867	1,513,225	980,699	334,104	1,984,865	21,557	84,552	1893	13,415,459	3,893,436	[2]2,068,333	[2]3,353,621	[2]20,042	[2]40,244
1868	3,068,629	1,627,577	443,501	2,028,514	26,751	110,641	1894	12,618,407	3,437,245	[2]2,000,753	[2]3,315,967	[2]17,290	[2]37,736
1869	3,184,955	1,444,968	585,989	2,020,519	52,241	195,025	1895	14,652,738	3,998,277	[2]1,874,759	[2]3,379,823	[2]22,773	[2]41,673
1870	3,246,697	1,357,302	583,316	1,776,625	47,401	143,460	1896	17,431,566	4,613,811	[2]2,191,254	[2]4,195,707	[2]16,865	[2]34,046
1871	2,463,554	1,009,508	511,959	1,600,651	32,584	93,884	1897	17,302,823	4,447,551	[2]2,448,036	[2]4,732,529	[2]17,640	[2]34,878
1872	4,495,441	2,521,357	692,728	3,256,854	36,722	131,010	1898	18,351,140	5,380,806	[2]2,225,428	[2]3,737,863	[2]19,316	[2]36,475
1873	5,114,653	2,667,386	845,162	3,631,996	43,585	177,435	1899	17,761,533	6,100,419	[2]2,586,174	[2]3,796,534	[2]36,903	[2]86,002
1874	6,784,178	2,758,933	929,342	3,046,431	71,920	238,779	1900	18,090,582	8,554,922	[2]2,389,364	[2]3,842,190	[2]36,585	[2]77,082
1875	5,599,624	1,924,544	937,527	2,774,419	54,905	127,206							

[1] The value of tar and pitch is included in that of turpentine and rosin, 1850 to 1854, inclusive.
[2] The quantity and value of pitch, 1884–1900, inclusive, is included with turpentine and rosin, instead of with tar.

The statistics presented in Tables 1 and 2 indicate the prosperity or depression of the industry during the past fifty years. At the census of 1850, returns were received from 856 establishments, reporting a product valued at $2,855,657. While reports were received from only 625 establishments at the census of 1860, showing a decrease of 231 as compared with 1850, the value of the product increased to $6,468,369, or 126.5 per cent, and the number of gallons of spirits of turpentine exported increased from 644,616 to 4,072,023. The decrease in the industry during the decade from 1860 to 1870 was due primarily to the war, and was even greater than indicated by Table 1, as the values given for the census of 1870 are expressed in a currency which was at a discount as compared with gold, and should be reduced by about one-fifth for purposes of comparison with the values for prior and subsequent decades. With the exception of temporary depressions, the industry has steadily increased, until the number of establishments amounted, in 1900, to 1,503, with a product valued at $20,344,888. The value of the exports of spirits of turpentine, rosin and crude tur-

pentine, and tar and pitch for 1900, amounted to $12,474,194. During the decade ending with 1900, the exports of spirits of turpentine to foreign countries averaged 15,594,434 gallons annually, the greatest amount, 18,351,140 gallons, being reported for the year 1898.

Turpentine distilleries are frequently located in regions difficult of access, and operated by persons who are ignorant of business methods, keep no book accounts, and are disinclined to furnish statistical information. Under these conditions, it is difficult to gather authentic data. It is possible that these difficulties were greater at prior censuses, and that the industry has not increased during the past decade to the extent indicated by the figures in Table 1. At each census the general enumerators, while enumerating the population, have secured reports from the establishments engaged in this industry. At the census of 1900 the work of the enumerators was supplemented by correspondence, schedules being mailed to all distillers from whom the enumerators failed to secure reports. It is, therefore, possible that the enumeration for 1900 is more complete than that for any prior census.

The rapid increase in the products was necessary to meet the urgent demand for spirits of turpentine and rosin in various fields of industry, such as the manufacture of paint, varnish, paper, soap, lubricants, pharmaceutical preparations, for illuminating purposes, and in the rubber industry. The depletion of the forests of North Carolina and South Carolina accelerated the development of the industry in other states.

Table 3 shows the distribution of the 1,503 establishments reported in 1900 throughout the South Atlantic and Eastern Gulf states.

TABLE 3.—SUMMARY BY STATES: 1900.

	United States.	Alabama.	Florida.	Georgia.	Louisiana.	Mississippi.	North Carolina.	South Carolina.
Number of establishments	1,503	152	366	524	10	145	174	132
Capital:								
Total	$11,847,495	$1,176,391	$5,526,618	$3,785,432	$74,539	$798,373	$217,423	$268,719
Land	$5,622,040	$525,973	$3,206,099	$1,496,829	$34,550	$227,977	$35,615	$94,997
Buildings	$1,097,240	$111,929	$488,376	$355,120	$8,240	$99,885	$19,745	$13,945
Machinery, tools, and implements	$1,575,948	$161,773	$562,172	$559,992	$16,125	$153,219	$66,671	$55,996
Cash and sundries	$3,552,267	$376,716	$1,269,971	$1,373,491	$15,624	$317,292	$95,392	$103,781
Salaried officials, clerks, etc., number	1,889	162	748	768	8	147	25	86
Salaries	$778,694	$67,062	$306,351	$320,265	$3,490	$67,775	$5,460	$8,291
Wage-earners, average number	41,864	3,716	15,073	19,199	302	2,288	400	886
Total wages	$8,393,483	$780,573	$3,049,200	$3,772,848	$54,180	$530,410	$70,697	$135,575
Men, 16 years and over	41,375	3,643	14,947	19,028	295	2,197	398	867
Wages	$8,358,044	$778,717	$3,034,259	$3,754,972	$53,910	$517,039	$70,497	$133,650
Women, 16 years and over	178	29	28	49		48	1	18
Wages	$21,680	$2,877	$3,977	$5,308		$7,568	$100	$1,805
Children, under 16 years	316	44	98	122	7	43	1	1
Wages	$33,809	$3,979	$10,964	$12,573	$270	$5,803	$100	$120
Miscellaneous expenses	$476,171	$59,214	$201,756	$178,774	$959	$18,655	$8,516	$8,297
Cost of materials used	$6,186,492	$650,681	$1,222,982	$2,292,665	$33,275	$697,539	$818,139	$471,261
Value of products:								
Total	$20,344,888	$2,033,705	$6,469,605	$8,110,468	$115,324	$1,772,435	$1,055,695	$787,656
Spirits of turpentine—								
Number of barrels	754,670	74,078	286,778	305,791	4,304	64,267	39,383	29,569
Value	$14,960,235	$1,460,582	$4,800,033	$6,024,054	$85,415	$1,253,934	$772,772	$563,445
Rosin—								
Number of barrels	2,563,087	245,894	772,587	950,582	14,055	241,607	218,899	120,013
Value	$5,129,268	$490,882	$1,689,472	$2,055,550	$27,319	$461,165	$271,352	$183,528
Value of all other products	$255,385	$82,241	$30,100	$30,864	$2,590	$57,336	$11,571	$40,683

In 1850 the industry was largely confined to North Carolina, when 785, or 91.7 per cent of the establishments, with a product valued at $2,476,252, or 86.7 per cent of the total product, were reported for that state. In 1856 the exports from the ports of Wilmington, Newbern, and Washington were 96,545 gallons of spirits of turpentine and 12,556 barrels of turpentine and rosin, 5.2 and 2.4 per cent, respectively, of the total exports of these products. The industry appears to have reached its highest point in this state about 1860, and since then has gradually decreased. In 1900 there were 174 establishments reported for the state, with products valued at $1,055,695, or only 5.2 per cent of the total for the United States, while the exports of spirits of turpentine from the ports of the state had decreased to 53,974 gallons.

The industry does not appear to have reached as large proportions in South Carolina. There were 40 establishments, with a product valued at $235,836, reported for the state at the census of 1850. The industry increased until 1880, when 192 establishments were reported, with a product valued at $1,893,206, which was the largest product reported for the state. In 1900 there were 132 establishments, with a product of $787,656. The industry appears to have reached its largest proportions in the Carolinas about 1880, when 5,321,456 gallons of spirits of turpentine and 656,019 barrels of turpentine and rosin were exported from the ports of the two states.

The industry entered the forests of Georgia during the decade ending with 1850, and 364 barrels of turpentine and rosin were exported from the port of Savannah in 1856. The apparently unlimited resources of the forests of the state have furnished a rich field for the operations of the turpentine distillers, and the industry has been conducted with the intention of obtaining the greatest return for the immediate outlay, irrespective of the waste and wanton destruction of the forests. While the development and increase of the industry under these conditions have been rapid, the possibilities

of its continued prosperity are greatly lessened. There were 14 establishments reported for the state at the census of 1850, and the products were valued at $55,068. As shown by Table 3, Georgia and Florida now rank first and second, respectively, in the number of establishments and value of products reported for the industry, Florida being first and Georgia second with respect to capital invested. There were 524 establishments reported for Georgia, or 34.9 per cent of the total number, and the products were valued at $8,110,468, or 39.9 per cent of the total. There were 305,791 barrels of spirits of turpentine and 950,582 barrels of rosin produced in the state, or 40.5 and 37.1 per cent, respectively, of the totals for the United States. The growth of the industry in Florida, as indicated by the census statistics, has been most marked during the last decade. There were only 5 establishments reported for the state in 1850, with a product of $29,671. There was a considerable increase in the value of product shown in 1860, 5 establishments reporting $100,676. There were 2 establishments, with a product of $26,116, reported for 1870, while 10 establishments were reported for 1880, with a product valued at $295,500; 15 were returned for 1890, with a product of $191,859, as compared with 366 in 1900, with a product valued at $6,469,605. The number of establishments and value of products in 1900 formed 24.4 and 31.8 per cent, respectively, of the totals for the United States. The production of spirits of turpentine amounted to 236,778 barrels and that of rosin to 772,537 barrels, being 31.4 and 30.1 per cent, respectively, of the totals for the United States.

The first indication of the existence of the industry in the state of Alabama was at the census of 1850, when 4 establishments, with a product valued at $17,800, were reported for the state. There were 152 establishments reported for 1900, with a product valued at $2,033,705.

The products of Mississippi and Louisiana are largely marketed through the port of New Orleans. Statistics of the exports of the United States by districts are not available prior to 1856; in that year 10,511 gallons of spirits of turpentine were exported from the port of New Orleans. At the census of 1850 there were 5 establishments, with a product valued at $19,680, reported for Mississippi, and 1 establishment, with a product of $1,750, for Louisiana, and in 1900, for the former state, 145 establishments manufacturing a product valued at $1,772,435 were reported, and for the latter, 10 establishments with a product of $115,324 in value.

Until recent years the products of the industry were sent almost exclusively to the nearest seaport, and from there shipped to northern cities or foreign countries. Therefore, the exports from the ports of the different states are a fair indication of the extent of the industry in those states, or in the regions surrounding the ports, which, in some cases, embrace parts of adjoining states. Table 4 shows the total quantity of spirits of turpentine, turpentine and rosin, and tar and pitch exported from the ports of each state in each decennial year from 1860 to 1900, inclusive.

TABLE 4.—EXPORTS OF SPIRITS OF TURPENTINE, TURPENTINE AND ROSIN, AND TAR AND PITCH BY DECENNIAL YEARS: 1860 TO 1900.

STATE AND PORT.[1]	1900			1890			1880			1870			1860		
	Spirits of turpentine.	Turpentine, rosin, and pitch.	Tar.	Spirits of turpentine.	Turpentine, rosin, and pitch.	Tar.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.
	Gallons.	*Bbls.*	*Bbls.*	*Gallons.*	*Bbls.*	*Bbls.*	*Gallons.*	*Bbls.*	*Bbls.*	*Gallons.*	*Bbls.*	*Bbls.*	*Gallons.*	*Bbls.*	*Bbls.*
United States	18,090,582	2,389,864	36,585	11,248,920	1,619,704	28,806	7,091,200	1,040,845	41,221	3,246,697	583,316	47,401	4,072,023	770,652	60,623
Alabama	153,018	58,646	113	210	.....	7	.....	22,373	154	462	885	104	.....	500	.....
Mobile	153,018	58,646	113	210	.....	7	.....	22,373	154	462	885	104	.....	500	.....
Alaska	.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arizona	.....	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
California	45	535	483	.....	25	71	6,055	125	294	1,965	76	112	1,280	2	106
San Diego	45	2	1	.....	25	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco	.....	533	482	.....	.....	70	6,055	125	294	1,965	76	112	1,280	2	106
Connecticut	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	640	10	197
Middletown	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	7
New Haven	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	500	.....	174
New London	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	140	.....	16
Delaware	.....	.....	.....	.....	.....	.....	.....	1,375	.....	.....	.....	.....	.....	.....	.....
Florida	795,267	243,452	10	1,742	940	59	25,728	12,215	284	90	518	85	.....	.....	.....
Apalachicola	30,755	52,765	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fernandina	157,768	14,498	5	50	.....	.....	25,536	3,189	.....	.....	.....	.....	.....	.....	.....
Key West	.....	.....	.....	1,134	855	54	192	611	194	.....	.....	.....	.....	.....	.....
Pensacola	476,167	169,281	.....	460	66	.....	.....	7,067	.....	.....	198	.....	.....	.....	.....
St. Johns	156	20	5	98	19	5	.....	1,348	40	90	277	85	.....	.....	.....
St. Marks	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	43	.....	.....	.....	.....
Tampa	130,421	6,888	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Georgia	14,623,328	1,408,928	2	7,251,929	841,217	40	570,549	91,909	111	.....	519	29	137	134	34
Brunswick	3,173,410	333,019	2	1,699,447	172,104	40	131,600	11,814	80	.....	.....	.....	.....	.....	.....
Savannah	11,449,918	1,075,909	.....	5,552,482	669,113	.....	438,949	80,095	31	.....	519	29	137	134	34
Louisiana	212,031	47,890	379	599	1,128	126	276	5,089	110	7,558	8,423	241	11,197	18,909	800
New Orleans	212,031	47,890	379	599	1,128	126	276	5,089	110	7,558	8,423	241	11,197	18,909	800

[1] The names of the ports are as they appear in the reports of the Bureau of Statistics of the United States Treasury Department.

TABLE 4.—EXPORTS OF SPIRITS OF TURPENTINE, TURPENTINE AND ROSIN, AND TAR AND PITCH, BY DECENNIAL YEARS: 1860 TO 1900—Continued.

STATE AND PORT.[1]	1900			1890			1880			1870			1860		
	Spirits of turpentine.	Turpentine, rosin, and pitch.	Tar.	Spirits of turpentine.	Turpentine, rosin, and pitch.	Tar.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.
	Gallons.	*Bbls.*	*Bbls.*	*Gallons.*	*Bbls.*	*Bbls.*	*Gallons.*	*Bbls.*	*Bbls.*	*Gallons.*	*Bbls.*	*Bbls.*	*Gallons.*	*Bbls.*	*Bbls.*
Maine	34,103	831	3	4,062	79	2	90	528			41			160	931
Bangor	34,103	56	1								40			5	
Belfast							90								
Passamaquoddy		775		4,062	75						1			35	
Portland and Falmouth			2		4	2		528						120	931
Maryland	111	174,416	7	3,002	50,928	127	754	7,623	201	6,104	30,626	760	38,080	20,268	2,047
Baltimore	111	174,416	7	3,002	50,928	127	754	7,623	201	6,104	30,626	760	38,080	20,268	2,047
Massachusetts	2,044	18,359	1,641	29,418	7,038	1,447	50,915	3,612	6,060	52,511	11,435	6,292	123,168	16,605	13,027
Boston	2,044	18,357	1,637	29,418	7,037	1,443	50,915	3,577	6,056	52,011	10,134	6,252	122,970	15,640	12,763
Fall River															5
Gloucester															4
New Bedford		2	4		1	4		35	4	500	10	50	45	10	15
Salem											1,291	10	148	955	240
Michigan	307,716	3,879	225	5,434	1,939		7,639	103	54		32	39			
Detroit	25,363	3,439	178	5,434	1,939		7,639	103	54		32	39			
Huron	282,353	440	52												
Minnesota		5		7,053	5	85	362	17	7		1	1			
Duluth		5													
Minnesota				7,053	5	85	362	17	7		1	1			
Mississippi		2	7					10	10						
Pearl River		2	7					10	10						
Montana and Idaho	11														
New Jersey															13
Camden															13
New York	1,630,164	252,801	9,738	894,287	267,801	7,995	1,105,100	227,746	20,572	796,824	464,538	31,072	2,816,768	562,253	30,301
Buffalo Creek	15,426	4,599										741	905	41	261
Cape Vincent		14		770		25	2,050	3	204					316	
Champlain	27,728	15,830	1,606	32,425	12,259	265	101,224	10,390	8,517	69,960	4,377	4,096		4,815	
Genesee		2											31		
New York	1,587,010	231,322	8,002	861,092	254,394	7,705	1,001,826	210,780	10,820	724,764	455,688	25,694	2,800,553	555,360	29,739
Niagara													12,740	609	12
Oswegatchie		1,034	130		1,148					300		1	160	15	
Oswego								6,573	1,031	1,800	4,473	540	2,379	1,097	289
North Carolina	53,974	139,767	17,404	1,751,270	304,100	18,690	3,630,009	497,456	11,602	2,042,756	33,212	7,677	736,948	77,851	6,264
Edenton															20
Newbern													1,815	5	391
Pamlico		4	4		115	106	906	99	130	1,025	25	358			
Plymouth															101
Washington													1,293	80	192
Wilmington	53,974	139,763	17,400	1,751,270	303,985	18,584	3,629,103	497,357	11,472	2,041,731	33,187	7,319	733,840	77,766	5,560
North and South Dakota	39,649	1,774	840												
Ohio	40					8			5		1	3			
Cuyahoga	40					8					1	3			
Sandusky									5						
Oregon				650											
Willamette				650											
Pennsylvania	121	144	35	500	1,201	47	1,443	7,974	1,807	544	3,063	142	25,511	19,845	347
Philadelphia	121	144	35	500	1,201	47	1,443	7,974	1,807	544	3,063	142	25,511	19,845	347
Rhode Island												4	200	534	148
Bristol															30
Newport												4		74	118
Providence													200	460	
South Carolina		21,248		1,293,389	140,399	33	1,691,447	158,563		337,530	25,279	30	315,099	50,753	264
Beaufort													9,481	1,649	60
Charleston		21,248		1,293,389	140,399	8	1,691,447	158,563		337,490	25,267	30	305,618	49,104	204
Georgetown						75				40	12				
Texas	659	126	240	1,515	412	14	762	42		273	318	2			
Brazos de Santiago	90	97		580	27		742	40		240	311	2			
Corpus Christi		29	240	865	135	4	20	2			7				
Galveston	2				250	10									
Paso del Norte										28					
Saluria	567			70											
Texas										10					
Vermont	235,776	15,631	4,750				41				2			80	
Memphremagog	9,768	2,307	2,774												
Vermont	226,008	13,324	1,976				41				2			80	
Virginia			499		2,491		30	3,585		80	4,347	1808	3,000	2,748	6,144
Norfolk and Portsmouth			499		2,491			3,585		80	4,087	808	3,000	1,033	6,144
Richmond							30				260			1,715	
Washington	2,525	923	135	3,860											
Puget Sound	2,525	923	135	3,860											
Wisconsin					1	5									
Superior					1	5									

[1] The names of the ports are as they appear in the reports of the Bureau of Statistics of the United States Treasury Department.

Considerable quantities of these products are now shipped from the distilleries by rail to Northern and Western states, and also by the same method from the ports of receipt named in the above table. For this reason, the exports do not indicate the extent of the commercial interests of the several ports represented by these products. The boards of trade, produce exchanges, and other quasi-governmental organizations in the cities have, however, made a practice of compiling statistics of receipts at the ports, and the statistics given in Table 5 have been obtained from these sources.

As shown by Table 3, the total product of spirits of turpentine in the United States during the year 1900 amounted to 754,670 barrels. From Table 5 it appears that 461,227 barrels were received for distribution at the principal ports during that year. These figures therefore indicate that 293,443 barrels were shipped directly from the distilleries to internal points of consumption. The boards of trade of Cincinnati and St. Louis, respectively, report receipts of 52,387 and 18,000 barrels of spirits of turpentine, making a total of 70,387 barrels; but as many points of receipt have no available records, it is impossible to make satisfactory compilations.

TABLE 5.—SPIRITS OF TURPENTINE AND ROSIN RECEIPTS AT PORTS.

YEAR.	TOTAL.		WILMINGTON, N. C.		CHARLESTON, S. C.		SAVANNAH, GA.	
	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.
	Barrels.	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*
1896	455,380	1,703,484	46,563	205,137	10,871	70,240	303,867	1,143,026
1897	494,374	2,048,512	39,928	192,640	7,702	52,478	329,445	1,311,050
1898	464,086	1,760,866	35,273	163,459	3,724	38,597	313,797	1,127,130
1899	488,279	1,766,374	27,981	161,161	2,513	23,085	329,466	1,123,942
1900	461,227	1,705,220	29,761	167,316	1,851	25,949	309,465	1,076,815
1901	498,285	1,755,700	25,541	181,743	2,433	17,681	337,452	1,119,957

YEAR.	BRUNSWICK, GA.		MOBILE, ALA.		NEW ORLEANS, LA.		CARRABELLE, FLA.	
	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.
	Barrels.	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*
1896	56,538	215,544	20,314	57,745	12,160	56,348	5,067	15,444
1897	66,799	287,416	[1] 25,000	[1] 100,000	15,018	67,598	10,482	37,330
1898	65,161	250,152	13,700	50,200	16,605	69,049	15,826	62,279
1899	72,833	257,749	19,004	65,271	17,290	68,772	19,192	66,394
1900	69,489	240,884	13,964	47,366	20,954	91,255	15,743	55,635
1901	71,755	221,757	25,445	68,361	19,268	83,588	16,391	62,613

[1] Estimated.

The capital invested in the industry in 1900 amounted to $11,847,495. Table 3 shows that this amount consisted of land valued at $5,622,040; buildings valued at $1,097,240; machinery, tools, and implements valued at $1,575,948; and cash on hand, bills receivable, unsettled ledger accounts, and miscellaneous items of live capital amounting to $3,552,267. In many instances the land is not owned by the distillers, but is leased for a crop, which generally extends over a period of three or four years. The amount reported for value of land is the land which was owned by the distillers, and includes not only the land on which the still was located, but the forests from which the crude material was obtained. From Table 7 it appears that $18,714 was paid for rent of works, which represents the yearly expense for the use of the forests. Considered strictly as a manufacturing industry, the amount invested in forest lands should be deducted from the total capital, leaving $6,225,455 as the amount of capital engaged in manufactures, as compared with a product valued at $20,344,888.

In some instances the conditions under which the turpentine industry is conducted are anomalous. For instance: The distillers, in many cases, are advanced money by factors or commission merchants, with which to carry on their operations for a year, the prospective crop being mortgaged to secure the payment of the advances, the factor controlling the output. Under these conditions the amount of live capital (cash on hand, bills receivable, unsettled ledger accounts, etc.) was abnormally large, including, as it did, the borrowed cash and the amounts represented by bills receivable for products shipped to the commission merchants. It formed 30 per cent of the total capital reported for the industry.

As previously explained, the amount, $6,186,492, reported as the cost of materials used, does not include the value of the crude turpentine gathered by distillers, but represents only the amounts actually purchased. Using as a basis the reports for establishments that purchase crude turpentine, the office has estimated the total quantity of crude turpentine gathered, and Table 6 presents the total quantity gathered in each state, the quantities and values of the different classes of products, and the average values per barrel of spirits of turpentine and rosin.

From Table 6 it appears that the total value of products, $20,344,888, consists of $14,960,235, the value of 754,670 barrels of spirits of turpentine; $5,129,268, the value of 2,563,087 barrels of rosin; and $255,385, the value of the miscellaneous products, such as tar, pitch, rosin oil, charcoal, refined tar, etc. There were 4,033,161 barrels of crude turpentine consumed by the

TABLE 6.—QUANTITY OF CRUDE TURPENTINE GATHERED, QUANTITIES AND VALUES OF PRODUCTS, AND AVERAGE VALUES PER BARREL OF SPIRITS OF TURPENTINE AND ROSIN, BY STATES: 1900.

STATES.	Crude turpentine gathered.	PRODUCTS.							
		Total value.	Spirits of turpentine.			Rosin.			All other products, value.
			Quantity.	Value.	Average value per barrel.	Quantity.	Value.	Average value per barrel.	
	Barrels.		*Barrels.*			*Barrels.*			
United States	4,033,161	$20,344,888	754,670	$14,960,225	$19.82	2,563,087	$5,129,268	$2.00	$255,385
Alabama	373,005	2,038,705	74,078	1,460,582	19.72	245,394	490,882	2.00	82,241
Florida	1,212,935	6,469,605	236,778	4,800,033	20.27	772,537	1,639,472	2.12	30,100
Georgia	1,515,569	8,110,468	305,791	6,024,054	19.70	950,582	2,055,550	2.16	30,864
Louisiana	20,299	115,324	4,304	85,415	19.85	14,055	27,319	1.94	2,590
Mississippi	359,529	1,772,435	64,267	1,253,934	19.51	241,607	461,165	1.91	57,336
North Carolina	361,729	1,055,695	39,883	772,772	19.37	218,899	271,352	1.24	11,571
South Carolina	190,095	787,656	29,569	563,445	19.06	120,013	183,528	1.53	40,083

1,503 establishments reported. From the distillation of the 4,033,161 casks of crude turpentine, resulted 24.4 per cent of spirits of turpentine, 54.5 per cent of rosin, and 21.1 per cent of other products. In obtaining the above percentages, the crude turpentine, rosin, and spirits of turpentine were reduced to pounds, the reduction being based, in the case of crude turpentine and rosin, on the standard weights of the packages, and, in the case of spirits, on the generally accepted specific gravity of the oil.

The totals for all classes of establishments were used, those operating on "virgin dip" as well as those obtaining the raw material in the second, third, or even later years of the period during which the forests were worked. The purity of the crude turpentine, its freedom from "scrape" dirt, sticks, and leaves, and the skill of the operator are the principal factors in the production of a large percentage of spirits. The percentage of waste depends very largely on the care with which the molten rosin is strained. If the rosin is passed through a cloth or fine screen and all "dross" carefully removed, the percentage of waste will be increased.

The following is a statement of the quantities of spirits of turpentine and rosin manufactured during 1900, showing the exports and the domestic consumption:

	Spirits of turpentine.	Rosin.
	Gallons.	*Barrels.*
Domestic production	38,488,170	2,563,087
Exports	18,090,582	2,369,118
Domestic consumption	20,397,588	193,969

According to this statement, the consumption of spirits of turpentine in the United States is 20,397,588 gallons, or 53 per cent of the quantity manufactured; and of rosin, 193,969 barrels, or only 7.6 per cent of the entire output of the stills.

The imports of the above products are so small as hardly to deserve consideration, there being only 22,183 gallons of spirits and no rosin imported. In the statement the domestic production is reduced to gallons by multiplying by 51, which is generally accepted as the average number of gallons to a barrel.

The statistics for the census of 1900 are presented in detail for each state in Table 7. The highest proportion of spirits and the lowest proportion of waste are reported for the state of Louisiana. It is possible that the distillers in that state obtained a quantity of "virgin dip" during the census year. The lowest proportion of spirits and the highest proportion of waste are reported for North Carolina, where the industry is oldest and the percentage of "virgin dip" is, therefore, small.

Considering the proportions shown in Table 6 in connection with the percentages presented in the statement on page 4, it must be remembered that the figures on which the latter statement is based were obtained from representative establishments, and therefore can not be accepted as indicating the results of the operations of all the distillers in the United States. It is probable that the majority of the distillers are now engaged in working their forests during the second and third years. Therefore, the general percentage of spirits of turpentine would be about as shown for the "third year" in the statement on page 4.

TABLE 7.—TURPENTINE AND ROSIN, BY STATES: 1900.

	United States.	Alabama.	Florida.	Georgia.	Louisiana.	Mississippi.	North Carolina.	South Carolina.
Number of establishments	1,503	152	366	524	10	145	174	132
Character of organization:								
Individual	713	67	123	232	2	64	140	85
Firm and limited partnership	726	79	230	272	7	63	33	42
Incorporated company	62	5	13	20	1	17	1	5
Miscellaneous	2	1	.....	.....	.....	1	.....	.....
Capital:								
Total	$11,847,495	$1,176,391	$5,526,618	$3,785,432	$74,539	$798,373	$217,428	$268,719
Land	$5,622,040	$525,973	$3,206,099	$1,496,829	$34,550	$227,977	$35,615	$94,997
Buildings	$1,097,240	$111,929	$488,376	$355,120	$8,240	$99,885	$19,745	$13,945
Machinery, tools, and implements	$1,575,948	$161,773	$562,172	$559,992	$16,125	$153,219	$66,671	$55,996
Cash and sundries	$3,552,267	$376,716	$1,269,971	$1,373,491	$15,624	$317,292	$95,392	$103,781
Proprietors and firm members	2,192	236	552	815	15	198	205	171
Salaried officials, clerks, etc.:								
Total number	1,889	162	748	763	8	147	25	36
Total salaries	$778,694	$67,062	$306,251	$320,265	$3,490	$67,775	$5,460	$8,291
Officers of corporations—								
Number	28	4	7	6	.....	8	2	1
Salaries	$22,620	$2,300	$8,000	$4,020	.....	$7,100	$600	$600
General superintendents, clerks, etc.—								
Total number	1,861	158	741	757	8	139	23	35
Total salaries	$756,074	$64,762	$298,351	$316,245	$3,490	$60,675	$4,860	$7,691
Men—								
Number	1,856	157	738	756	8	139	23	35
Salaries	$754,812	$64,690	$297,451	$315,955	$3,490	$60,675	$4,860	$7,691
Women—								
Number	5	1	3	1	.....	.....	.....	.....
Salaries	$1,262	$72	$900	$290	.....	.....	.....	.....
Wage-earners, including pieceworkers, and total wages:								
Greatest number employed at any one time during the year	55,568	5,264	20,848	23,459	371	3,727	589	1,310
Least number employed at any one time during the year	39,942	3,525	14,718	17,959	252	2,204	368	916
Average number	41,864	3,716	16,073	19,199	302	2,288	400	886
Wages	$8,393,488	$780,573	$3,049,200	$3,772,848	$54,180	$530,410	$70,697	$135,575
Men, 16 years and over—								
Average number	41,375	3,643	14,947	19,028	295	2,197	398	867
Wages	$8,338,044	$773,717	$3,034,269	$3,754,972	$53,910	$517,039	$70,497	$133,650
Women, 16 years and over—								
Average number	173	29	28	49	.....	48	1	18
Wages	$21,680	$2,877	$3,977	$5,303	.....	$7,568	$100	$1,805
Children, under 16 years—								
Average number	316	44	98	122	7	43	1	1
Wages	$33,809	$3,979	$10,964	$12,573	$270	$5,803	$100	$120
Average number of wage-earners, including pieceworkers, employed during each month:								
Men, 16 years and over—								
January	42,210	3,840	16,039	19,052	303	1,960	269	747
February	43,103	3,994	16,478	19,133	321	2,156	261	765
March	46,487	4,265	17,204	20,748	331	2,672	357	910
April	45,818	4,185	16,660	20,355	314	2,819	442	1,043
May	46,102	4,157	16,618	20,556	326	2,843	495	1,107
June	42,190	4,248	14,290	19,548	317	2,250	514	1,023
July	38,984	3,268	12,925	18,929	284	2,118	501	959
August	38,748	3,294	13,010	18,645	277	2,113	490	919
September	38,674	3,215	13,255	18,488	262	2,104	458	892
October	38,812	3,205	13,675	18,371	285	2,015	425	836
November	37,217	3,017	14,164	17,158	264	1,679	320	615
December	38,156	3,027	15,053	17,958	254	1,635	241	588
Women, 16 years and over—								
January	224	20	32	81	.....	47	1	43
February	173	20	34	57	.....	46	.....	16
March	169	23	34	46	.....	48	2	16
April	189	50	27	44	.....	50	2	16
May	188	50	27	44	.....	49	2	16
June	174	34	27	43	.....	52	2	16
July	171	34	23	45	.....	51	2	16
August	166	34	24	39	.....	51	2	16
September	164	30	24	45	.....	49	.....	16
October	144	17	24	39	.....	48	.....	16
November	159	20	26	52	.....	45	.....	16
December	153	20	29	47	.....	41	.....	16
Children, under 16 years—								
January	344	56	89	152	5	37	.....	5
February	335	53	100	134	5	38	.....	5
March	337	56	97	125	5	49	.....	5
April	371	78	103	129	8	52	1	.....
May	378	76	107	131	8	55	1	.....
June	319	34	96	128	8	52	1	.....
July	282	27	83	119	8	44	1	.....
August	282	31	88	115	8	39	1	.....
September	284	30	101	105	8	39	1	.....
October	285	30	99	109	8	39	.....	.....
November	280	26	106	104	5	39	.....	.....
December	295	31	109	114	5	36	.....	.....
Miscellaneous expenses:								
Total	$476,171	$59,214	$201,756	$178,774	$959	$18,655	$8,516	$8,297
Rent of works	$18,714	$8,015	$2,593	$1,998	.....	$1,017	$2,881	$2,210
Taxes, not including internal revenue	$80,918	$8,157	$38,946	$26,714	$424	$4,178	$1,110	$1,389
Rent of offices, insurance, interest, and all sundry expenses not hitherto included	$216,230	$24,616	$82,911	$86,681	$285	$13,249	$4,465	$4,073
Contract work	$160,309	$18,426	$77,306	$63,381	$300	$211	$60	$625
Cost of materials used:								
Total	$6,186,492	$650,681	$1,222,932	$2,292,665	$33,275	$697,539	$818,139	$471,261
Crude turpentine purchased	$4,542,383	$475,953	$671,371	$1,673,995	$22,026	$573,579	$719,907	$405,552
Fuel	$88,604	$11,512	$22,522	$25,133	$2,354	$13,085	$7,206	$6,792
Mill supplies	$8,008	$1,066	$4,178	$2,537	$1	$155	$65	$6
All other materials	$1,486,630	$143,659	$503,764	$576,658	$7,369	$107,921	$89,673	$57,586
Freight	$60,867	$18,491	$21,097	$14,342	$1,525	$2,799	$1,288	$1,325

TABLE 7.—TURPENTINE AND ROSIN, BY STATES: 1900—Continued.

	United States.	Alabama.	Florida.	Georgia.	Louisiana.	Mississippi.	North Carolina.	South Carolina.
Products:								
Total value	$20,344,888	$2,033,705	$6,469,605	$8,110,468	$115,324	$1,772,435	$1,055,695	$787,656
Spirits of turpentine—								
Number of barrels	754,670	74,078	236,778	305,791	4,304	64,267	39,883	29,569
Value	$14,960,235	$1,460,582	$4,800,033	$6,024,054	$85,415	$1,253,934	772,772	$563,445
Rosin—								
Number of barrels	2,563,087	245,394	772,537	950,582	14,055	241,607	218,899	120,013
Value	$5,129,268	$490,882	$1,639,472	$2,055,550	$27,319	$461,165	$271,352	$183,528
Value of all other products	$255,385	$82,241	$30,100	$30,864	$2,590	$57,336	$11,571	$40,083
Comparison of products:								
Number of establishments reporting for both years	597	53	113	219	2	47	84	79
Value for census year	$9,198,442	$923,578	$2,707,719	$3,899,129	$15,800	$593,977	$540,446	$517,793
Value for preceding business year	$7,813,259	$842,027	$2,217,754	$3,310,503	$18,900	$500,130	$500,308	$428,642
Power:								
Number of establishments reporting	135	6	63	62	1	1	2	.....
Total horsepower	866	50	350	422	5	10	29	.....
Engines, steam—								
Number	116	7	50	54	2	1	2	.....
Horsepower	706	50	219	393	5	10	29	.....
Other power—								
Number	28	.....	21	7	.....	.....	.....	.....
Horsepower	160	.....	131	29	.....	.....	.....	.....
Establishments classified by number of persons employed, not including proprietors and firm members:								
Total number of establishments	1,503	152	366	524	10	145	174	132
No employees	16	1	.....	.....	.....	2	11	2
Under 5	272	13	5	15	1	39	136	63
5 to 20	253	37	35	73	1	37	21	49
21 to 50	533	67	132	262	6	45	6	15
51 to 100	347	27	157	138	2	20	.....	3
101 to 250	79	7	34	36	.....	2	.....	.....
251 to 500	3	.....	3	.....	.....	.....	.....	.....

PAPER AND PULP.

PAPER AND PULP.

By CHARLES W. RANTOUL, JR., *Expert Special Agent.*

The manufactures of paper and wood pulp have become so closely connected that they are now treated as a single industry. At former censuses the statistics for wood pulp were reported separately, but the schedule of inquiry for the Twelfth Census was so prepared as to apply to paper mills, pulp mills, and paper and pulp when manufactured at the same mill.

Table 1 shows the totals for the combined industries at the censuses of 1850 to 1900, inclusive, with the percentages of increase for each decade.

TABLE 1.—COMPARATIVE SUMMARY FOR THE UNITED STATES, 1850 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	DATE OF CENSUS.						PER CENT OF INCREASE.				
	1900	1890	1880	1870	1860	1850	1890 to 1900	1880 to 1890	1870 to 1880	1860 to 1870	1850 to 1860
Number of establishments	763	649	742	677	555	443	17.6	[1]12.5	9.6	22.0	25.3
Capital	$167,507,713	$89,829,548	$48,139,652	$34,556,014	$14,052,683	$7,260,864	86.5	86.6	39.3	145.9	93.5
Salaried officials, clerks, etc., number	2,935	[2]1,348	[3]	[3]	[3]	[3]	117.7	.....	.....	.....	.....
Salaries	$4,500,911	[2]$1,770,657	[3]	[3]	[3]	[3]	154.2	.....	.....	.....	.....
Wage-earners, average number	49,646	31,050	25,631	18,021	10,911	6,785	59.9	21.1	42.2	65.2	60.8
Total wages	$20,746,426	$13,204,828	$8,970,133	$7,208,691	$2,767,212	$1,497,792	57.1	47.2	24.4	160.5	84.8
Men, 16 years and over	41,547	24,015	17,317	11,032	6,519	3,835	73.0	38.7	57.0	69.2	70.0
Wages	$18,753,326	$11,459,318	[3]	[3]	[3]	[3]	63.6	.....	.....	.....	.....
Women, 16 years and over	7,930	6,767	7,648	6,153	4,392	2,950	17.2	[1]11.5	24.3	40.1	48.9
Wages	$1,958,135	$1,705,287	[3]	[3]	[3]	[3]	14.8	.....	.....	.....	.....
Children, under 16 years	169	268	666	336	[3]	[3]	[1]36.9	[1]59.8	[1]20.3	.....	.....
Wages	$34,965	$40,223	[3]	[3]	[3]	[3]	[1]13.1	.....	.....	.....	.....
Miscellaneous expenses	$10,184,106	$6,770,681	[4]	[4]	[4]	[4]	50.4	.....	.....	.....	.....
Cost of materials used	$70,530,236	$44,228,480	$34,862,132	$30,058,563	$11,662,266	$5,553,929	59.5	26.9	16.0	159.1	108.9
Value of products	$127,326,162	$78,987,184	$57,366,860	$48,849,285	$21,216,802	$10,187,177	61.3	37.6	17.4	130.2	108.3

[1] Decrease.
[2] Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See Table 7.)
[3] Not reported separately.
[4] Not reported.

In preparing Table 1 a combination was made of the statistics of paper and of wood pulp, which were formerly reported separately. The statistics for 1850 and 1860 include the manufacture of paper only. The manufacture of wood pulp was first reported at the census of 1870, and appears as a separate industry in that and the two following censuses. In 1900 the manufactures of paper and of wood pulp were considered as forming a single industry, and their statistics were reported together. The term "establishment" as used in the tables of this report is defined as representing a mill or mills owned by one individual, firm, or corporation, when located in the same city or county. Mills situated in different cities, counties, or states are treated as separate establishments, even though under the same ownership.

It appears from Table 1 that since 1850 the number of establishments for the combined industry has increased from 443 to 763; the number of wage-earners from 6,785 to 49,646; the wages paid from $1,497,792 to $20,746,426; and the value of products from $10,187,177 to $127,326,162.

During the decade from 1890 to 1900, which in many respects has been the most important in the history of the industry, the capital invested shows an increase from $89,829,548 to $167,507,713, or 86.5 per cent. This represents the value of land, buildings, machinery, tools, and implements, and cash and sundries utilized in the business, but does not include the capital stock of any of the corporations. In the same period the number of establishments increased from 649 to 763, or only 17.6 per cent. The large increase in capital was due to a greater extent to the improvement and development of plants already in existence than to the erection of additional mills by new capital. This increase in the size and value of individual establishments is notice-

able throughout these figures, not only in the capitalization, but in the volume of the transactions of each concern as shown in the tables of production.

Table 1 shows that in 1850 the average amount of capital employed in each establishment was $16,390; in 1860 it was $25,320; in 1870, $51,043; in 1880, $64,878; in 1890, $138,412; and in 1900 it was $219,538. The average capital per establishment was more than thirteen times as great in 1900 as in 1850. These figures illustrate the modern tendency to concentration of industry in large establishments. Under the stress of competition the producer endeavors to realize the advantages in economy and efficiency of production on a large scale.

The average number of wage-earners reported for 1900 was 49,646, an increase of 59.9 per cent over the 31,050 reported for 1890. The total wages paid increased from $13,204,828 to $20,746,426, or 57.1 per cent.

In 1900 the amount paid for miscellaneous expenses was $10,184,106, an increase of 50.4 per cent over the $6,770,681 paid in 1890. This item includes rent, taxes, interest, insurance, contract work, and all other sundry expenses. The cost of materials was $44,228,480 in 1890; in 1900 it had increased 59.5 per cent, to $70,530,236. In value of products an increase of 61.3 per cent is noted, from $78,937,184 to $127,326,162.

In addition to the 763 active establishments during the census year, with a capital of $167,507,713, shown in Table 1, there were 29 idle establishments, with a capital of $4,326,629, divided as follows:

STATES.	Number of idle establishments.	Capital.
California	2	$452,000
Colorado	1	1,575,000
Connecticut	2	60,000
District of Columbia	1	200,000
Florida	1	40,000
Illinois	2	199,396
Indiana	1	38,000
Iowa	1	30,000
Maryland	2	38,000
Massachusetts	3	734,908
Michigan	2	34,307
New Jersey	2	48,852
New York	3	47,500
Ohio	2	259,666
Pennsylvania	2	154,000
Vermont	1	15,000
Wisconsin	1	400,000

The above figures do not include any plants absolutely abandoned, but only such as were not running through some temporary necessity of closing down, or such as it was reasonable to suppose might at some later date be engaged in the manufacture of paper or pulp; nor do they include several large plants in course of construction that had never been in operation up to the close of the census year. Among these latter are the large plants of the Great Northern Paper Company, at Millinocket, Me., and of the St. Regis Paper Company, at Watertown, N. Y.

There is a great diversity among the different paper and pulp establishments as to materials used, processes employed, kinds of products, and quantity of output. Some plants consume but a limited variety of materials, others use nearly all the different kinds enumerated. Some make but a few thousand pounds of paper or pulp a day, others hundreds of tons; while the products range in quality from tissue paper to trunk board, and from news to high-grade ledger papers, in value from less than twenty to several hundred dollars per ton.

Table 2 shows the quantity and cost of the different varieties of materials and the number of establishments using each in 1900.

Table 3 shows the quantity and value of the different kinds of products and the number of establishments producing each in 1900.

In Tables 2 and 3 the number of establishments shown for each item is the whole number reporting the material or product of the kind specified; but in Table 2 the number shown as using fiber falls short of the whole number actually using this material, for only those purchasing and not those making it for their own use are so shown. So in Table 3, where pulp or fiber was made and all consumed by the same establishment, its value is not shown. Single mills, moreover, frequently use different kinds of materials, employ various processes, and make several classes of products, so that in these tables the sum of the numbers of establishments reporting the different items is greater than the number of mills shown for the whole industry.

The tendency to combine different stages in the general process of production, which made it impossible for the Twelfth Census to treat paper and pulp manufacture as separate industries, is brought out clearly in these tables. Of the 586,374 tons of ground wood pulp produced, 306,322 tons, or 52.2 per cent, were made for use in the establishments producing it; of 177,124 tons of soda fiber, 78,110 tons, or 44.1 per cent, and of 416,037 tons of sulphite fiber, 144,452, or 34.7 per cent, were likewise made for the use of the producing establishments.

On the other hand, although there appears to be a tendency for the establishments using wood fiber to make this material themselves, and for those manufacturing wood pulp to continue its manipulation until the finished product, paper, is reached, yet there also seems to be a tendency toward specialization of process, confining the field of operations of a certain establishment to the homogeneous branches of the industry. For example, of the 763 establishments reporting, only 226 used rags as material, 222 used purchased ground wood pulp, and 134 used domestic spruce to make ground wood. In Table 3 the tendency to specialization is seen even more clearly. The number of establishments engaged in any one line of production is generally less than one-tenth of the total number. Only 61 establishments produced news paper in rolls for printing, 88 book paper, and 64 writing paper. Manila paper was made in 51 mills, and straw paper in 55.

TABLE 2.—MATERIALS, AND ESTABLISHMENTS USING EACH KIND: 1900.

	Number of establishments reporting.	Unit of measure.	Quantity.		Cost.	
Total	763	Cords Tons		1,986,310 1,701,319		$70,530,236
Establishments using:						
Wood		Cords		1,986,310		9,837,516
Domestic spruce, for ground wood	134	Cords	598,229		$2,855,872	
Domestic spruce, for sulphite and soda fiber	46	Cords	561,889		2,731,070	
Canadian spruce, for ground wood	41	Cords	120,820		868,187	
Canadian spruce, for sulphite and soda fiber	21	Cords	228,264		1,404,308	
Domestic poplar, for soda fiber	28	Cords	236,820		1,103,132	
Canadian poplar, for soda fiber	7	Cords	20,133		90,962	
Other pulp wood, for ground wood	62	Cords	67,791		293,304	
Other pulp wood, for sulphite and soda fiber	27	Cords	152,864		490,681	
Rags, including cotton and flax waste, and sweepings	226	Tons		234,514		6,595,427
Old or waste paper	397	Tons		356,193		4,869,409
Manila stock, including jute bagging, rope, waste, threads, etc	161	Tons		99,301		2,437,256
Straw	112	Tons		367,305		1,395,659
Fiber		Tons		644,006		18,369,464
Ground wood pulp, purchased	222	Tons	261,962		4,361,211	
Soda wood fiber, purchased	142	Tons	94,042		3,430,809	
Sulphite wood fiber, purchased	334	Tons	278,194		10,112,189	
Other chemical fiber, purchased	20	Tons	14,808		465,255	
Chemicals	598					6,140,678
Clay	294					1,493,469
Colors	410					705,365
Sizing	376					826,245
All other stock	119					817,075
Fuel, rent of power and heat, mill supplies, freight, and all other materials						17,042,683

TABLE 3.—PRODUCTS, AND ESTABLISHMENTS PRODUCING EACH KIND: 1900.

	Number of establishments reporting.	Quantity (tons).		Value.	
Total	763		3,347,128		$127,326,162
Establishments producing:					
News paper			569,212		20,091,874
In rolls, for printing	61	454,572		$15,754,992	
In sheets, for printing	60	114,640		4,336,882	
Book paper			351,702		24,870,951
Book	88	282,093		19,466,804	
Cover	23	18,749		1,665,376	
Plate, lithograph, map, woodcut, etc	25	22,366		2,018,958	
Cardboard, bristol board, card middles, tickets, etc	28	28,494		1,719,813	
Fine paper			112,707		15,895,974
Writing paper	64	90,204		12,222,870	
All other fine paper	30	22,503		3,673,104	
Wrapping paper			535,252		24,542,373
Manila (rope, jute, tag, etc.)	51	89,419		5,929,764	
Heavy wrapping (mill wrappers, etc.)	78	82,875		4,143,240	
Straw	55	91,794		2,027,518	
Bogus or wood manila, all grades	91	203,826		9,148,677	
All other wrapping	62	67,338		3,293,174	
Boards			365,617		10,353,319
Binders and trunk	41	27,774		858,745	
Leather	29	11,351		677,807	
Press and album	10	3,745		325,017	
Wood pulp	19	44,187		1,406,130	
Strawboard	59	167,534		3,187,342	
News	20	32,119		930,631	
All other boards	48	88,907		2,967,747	
All other paper products			233,103		12,154,555
Tissues	56	28,406		3,486,652	
Blotting	11	4,351		580,750	
Building, roofing, asbestos, and sheathing	50	96,915		3,025,967	
Carpet lining	24	16,622		448,230	
Hanging	25	54,330		2,265,345	
Curtain	3	208		11,495	
Miscellaneous	46	32,271		2,336,116	
Ground wood pulp			586,374		4,433,699
Made for own use	77	306,322			
Made to sell as such	91	280,052		4,433,699	
Soda fiber			177,124		3,612,602
Made for own use	16	78,110			
Made to sell as such	20	99,014		3,612,602	
Sulphite fiber			416,087		10,451,400
Made for own use	29	144,452			
Made to sell as such	40	271,585		10,451,400	
All other products	32				919,415

Table 2 shows that spruce, domestic and foreign, constitutes the greater part of the materials of all kinds used in this industry. It forms 76 per cent of all wood for both mechanical pulp and chemical fiber, 719,049 cords being used for ground wood pulp, and 790,153 cords for fiber by sulphite and soda processes. The quantity used for soda fiber is not separated from that used for sulphite fiber, but a wood softer than spruce is generally used for the soda process. Poplar is used almost entirely for soda fiber and forms 12.9 per cent of all the wood consumed in making the different kinds of pulp. Other unspecified woods for pulp or fiber make up the remaining 11.1 per cent. There were 644,006 tons of fiber purchased by paper manufacturers during the year, but, as shown in Table 3, 528,884 tons, or nearly half the pulp produced by the various processes, was made into paper by the same establishments and consequently does not appear in Table 2. Of the $70,530,236 reported as the cost of all materials in 1900, only $13,902,092 represents the cost of rags, old paper, and manila stock, which fifty years ago were the only materials for paper making. From this it may be realized to what extent the modern process of making paper from wood fiber has supplanted the old.

From Table 3 it appears that the greatest quantity of paper made was news paper, of which 454,572 tons in rolls, valued at $15,754,992, were produced by 61 establishments, and 114,640 tons, worth $4,336,882, were made in sheets by 60 establishments. The product of greatest value was book paper, for which $24,870,951 was received for the 351,702 tons produced. From this table it is seen that the products of this industry are of two general classes: First, paper, comprising many varieties which in the table are grouped under six general divisions; and second, pulp, which includes ground wood, and soda and sulphite fibers. It will be noted that the tonnage and value of pulp are included among the products only when made for sale, and among the materials only when purchased by the mill consuming it; for pulp made and used in the same establishment, only the tonnage is reported. No other method of considering this somewhat delicate problem of the valuation of wood pulp seems to be practicable, and this has been consistently followed throughout the collection of data in regard to this branch of the industry.

Table 4 presents a comparative summary of the power used in 1890 and 1900.

TABLE 4.—POWER: COMPARATIVE SUMMARY, 1890 AND 1900.

	1900	1890
Number reporting power	763	632
Total horsepower	764,847	297,724
Owned—		
Engines—		
Steam—		
Number	2,016	1,115
Horsepower	255,854	93,399
Gas or gasoline—		
Number	13	.....
Horsepower	1,062	.....
Water wheels—		
Number	3,209	2,150
Horsepower	504,762	202,721
Electric motors—		
Number	91	(1)
Horsepower	2,729	164
Other power, horsepower	180	5
Rented—		
Horsepower	260	1,435
Furnished to other establishments	3,400	(1)

[1] Not reported.

Table 4 shows that each of the 763 establishments reporting for 1900 used power. Of the 649 establishments in 1890, 632 used power, leaving 17 which used none. Abundant power is now so important in this industry that availability of waterpower is a more important factor in determining the location of plants than nearness to the source of material or to a market. In 1900, as in 1890, about two-thirds of the total horsepower was developed by water wheels and less than one-third by steam engines. Most mills now use both kinds of power, water for grinding the wood and for the beating and washing machines, and steam for the paper machines, the exhaust being utilized for drying the paper.

Table 5 is a comparative summary of the leading statistics of the industry by states for 1890 and 1900.

TABLE 5.—COMPARATIVE SUMMARY OF THE

	STATES.	Year.	Number of establishments.	Capital.	AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.					Miscellaneous expenses.	Cost of materials.	PRODUCTS.			
					Average number.	Total wages.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.			Aggregate value.	Paper.		
													Total value.	News.	
														Quantity (tons.)	Value.
1	United States.	1900	763	$167,507,713	49,646	$20,746,426	41,547	7 930	169	$10,184,106	$70,530,236	$127,326,162	$107,909,046	569,212	$20,091,874
		1890	649	89,829,548	31,050	13,204,828	24,015	6,767	268	6,770,681	44,228,480	78,937,184	69,294,306	196,053	13,106,434
2	California	[2]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		1890	5	421,004	169	104,771	155	12	2	74,649	399,901	630,262	630,262	4,445	402,500
3	Colorado	[2]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		[3]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	Connecticut	1900	49	3,968,152	1,425	633,413	1,157	268	.....	279,962	1,982,080	3,565,021	3,493,596	.....	.....
		1890	42	3,920,916	1,393	625,522	988	394	11	302,592	2,014,680	3,556,257	3,173,052	200	20,000
5	Delaware	1900	6	2,143,108	451	193,783	372	79	.....	90,785	1,028,274	1,599,718	1,169,405	.....	.....
		[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	Georgia	[2]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		1890	3	117,400	70	16,800	52	18	.....	5,025	45,695	93,874	84,374	247	23,055
7	Illinois	1900	15	1,554,858	623	250,303	577	37	9	72,650	798,370	1,431,618	1,431,618	.....	.....
		1890	21	1,687,381	758	315,882	686	49	23	119,214	581,329	1,467,289	1,449,969	1,500	112,500
8	Indiana	1900	39	5,379,227	1,816	723,972	1,720	93	3	226,156	2,470,623	4,170,497	3,690,968	6,400	320,000
		1890	29	1,513,275	805	340,045	720	75	10	134,032	873,320	1,776,016	1,514,681	12,662	353,522
9	Iowa	1900	4	182,045	180	63,589	132	28	20	13,350	106,615	243,776	243,776	.....	.....
		1890	7	324,498	187	71,605	156	29	2	18,285	116,349	268,934	268,934	.....	.....
10	Kansas	[2]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
11	Kentucky	[3]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12	Maine	1900	35	17,473,160	4,851	2,162,972	4,560	291	.....	1,894,967	7,118,945	13,223,275	9,394,646	122,738	4,122,050
		1890	17	4,273,825	1,509	669,057	1,442	67	.....	322,808	1,673,287	3,281,051	1,762,440	7,608	611,188
13	Maryland	1900	21	2,720,877	937	326,474	889	98	.....	105,571	1,780,910	2,589,540	1,754,060	810	49,748
		[4]1890	17	919,766	472	171,209	376	88	8	157,569	552,604	1,001,945	932,945	4,530	294,447
14	Massachusetts	1900	93	26,692,922	9,061	3,938,400	5,626	3,428	7	1,693,505	11,918,802	22,141,461	21,549,232	22,194	840,705
		[4]1890	85	22,467,036	7,817	3,420,459	4,557	3,246	14	1,832,753	12,210,458	21,524,178	20,491,527	17,320	1,308,000
15	Michigan	1900	27	4,505,741	2,014	700,826	1,534	479	1	264,373	2,707,827	4,217,869	3,871,120	160	10,200
		1890	31	2,712,773	1,219	519,432	966	242	11	192,302	1,711,486	2,919,166	2,285,484	3,861	240,898
16	Minnesota	[2]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
17	Nebraska	[3]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		1890	3	185,500	75	19,592	73	2	.....	14,908	27,128	90,995	90,995	.....	.....
18	New Hampshire	1900	29	8,163,081	2,391	1,036,856	2,223	168	.....	539,955	3,953,334	7,244,733	4,303,505	57,878	2,078,604
		1890	15	1,221,491	520	220,122	387	133	.....	65,747	715,081	1,282,022	1,111,022	970	58,200
19	New Jersey	1900	34	3,670,717	1,190	553,463	1,030	152	8	242,793	1,715,312	3,195,302	3,188,122	.....	.....
		1890	21	1,882,193	515	236,523	426	84	5	81,268	724,236	1,377,385	1,306,555	.....	.....
20	New York	1900	179	37,349,390	9,268	4,099,771	8,811	451	6	2,398,994	14,563,222	26,715,628	21,418,285	204,967	6,879,013
		1890	153	17,124,359	5,339	2,234,747	4,863	434	42	1,417,066	8,061,038	14,192,240	11,530,481	75,464	4,666,754
21	North Carolina	[3]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
22	Ohio	1900	51	7,872,913	3,184	1,118,040	2,542	629	13	479,386	3,768,572	6,543,513	6,142,580	7,517	354,556
		[4]1890	50	7,581,536	2,921	1,153,625	2,332	558	31	513,037	3,991,377	7,209,750	7,133,045	10,671	730,891
23	Oregon	1900	5	2,161,186	716	282,896	708	.....	8	147,417	582,078	1,305,696	1,290,186	21,416	856,646
		[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	Pennsylvania	1900	73	16,424,107	4,840	1,989,128	4,033	756	51	1,090,321	6,374,315	12,267,900	11,355,637	1,031	51,543
		[4]1890	72	9,404,772	2,951	1,256,340	2,216	678	57	646,472	4,646,456	7,838,299	7,032,899	10,588	779,017
25	Utah	[3]1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	Vermont	1900	27	4,853,806	1,216	571,018	1,129	86	1	265,569	1,684,922	3,384,773	2,656,025	26,166	930,818
		1890	21	3,151,911	1,065	487,529	1,003	62	.....	235,742	1,280,722	2,449,049	2,134,639	15,237	1,043,793
27	Virginia	1900	7	2,281,903	302	102,998	242	60	.....	57,829	410,640	850,386	651,114	1,320	72,600
		[4]1890	4	438,903	181	62,365	131	46	4	16,286	143,972	310,991	308,291	600	50,000
28	West Virginia	1900	6	926,463	281	98,329	263	18	.....	44,193	274,816	527,527	168,500	.....	.....
		[2]1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29	Wisconsin	1900	47	16,580,140	4,240	1,649,010	3,437	775	28	664,591	6,712,749	10,895,576	9,037,461	90,075	3,253,391
		1890	27	5,360,624	1,779	691,492	1,284	479	16	362,634	2,588,863	4,475,368	4,015,607	23,988	1,764,084
30	All other states	[5]1900	16	2,603,917	660	251,190	612	34	14	111,789	628,380	1,212,353	1,099,210	6,560	272,000
		[6]1890	26	5,120,385	1,305	587,711	1,202	71	32	258,292	1,870,548	3,192,118	2,037,104	6,762	647,585

[1] Not separately reported.
[2] Included in "all other states."
[3] No establishments reported.
[4] Exclusive of wood-pulp mills included with "all other states" in 1890.
[5] Includes establishments distributed as follows: California, 2; Colorado, 2; Georgia, 2; Kansas, 2; Minnesota, 2; North Dakota, 1; South Carolina, 1; Texas, 2; Washington, 2.

UNITED STATES, BY STATES: 1890 AND 1900.

PRODUCTS—continued.														
Paper—Continued.														
Book.		Fine.		Wrapping.		Boards.		Other paper products.		Total value.	Ground wood pulp, value.	Product of wood pulp mills, value.	All other products, value.	
Quantity (tons).	Value.	Quantity (tons).	Value.	Quantity (tons).	Value.	Quantity (tons).	Value.	Quantity (tons).	Value.					
351,702 158,173	$24,870,951 16,921,864	112,707 64,573	$15,895,974 11,939,576	535,252 276,978	$24,542,373 15,393,492	365,617 136,394	$10,353,319 4,891,762	233,103 102,445	$12,154,555 7,041,178	$4,433,699 5,871,426	$4,433,699 1,243,630	(1) $4,627,796	$14,983,417 3,771,452	1
				9,130	196,862	300	15,500	140	15,400					2
														3
7,849 9,190	756,471 1,225,781	2,298 3,402	361,412 542,320	14,219 5,751	743,747 498,423	30,762 9,135	1,158,499 373,436	4,679 3,730	478,467 513,142				71,425 383,205	4
14,421	1,097,722							1,065	71,683				430,313	5
				702	56,479			44	4,840	3,500	3,500		6,000	6
				32,980 34,638	544,575 793,843	37,428 18,698	814,081 456,460	3,650 5,350	72,962 87,166				17,320	7
4,110 278	270,868 22,365			23,010 10,186	786,540 396,742	93,775 19,459	2,041,881 602,860	4,233 4,992	271,679 139,192	75,870 192,311	75,870 5,000	187,311	403,659 69,024	8
				4,990 9,769	166,776 226,234	1,525	42,700	3,850	77,000					9
														10
														11
30,041 6,060	2,660,211 578,360			39,659	2,092,298	14,843 5,449	520,087 287,960	2	334,932	1,168,887 1,518,611	1,168,887	1,518,611	2,659,742	12
14,873 8,297	1,017,164 254,168			8,045 4,661	422,584 251,545	5,172 2,942	106,719 75,260	4,638 885	157,845 57,525	69,000	69,000		835,480	13
69,029 45,806	5,501,788 5,560,523	68,055 45,157	11,298,628 8,911,723	22,238 31,536	1,441,291 3,182,805	17,238 2,032	954,111 126,525	25,755 15,820	1,512,709 1,451,951	2,000 58,750	2,000 58,750		590,229 973,896	14
48,206 8,119	2,350,790 1,175,681	1,592	161,427	20,370 15,358	811,750 495,806	14,051 7,712	348,947 318,849	4,861 775	188,006 54,250	5,284 626,182	5,284	626,182	341,465 7,500	15
														16
				3,550	90,995									17
11,070 9,050	724,053 802,642			16,933 40	784,422 2,400	5,618 688	241,184 29,987	6,788 1,776	475,242 217,793	205,575 59,000	205,575 1,000	58,000	2,735,653 112,000	18
3,650	249,640	60 694	6,000 152,800	18,959 8,407	1,015,645 802,412	21,165 5,024	703,180 242,402	12,641 619	1,213,657 108,941				7,180 70,830	19
35,842 8,985	2,213,389 885,846	1,225 3,808	136,959 450,000	157,385 65,606	7,466,185 3,131,265	40,394 14,284	1,368,585 514,826	65,608 25,521	3,354,154 1,881,790	1,896,783 1,582,482	1,896,783 585,694	996,788	3,400,560 1,079,277	20
														21
16,742 14,369	1,158,695 1,409,070	4,095 2,617	578,172 490,500	49,854 37,729	2,303,199 2,698,078	53,886 41,030	1,167,360 1,448,441	13,269 6,450	580,598 356,065	34,580	34,580		400,933 42,125	22
				8,274	375,960			1,510	57,580	15,510	15,510			23
61,863 24,756	4,766,699 2,561,174	19,944 6,542	1,749,511 1,023,082	36,110 13,703	2,024,486 1,229,812	20,486 5,681	595,414 171,781	58,152 27,172	2,167,984 1,278,033	12,100 216,000	12,100 216,000		900,163 589,400	24
														25
4,431 1,994	181,671 139,566			20,295 7,196	973,792 546,610	3,763 3,255	183,236 109,435	4,364 2,381	386,508 295,285	460,748 298,078	460,748 138,930	159,148	268,000 16,332	26
799 410	51,223 41,000	720	55,506	762 380	15,250 15,400	2,236 2,614	55,735 76,710	4,780 668	400,800 126,131				199,272 2,700	27
		50	6,000	1,525	89,000	3,500	73,500			112,381	112,381		246,646	28
25,657 12,398	1,653,974 1,239,924	13,991 2,353	1,489,199 369,151	46,889 12,214	2,048,805 577,206			10,119 3,370	592,092 65,242	478,561 380,951	478,561 122,176	258,775	1,379,554 78,810	29
3,119 8,461	216,593 1,036,814	677	53,160	12,755 6,417	436,068 260,575	1,300 1,621	20,800 48,630	3,641 2,750	100,589 54,500	831,981	9,000	822,981	113,148 323,033	30

[1] In 1890 paper and wood pulp were treated as separate industries and each given a group of "all other states" embracing those in which there were less than 3 establishments. These groups are combined and the total given for establishments distributed as follows: California, 1 (wood pulp); Delaware, 2 (paper); Kansas, 1 (paper); Kentucky, 1 (paper); Maryland, 1 (wood pulp); Massachusetts, 2 (wood pulp); Minnesota, 2 (paper); Missouri, 1 (paper); North Carolina, 2 (1 paper, 1 wood pulp); Ohio, 1 (wood pulp); Oregon, 2 (paper); Pennsylvania, 2 (wood pulp); Rhode Island, 2 (paper); Utah, 1 (paper); Virginia, 1 (wood pulp); West Virginia, 4 (2 paper, 2 wood pulp).

Table 5 shows that of the 763 establishments reported for the industry, 179 were located in the state of New York, 93 in Massachusetts, and 73 in Pennsylvania, these three states containing 45.2 per cent of the total number. New York ranked first, not only in the number of establishments, but also in amount of capital invested, in number of wage-earners and wages paid, in cost of materials, and in value of products. In number of establishments the three leading states retained the same relative rank that they had in 1890. In capital, again Massachusetts was second, but Maine took third place; in 1890 the places of Massachusetts and New York were reversed and Pennsylvania ranked third, dropping to fifth in 1900. In number of employees and amount of wages, New York had passed Massachusetts, and Pennsylvania, which was third in 1890, was supplanted by Maine. In value of products, also, the rank was New York, Massachusetts, Maine, in 1900, instead of Massachusetts, New York, Pennsylvania, as in 1890. As to the different classes of products, New York led in wood pulp, news paper, wrapping paper, and "other paper products" not specially designated. Indiana produced more boards than any other state, and Massachusetts was first in the production of book paper and fine writing paper.

Nearness to supply of raw material is a great advantage to mills using wood; and this is apparently an important factor in the great growth of the paper industry shown in the table for Maine, New Hampshire, Vermont, and New York. In these states the capital invested was increased from $25,771,586 in 1890 to $67,839,437 in 1900, and the mills which in 1890 represented 28.7 per cent of the capital invested in the industry for the whole country, in 1900 represented 40.5 per cent. The main spruce supplies of the United States are to be found in this group of states, which use about two-thirds of all the domestic spruce made into pulp, the three New England states employing it rather more for chemical, and New York for mechanical pulp, as is shown in Table 7. That table shows, further, that New York and New Hampshire together use two-thirds of all Canadian wood of all kinds imported for pulp, the Canadian supply being about one-fifth of the entire supply of wood used for pulp. The quantity of rags used by this group is relatively insignificant, constituting not more than 13.2 per cent of the total quantity reported for the United States. In New York state about 14.5 per cent of the old paper supply and 23.8 per cent of the manila stock is consumed.

The paper produced in these states corresponds to the raw materials used, Maine, New Hampshire, and Vermont in 1900 producing 36.3 per cent of the news paper manufactured in the United States, and New York 36 per cent, making altogether nearly three-fourths of the total product. These same states made 23.7 per cent of the book paper, while New York alone made 25.5 per cent of the manila wrapping paper and 16 per cent of the straw wrapping paper. In the three New England states named, no writing paper was made, and the quantity made in New York was inconsiderable.

Mills using rags as their principal material, and producing writing and other fine papers, are located with regard to availability of power rather than source of supply. These mills are found chiefly in Massachusetts, Pennsylvania, and Wisconsin, Massachusetts alone using two-fifths of the rag supply and producing 60.7 per cent of the writing paper. Little news paper, but considerable book and building paper, is made in this state. Pennsylvania and Wisconsin use about one-fourth of the supply of rags, and make 30.1 per cent of the writing paper. Wisconsin, however, has considerable available timber and is a wood-using state, employing 10.8 per cent of the entire domestic spruce supply and producing 15.8 per cent of the news paper.

Certain states show certain other specialties. Connecticut produces an especially large proportion of the cover and heavy wrapping papers, binders, trunk boards, news boards, and similar grades. Pennsylvania makes nearly one-half of all the building and roofing paper. Indiana makes a considerable part of the supply of wood-pulp boards and other boards; New Jersey makes about one-half of the news boards.

States in the farming region of the middle West are shown in Table 7 to be the great consumers of straw, and producers of straw wrapping paper and strawboard. Indiana, Ohio, and Illinois together use four-fifths of the straw employed in paper making, and produce over half of the straw wrapping paper and 83 per cent of the strawboard.

Illinois, with 15 establishments and only a million and a half of capital invested in the paper industry, used one-fifth of the straw, and produced one-third of the straw wrapping paper. Indiana alone used one-third of the straw, and produced almost one-half of the strawboard.

The statistics for the manufacture of wood pulp as a distinct industry at the census of 1890 do not show the quantities and values of the different classes of materials and products. In Table 5 only the total cost of all classes of materials, the total value of all products, the quantities and values of the kinds of paper produced, and the total value of the ground-wood pulp are separately shown. The value of the wood pulp sold by paper mills is combined with the total value of all products of pulp mills for 1890, and this value is placed in comparison with the value of wood pulp reported as made for sale at the census of 1900; the value of the soda and sulphite fiber separately reported in both years is included with all other products. While this is not an exact comparison, it nevertheless indicates the value of pulp made for sale as reported at the two censuses. Among the products reported for the paper mills in 1890 were 64,721 tons of ground-wood pulp, valued at $1,243,630; 16,214 tons of soda-wood fiber, valued at $840,909; and 6,845 tons of sulphite fiber, valued at $368,050. The quantities and values of these classes of products for the combined paper and pulp mills in 1900 are shown in Table 7.

The full extent of the growth of the wood pulp industry is not realized, however, until both quantity and

value of product are taken into account. Values for 1900 represent a far larger proportionate quantity of output than those for 1890, owing to the steady and large decline in prices during the decade. Only values, not quantities, were given for the product of wood pulp mills in 1890; that the increase in total value was considerably less, however, than in total quantity may be inferred from the fact that the value of ground wood per ton (computed on the basis of cost of material used in the paper industry as reported at the two censuses) dropped, between 1890 and 1900, from $19.88 to $16.60, of soda fiber from $62.45 to $36.50, and of sulphite fiber from $62.61 to $37. In 1890 the production of news paper was 196,053 tons, with a value of $13,106,434, indicating a value of about $67 per ton; in 1900 the product of 569,212 tons was valued at $20,091,874, or about $35 per ton. A similar reduction in price is seen in book paper. In 1890 the product was 158,173 tons, valued at $16,921,864, or $107 per ton; while in 1900 the quantity produced was 351,702 tons, valued at $24,870,951, or $71 per ton. Even after allowance is made for the fact that the prices of paper products were the lowest ever known, the full growth of the industry is scarcely shown by the figures for the census year. During the latter half of 1899 the production of all mills dependent on waterpower was greatly lessened owing to the severe drought that prevailed at that time. The census statistics, however, are intended to show not the full capacity of all plants engaged in the industry, but the actual production.

Table 6 presents a statement of imports and exports of paper and pulp for each year from 1880 to 1900, inclusive.[1]

[1] Figures for imports and exports are those furnished by the United States Treasury Department, Bureau of Statistics.

TABLE 6.—IMPORTS AND EXPORTS, 1880 TO 1900.

YEARS.	PAPER.			WOOD PULP.			
	Imports.		Exports.	Imports.		Exports.	
	Paper and manufactures of paper. (Value.)	Paper stock, crude. (Value.)	Paper and manufactures of paper. (Value.)	Tons.	Value.	Pounds.	Value.
1900...	$3,795,645	$3,261,778	$6,215,833	82,441	$2,405,630	28,554,801	$458,463
1899...	3,191,589	2,614,914	5,477,884	33,319	671,506	55,932,270	696,319
1898...	2,838,738	2,870,323	5,494,564	29,846	601,642	50,428,161	536,670
1897...	3,121,530	3,071,705	3,333,163	41,770	800,886	(1)	.....
1896...	3,169,480	3,445,723	2,713,875	45,143	1,052,829	(1)	.....
1895...	2,863,533	3,786,026	2,185,257	28,440	958,009	(1)	.....
1894...	2,628,351	3,048,094	1,906,634	35,587	1,664,547	(1)	.....
1893...	3,880,981	6,272,298	1,540,886	63,565	2,908,884	(1)	.....
1892...	3,342,304	5,448,263	1,382,251	41,118	1,820,148	(1)	.....
1891...	3,031,454	5,019,533	1,299,169	43,316	1,902,689	(1)	.....
1890...	2,816,860	5,261,448	1,226,686	(1)	.....	(1)	.....
1889...	2,542,383	5,925,047	1,191,035	(1)	.....	(1)	.....
1888...	2,400,790	5,463,036	1,078,561	(1)	.....	(1)	.....
1887...	2,028,235	4,540,598	1,118,538	(1)	.....	(1)	.....
1886...	1,838,822	5,194,951	1,106,616	(1)	.....	(1)	.....
1885...	1,592,892	5,827,878	972,493	(1)	.....	(1)	.....
1884...	1,714,419	5,638,647	929,821	(1)	.....	(1)	.....
1883...	1,958,113	5,329,876	1,614,950	(1)	.....	(1)	.....
1882...	2,084,289	6,014,183	1,631,370	(1)	.....	(1)	.....
1881...	1,841,840	5,245,691	1,408,976	(1)	.....	(1)	.....
1880...	1,671,120	7,037,197	1,201,143	(1)	.....	(1)	.....

[1] Not reported separately.

This table shows that from 1880 to 1890 our export trade in paper scarcely held its own. In 1880 it was $1,201,143 as against imports amounting to $1,671,120 during the same year; in 1890, the last year of the decade and the date of the Eleventh Census, it showed but a slight increase, total paper exports being only $1,226,686, while imports had increased to $2,816,860. During two years of this decade (1884 and 1885) the total value of exports fell below $1,000,000.

From 1890 to the date of the present census the growth of our export trade in this commodity was steady and healthy, amounting in 1900, with wood pulp included, to a total of $6,674,296, an increase of nearly 500 per cent during the decade. The grades exported are largely wood papers (especially news), while the usual imports are of the higher grades of book and fancy papers and specialties.

The total exports of the world in 1899 of paper and the manufactures of paper, and of wood pulp were about $91,000,000. The exports of the United States in that year amounted to $6,174,203, or nearly 7 per cent of the world's export trade in these goods.

The per capita value of the paper consumed in the United States in 1900 was the greatest in the world, amounting to $1.66. The per capita production of paper in 1860, as given in the census report for that year, was 8.1 pounds;[1] in 1900 it was 56.9 pounds.

Four industrial combinations have been organized in this industry during the past decade. During the census year these combinations controlled 10.5 per cent of the establishments. Their capital amounted to $40,320,498, or 24.1 per cent of the total capital invested in the industry; they gave employment to 11,582 wage-earners, or 23.3 per cent of the total; paid $4,996,528 in wages, or 24.1 per cent of the total; and the value of their products was $30,725,020, or 24.1 per cent of the total value. These combinations have each consolidated under one central management 31, 25, 15, and 9 establishments, respectively. This change in the ownership, combined with radical changes in the method of manufacture, has made the period from 1890 to 1900 by far the most important in the history of the industry.

HISTORICAL AND DESCRIPTIVE.

Although much the same process has been used for many years in this and other countries for producing paper, the evolution of paper making through the use of improved methods and machinery, and the great change in the character of materials used at different periods, renders it desirable to add some explanation of the method of manufacture.

From the earliest Egyptian papyrus to the paper of to-day the predominant characteristic is that it consists

[1] Eighth Census of the United States, Manufactures, Introduction, page cxxi.

of the enduring portion of vegetable growth known as cellulose or pure fiber. The leaves, blossoms, and stems of plant life have in turn, as experience and knowledge increased, served to furnish the raw material of this manufacture.

Modern paper making may be said to have begun with the introduction, early in the Nineteenth century, of the Fourdrinier machine, which was a development of the invention of Louis Robert, of Essonnes, France; in the last decade of the previous century, probably in 1798. Paper was made chiefly from rag fiber, which continued to be the material used in England, on the Continent, and in the United States until past the middle of the Nineteenth century, when wood fiber was introduced. In the treatment of these materials for paper making, a fluid stock was prepared by putting the rags, after sorting and cleaning, through the washing and beating machines, where the component fibers were separated and reduced to the fineness and fluidity requisite to produce smooth and uniform sheets. In 1854 the first wood pulp was made in the United States by the alkali process, but the process of mechanical grinding, upon which the present extensive pulp industry is based, was introduced at Stockbridge, Mass., in 1867, the product being used in a paper mill at Lee. A small proportion of this material was mixed with more conservative grades of stock, and the result, though far from satisfactory at first, grew better as experience taught how the new material should be used. The use of rags for making news papers has been entirely superseded by wood.

The earliest mills in this country were established before the invention of the Fourdrinier machine, and the process of making paper was therefore conducted by hand. The rag fiber, after being prepared in the beating machine, was formed into a sheet in a mold or wire sieve, which was dipped from the pulp vat by hand, the water drained off, and the pulp left in a wet sheet in the mold. Sheets so made were turned out upon a felt, pressed, and then dried by exposure to the air in single sheets. Such mills were small, employing few hands, and of limited product. Paper was made by hand at Roxboro, in the vicinity of Philadelphia, as early as 1690, by William Rittenhouse. In 1729 the Ivy Mills on Chester Creek, in Delaware county, Pa., were built by Thomas Wilcox, and up to 1866 produced handmade paper. Here was made the paper which supplied the press of Benjamin Franklin, and during the Revolution, the paper for the Continental currency. Figure 1 is an exterior view of one of the early mills, which was built in 1811, and has been operated ever since.

To a limited extent paper is still made by hand, as shown in figure 2, which is a view of the interior of a mill at Adams, Mass. At the right are seen two "vat men," each taking a mold full of prepared fiber from the vat. The third man is stooping over to deposit the newly formed sheet on the felts, between which it is pressed in the press to the left and then taken out and (where necessary) surface sized and dried in the air.

By the Fourdrinier machine the transformation of the fluid stock to finished paper is made an automatic operation. The pulp is screened from the vat over an apron to a moving endless wire cloth made of closely woven fine brass wire, and supported by a series of small metal rolls, set close together but without touching each other. In this way an even surface of the wire cloth is maintained, and by preserving an unvarying flow of the pulp and a constant forward motion of the wire cloth the thickness of the layer of pulp deposited is kept uniform. By a violent lateral motion or "shake" of the supporting rolls the fibers are caused to interlace in various directions and give greater transverse strength to the texture. As the pulp is carried along on the wire cloth much of the water drains through, leaving the fiber on the meshes. This first drying is usually hastened by various devices. After sufficient water has drained from the pulp the moist web is carried between couch rolls which are covered with woolen felt, and there taken from the wire cloth on endless woolen felts, which pass it between press rolls, and thence to driers. These are large metal cylinders heated by steam, placed one after another or in two tiers; their number varies in different machines. By the time it has passed the press rolls the paper has acquired considerable strength from the loss of the greater part of its moisture. The heated cylinders complete the drying process, and then the paper is given a smooth surface by the calenders, which are smooth-faced heavy metal rollers arranged vertically in a stack, giving great pressure by their cumulative weight. Finally the finished paper is reeled off in rolls or cut into sheets of the desired size. Figure 3 shows a view of the widest paper machine in the world, which is running in the mills at Rumford Falls, Me. The rolls of finished paper and the calenders occupy the foreground of the cut. Figure 4 is another view in the same machine room, showing in the foreground the screens and the wire or "wet end," where the web of paper is first formed, with the driers in the background.

Another type of paper machine, known as the cylinder machine, differs from the Fourdrinier mainly in that the pulp, instead of being flowed onto a moving endless wire cloth, is taken up by a cylinder, the face of which is formed from close-meshed wire cloth, revolving partly submerged in the vat of stock. From the cylinder the net is removed by a couch roll carrying a felt, and then dried and finished essentially as in the Fourdrinier machine. There is less waste of pulp in this machine, but the paper made by it has less transverse strength, because the fibers lie mostly in the line of travel of the web, there being no "shake" to give them lateral motion.

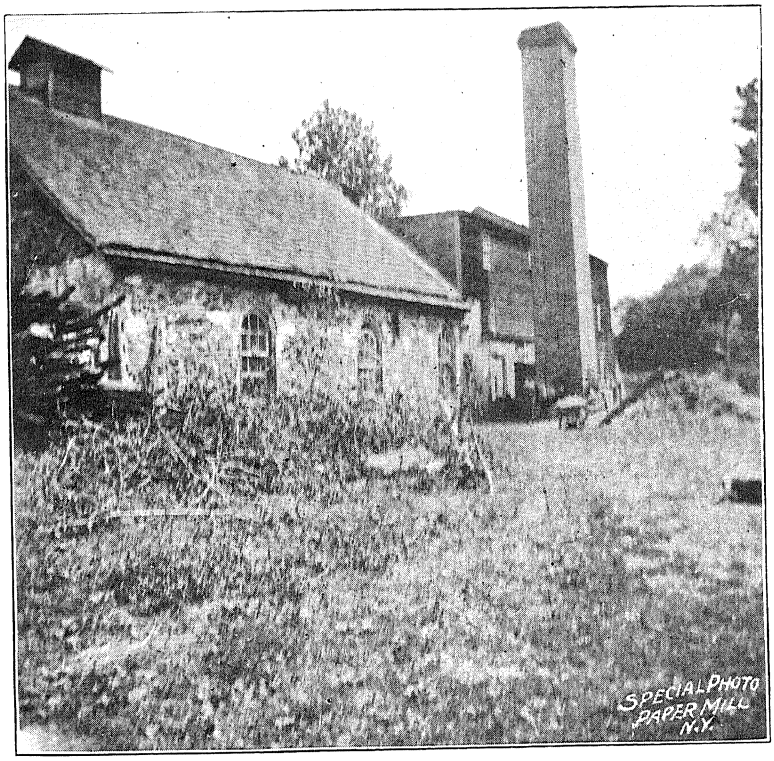


FIG. 1.—SUNNYDALE PAPER MILL—EXTERIOR. BUILT IN 1811.

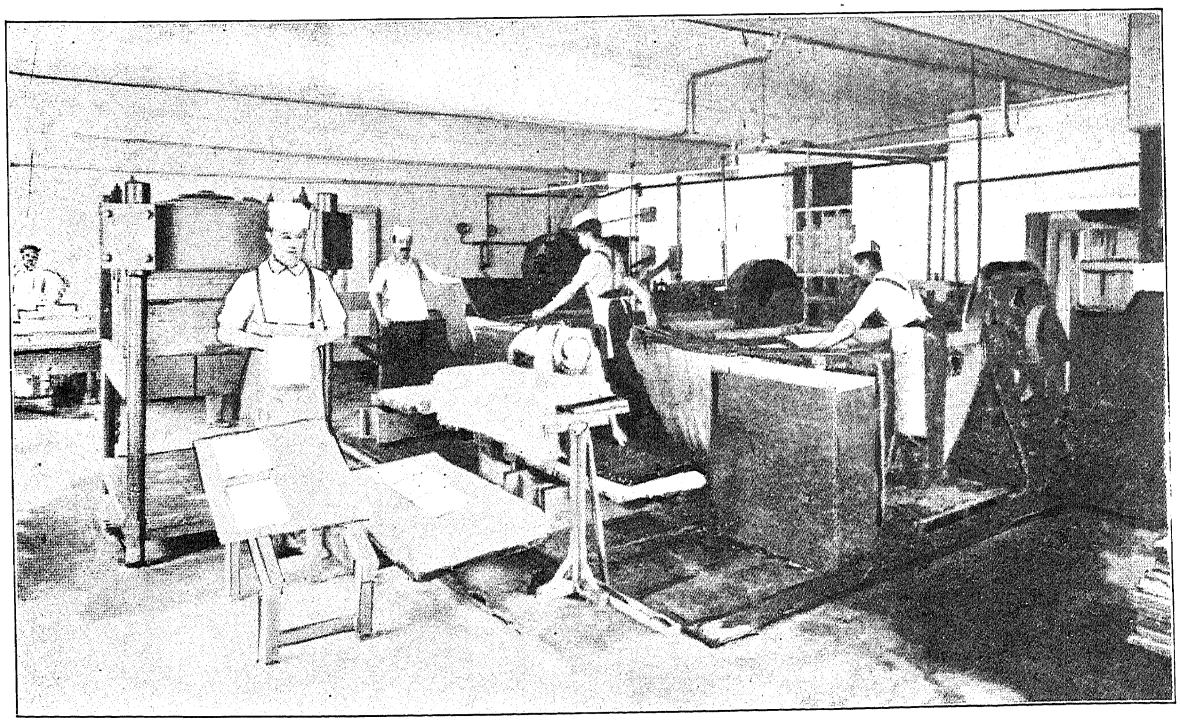


FIG. 2.—MAKING PAPER BY HAND.

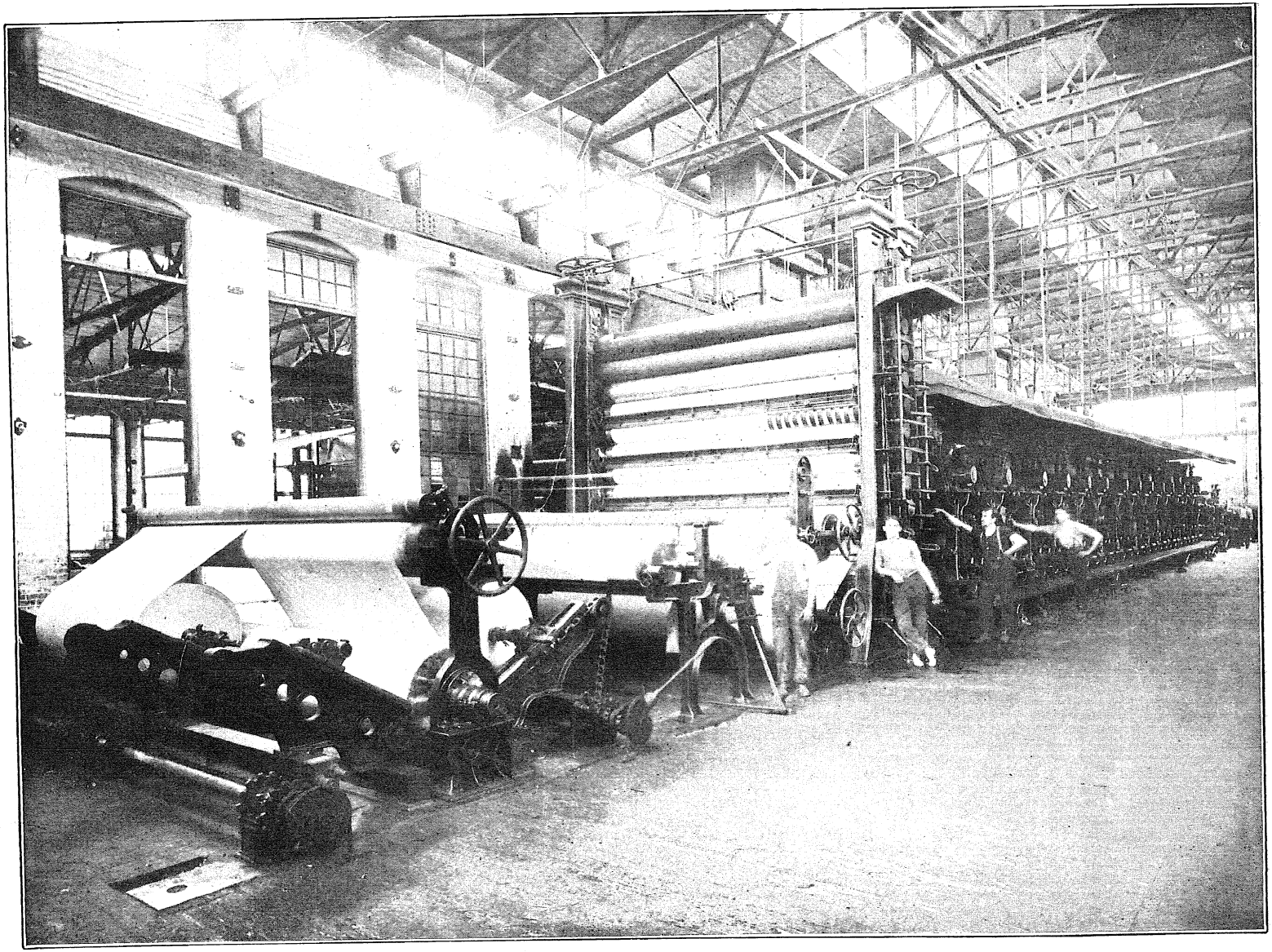


FIG. 3.—WIDEST PAPER MACHINE IN THE WORLD.

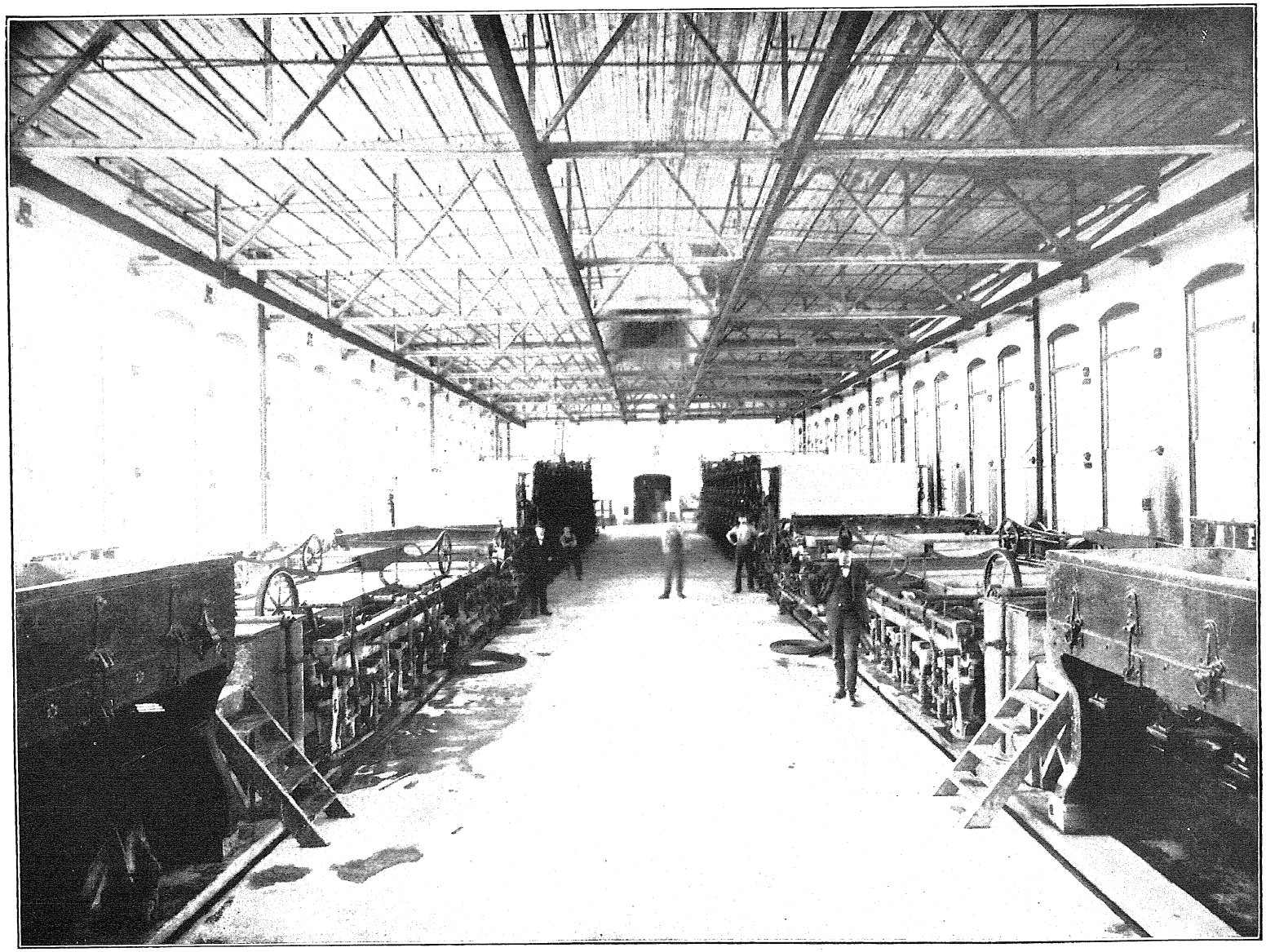


FIG. 4.—MACHINE ROOM OF MILLS AT RUMFORD FALLS, ME.

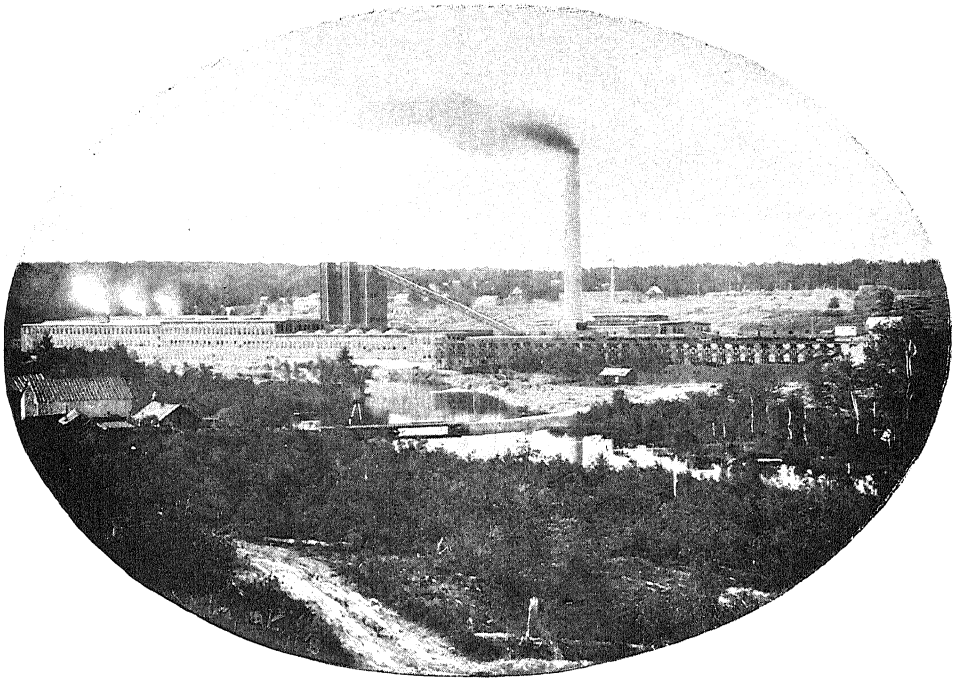


FIG. 5.—EAST VIEW, MILLINOCKET MILL.

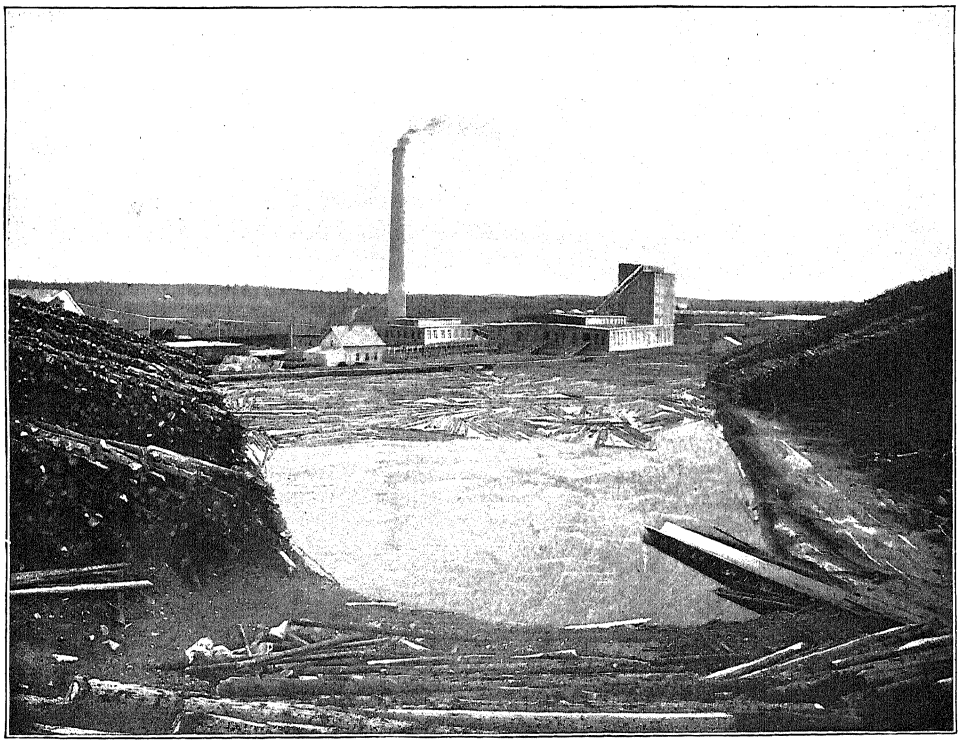


FIG. 6.—WEST VIEW, MILLINOCKET MILL.

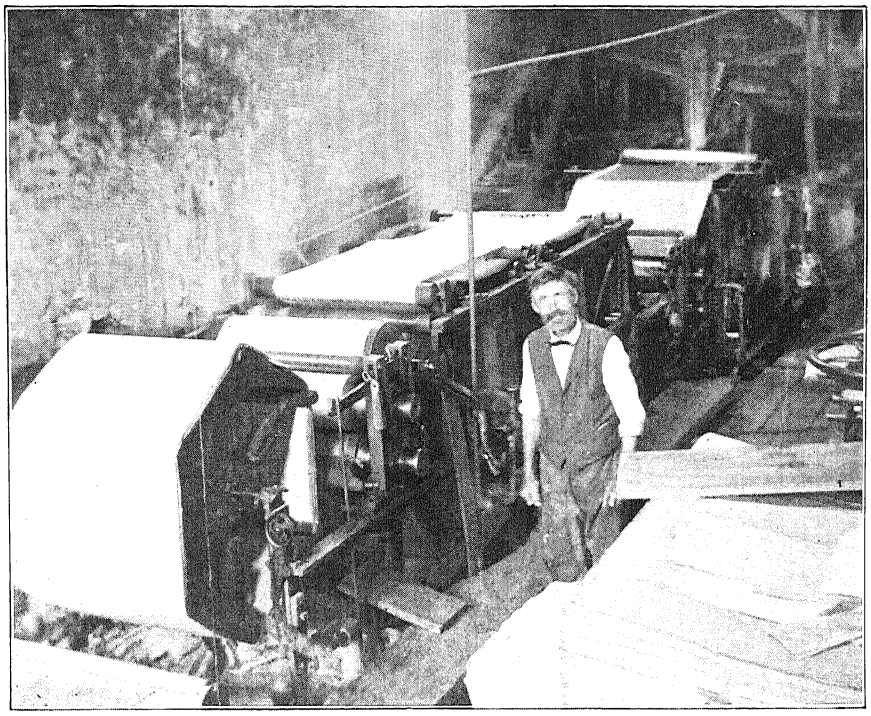


FIG. 7.—SUNNYDALE MILL—INTERIOR.

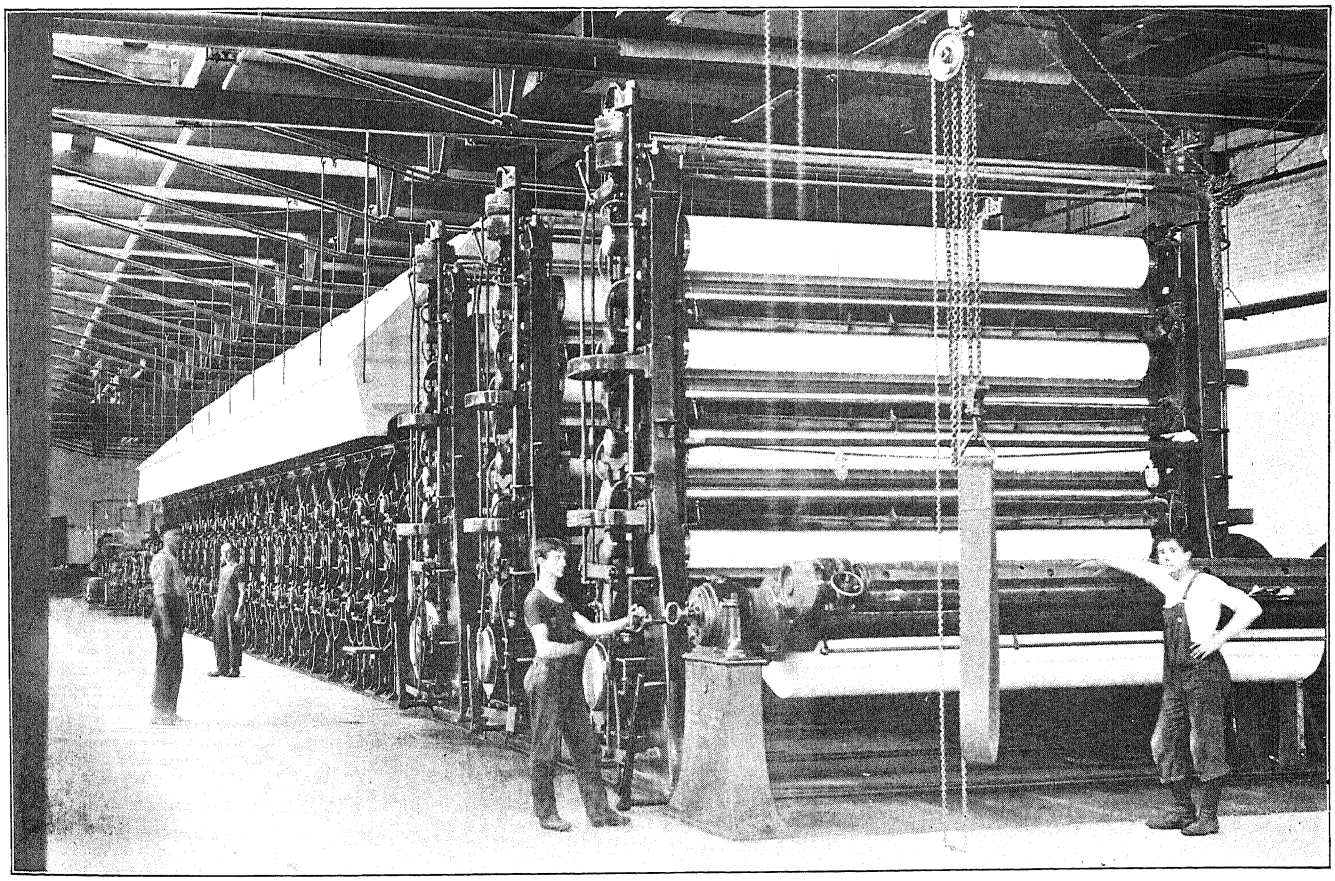


FIG. 8.—MODERN 158-INCH MACHINE. CAPACITY, 50 TONS DAILY.

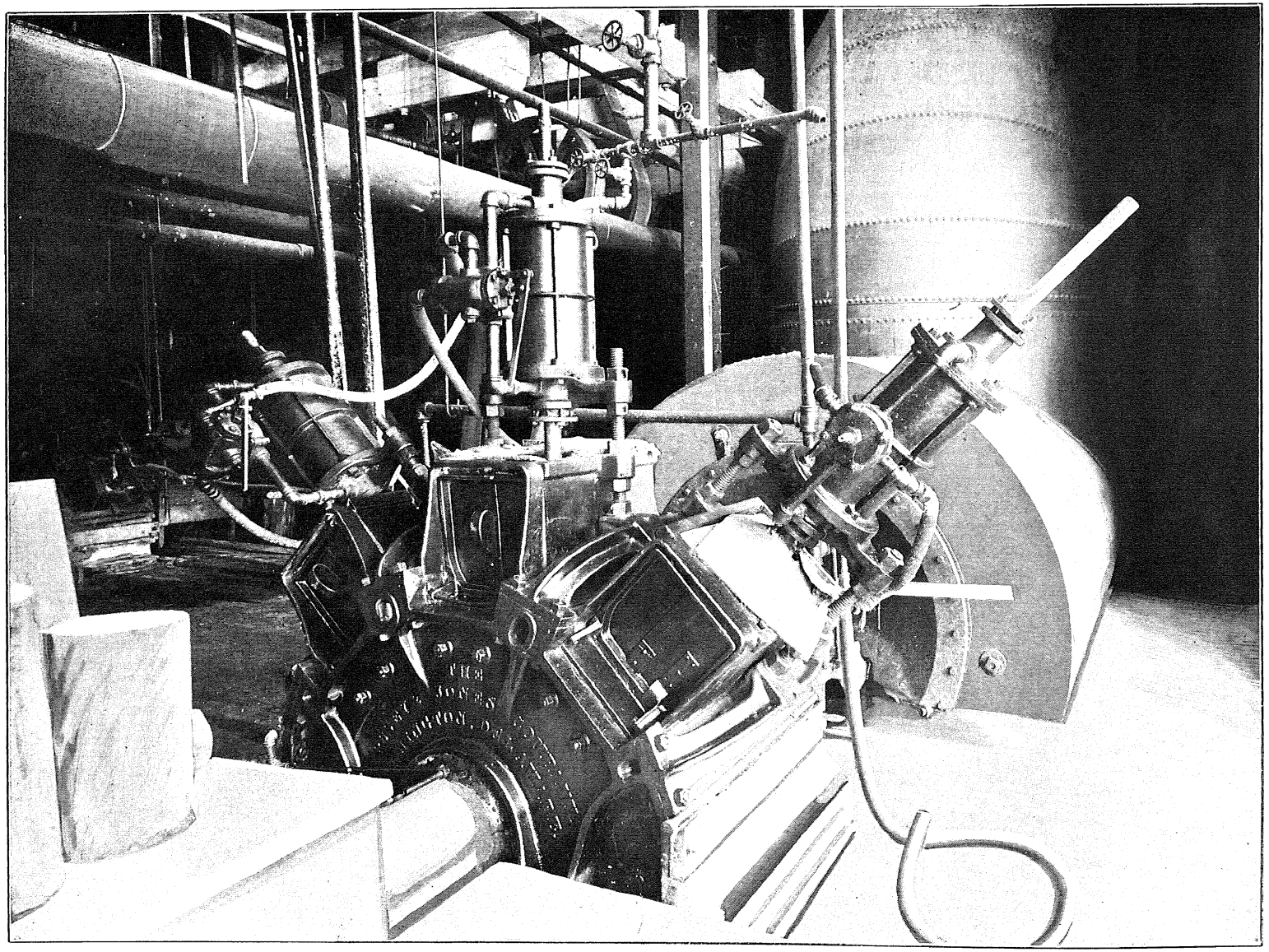


FIG. 9.—WOOD-PULP GRINDER.

FIG. 10.—INTERIOR OF PULP MILL.

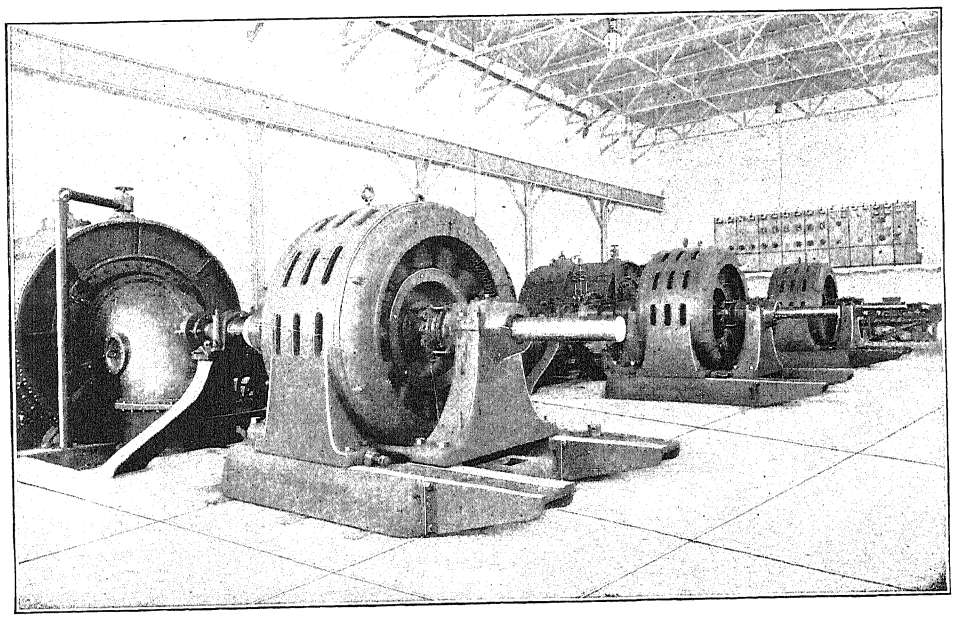


FIG. 11.—TURBINE-DRIVEN GENERATORS.

There is no more striking comparison between the old and the new in the paper industry than to note the points of difference between the earlier mills with limited product, and employing little labor outside the proprietor and his family, and some of the best modern mills. The new plant of the Great Northern Paper Company, at Millinocket, Me., is probably the largest in point of tonnage in the world, and with its houses for employees, shops, and other dependent features, forms a city in itself. It makes 250 tons of finished paper each twenty-four hours. In another plant in the same state a single machine is producing 50 tons of wrapping manila in twenty-four hours, with a daily average of nearly four-fifths of this amount.

Figure 5 gives the east view of the plant at Millinocket and figure 6 a west view of the same. Figure 7 is an interior view of the old establishment shown in figure 1. The width of the machine presented is 36 inches, and its product is about 1,000 pounds of tissue paper per week. The proprietor himself prepares the stock, operates the machine, and finishes and sells the product. Figure 8 shows a machine in the mills at Winslow, Me., which is reputed to have the largest tonnage of any paper machine in the world. It turns out a continuous web of finished paper at the rate of 500 feet a minute. The mill in which this machine is run is one of the largest and most modern wrapping-paper mills in existence, having a capacity of about 100 tons a day.

From the hand process of the early days to such huge machines as are shown in figures 3 and 8 is a progress in method of production which explains the immense increase in the volume of the products of this industry. The principles are the same whether the pulp is taken from the vat on small hand sieves and turned out a single sheet at a time, or whether it is flowed onto an endless wire cloth from which it is conveyed on blankets or felts in a continuous web through heavy press rolls and then over steam-heated drying cylinders. By the introduction of such machinery not only has the rapidity of manufacture been multiplied many times and the labor cost diminished, but the quality of the product has also become more uniform and capable of more exact regulation.

During the Nineteenth century there was a remarkable improvement in the method of making paper from the stock, while the materials from which the stock is made were revolutionized in the last half of the century. Although various attempts had previously been made to provide a cheaper substitute for paper rags, and many other materials are used to some extent, yet the cheapness of wood pulp and the abundance of wood from which it can be made have brought about changes that appear almost marvelous.

The raw material of wood pulp is spruce, poplar, and, in smaller quantities, various other woods, according to the location of plant, the process employed, and the kind of paper in which the material is to be used. To a very great extent this material has superseded the use of rags, entirely so in the manufacture of news papers, very largely so in the manufacture of book and wrapping papers, and to a considerable proportion in writing and other grades. Treated mechanically or chemically, it furnishes all the essential qualities in nearly every grade of paper. The history of the discovery that wood could be made into paper, and the gradual adoption of this material, would be too extensive for the purpose of this report.

Many varieties of woods are suitable for ground wood pulp, but spruce is the principal raw material. In preparing the pulp the wood is cut into suitable lengths for grinding, the bark removed, and the blocks held by hydraulic pressure against the edge of a rapidly revolving grindstone and by attrition reduced to a mushy consistency. Figure 9 shows such a wood pulp grinder by which the pulp is mechanically pro duced from wood.

The fiber as thus ground is screened and either used in a liquid state for the paper machines in the same establishment or run over "wet machines" into thick sheets which are folded into bundles and shipped to points where they are to be used. The pulp so made is the basis of all lower grades of paper. As already noted, the pulp industry has become an integral part of the paper business, over half of the ground wood produced being made into paper on the spot. Figure 10 shows the interior of a pulp mill with the sheets of prepared pulp.

Since the introduction into this country, in 1866 or 1867, of the German process for making a ground wood fiber, its use has steadily increased until it has nearly driven other materials from the field, except for higher or special grades of paper. When the manufacture of wood pulp first appeared as an industry in the census of 1870, 8 establishments were reported, with products valued at $172,350. In 1880 there were 50 establishments, with products valued at $2,256,946. In 1890, 82 establishments reported products valued at $4,627,796. The first wood pulp made in this country was sold at 8 cents per pound; to-day the price is less than 1 cent. Doubtless the general adoption of the new material was aided by the great scarcity of rags and the high range of prices prevailing in the sixties. Rags were worth from 4 to 6 cents a pound, and news paper was selling at 14 and 15 cents and book paper from 27 to 35 cents, double or triple the prices prevailing just before the war. The cheapness of the wood fibers commended them for all purposes where they could be used, and stimulated the efforts to adapt them to more extended uses. The profusion of the wood supply in the great forests of spruce and other woods in the United States renders this a cheap material, and competition and improvements in process have reduced the cost still further in recent years.

Sulphite fiber, next in importance as a product in the pulp industry, is made by a chemical method of producing fiber instead of a mechanical, as in the case of ground wood. For both processes, however, spruce is the most common material, though many other woods are used. The wood after being barked is cut into small chips, which are dissolved by boiling or cooking with sulphurous acid in large boiling tanks or digestors. The product, after being washed and otherwise prepared for use, has a much longer fiber than a mechanically prepared pulp, and is used to give strength to papers in which that quality is required. News, common wrapping papers, and some other grades consist chiefly of ground wood with 10 to 25 per cent of this chemically prepared sulphite added to hold them together. Other grades, e. g., strong wrapping papers, are made entirely from sulphite fiber.

This process is of American invention and was first used in 1867. Its early development was slow, owing to the difficulty of procuring the necessary apparatus. The strong chemicals employed penetrated the linings of the digestors as then constructed, eating into their shells and rapidly spoiling them for use, and until recently no species of lining had been found to resist the attacks of the acid and keep the digestors whole. Within a few years, however, linings have been invented which secure this end and the sulphite process is now established as the leading method of production of chemical pulp.

Soda fiber is ordinarily made from woods softer than spruce, chiefly poplar, and is a softer, mellower fiber, without much strength. It is used as a soft stock in book, and to some extent in writing papers. Its preparation is similar to that of sulphite, except that in place of sulphurous acid a solution of caustic soda is used in the digestors. The process is older than either of the two just mentioned, having been introduced into this country from England in 1854. It came into extended use earlier than the sulphite fiber, but owing to the greater cheapness of the sulphite process in producing a strong cellulose fiber from spruce, the use of the latter has increased more rapidly than that of soda.

The merchantable shape of these fibers differs somewhat. Ground wood is ordinarily sold in folded sheets only partially dry, and is, therefore, under common conditions only suitable for use near the locality of its manufacture, its weight being so increased by the water as to preclude the profitable transportation of such a low-priced product, on account of the freight on this extra weight. Sulphite is either sold in similar shape, first having had a portion of the water removed by pressure, or else dried by steam in rolls like paper; soda fiber is ordinarily so sold, though sometimes in a partially wet state like sulphite.

Since 1867 the ground wood manufacture has developed until in 1900 there were 91 plants producing 280,052 tons for sale, and 77 mills making 306,322 tons for their own use. Soda fiber was first made in the United States experimentally in 1854 or 1855; the first soda-fiber plant began operations in 1862 or 1863, and the earliest one still in existence, in 1869. In 1900, 20 establishments were manufacturing for sale 99,014 tons, and 16 establishments were producing for their own use 78,110 tons. The first sulphite plant was started shortly after the Civil War, though a general use of the fiber began some years later, about 1884. In 1900, 40 mills produced 271,585 tons to sell, and 29 establishments made 144,452 tons for their own use.

The manufacture of ground wood pulp, as well as the use of the large Fourdrinier and cylinder machines, would be impossible without the modern transformers of energy. The grinding of wood is usually accomplished by water wheels commonly fitted directly with the stones by which the wood is converted into pulp. From 75 to 100 horsepower per ton of wood pulp is required each twenty-four hours for these grinders and the necessary auxiliary machinery. For the paper machines steam is the most satisfactory power, on account of the constant and easily governed speed of the steam engine, whereby uniformity in the thickness of the paper can be secured. Water power, on the other hand, is sure to vary in volume and pressure, and can not be quickly enough controlled to make the flow of pulp so uniform. Furthermore, in using steam engines for the machines, the exhaust is utilized in the cylinders which dry the paper, and waste is thus prevented. Although many machines were formerly run by water, this agency is rapidly being supplanted by steam. In the preparation or beating of stock and all general work about the mill, however, water power is more economical than any other unless steam is produced by natural gas.

Within the last decade electric power is being more and more used in this, as in other industries, and it seems destined to play a still larger part. The most extensive and complete system now in use is installed in the Millinocket plant of the Great Northern Paper Company, in Maine, where the three generators, shown in figure 11, are each driven by a pair of turbine water wheels, furnishing in all about 4,500 horsepower; they drive all the machinery of the mill except the Fourdrinier machines, which are run by steam engines, and the pulp grinders, which are directly connected to turbines.

The statistics for the paper and pulp industry, as reported at the census of 1900, are shown in detail in Table 7. This table presents separate totals for each state in which there were 3 or more establishments, and groups the statistics for other states so as not to disclose the operations of individual establishments. The establishments are classified according to the character of the ownership, which shows that 144 were

owned by individuals, 135 by firms or limited partnerships, and 484 by corporations. The employees are segregated so as to show for salaried officials and wage-earners, separately, the number and salaries or wages of men, women, and children, respectively, and also the average number of wage-earners employed during each month of the year. Separate totals are shown for the quantity and cost of the different kinds of materials and for the quantity and value of the various classes of products of the industry. A presentation of the machinery and power is made, and the 763 establishments are grouped according to the number of employees in each.

TABLE 7.—PAPER AND

		United States.	Connecticut.	Delaware.	Illinois.	Indiana.	Iowa.	Maine.	Maryland.
1	Number of establishments	763	49	6	15	39	4	35	21
	Character of organization:								
2	Individual	144	20	.....	3	3	.....	1	8
3	Firm and limited partnership	135	7	3	1	3	1	4	4
4	Incorporated company	484	22	3	11	33	3	30	9
	Capital:								
5	Total	$167,507,713	$3,968,152	$2,143,108	$1,554,858	$5,379,227	$182,045	$17,473,160	$2,720,877
6	Land	$21,467,286	$445,655	$173,200	$105,985	$371,615	$20,000	$2,671,385	$127,142
7	Buildings	$35,440,184	$1,048,294	$397,775	$264,877	$1,141,389	$10,000	$3,866,120	$715,396
8	Machinery, tools, and implements	$60,351,066	$1,236,672	$1,285,317	$550,762	$2,439,153	$124,400	$6,148,974	$1,147,920
9	Cash and sundries	$50,249,177	$1,237,531	$286,816	$633,234	$1,427,070	$27,645	$4,786,681	$730,419
10	Proprietors and firm members	431	36	6	6	12	2	12	11
	Salaried officials, clerks, etc.:								
11	Total number	2,935	115	19	35	134	11	258	35
12	Total salaries	$4,500,911	$151,600	$61,675	$37,370	$186,394	$11,770	$445,348	$58,793
	Officers of corporations—								
13	Number	624	24	4	13	46	2	40	6
14	Salaries	$1,619,878	$41,896	$40,000	$13,520	$69,928	$4,700	$115,281	$30,929
	General superintendents, managers, clerks, etc.—								
15	Total number	2,311	91	15	22	88	9	218	29
16	Total salaries	$2,881,033	$109,704	$21,675	$23,850	$116,466	$7,070	$330,067	$27,864
	Men—								
17	Number	2,063	79	14	22	78	7	204	29
18	Salaries	$2,760,863	$104,576	$21,375	$23,850	$112,289	$6,520	$323,777	$27,864
	Women—								
19	Number	248	12	1	.....	10	2	14	.....
20	Salaries	$120,170	$5,128	$300	.....	$4,177	$550	$6,290	.....
	Wage-earners, including pieceworkers, and total wages:								
21	Greatest number employed at any one time during the year.	58,316	1,657	484	716	2,189	221	5,848	1,165
22	Least number employed at any one time during the year.	45,257	1,272	416	566	1,732	137	4,408	1,003
23	Average number	49,646	1,425	451	623	1,816	180	4,851	937
24	Wages	$20,746,426	$633,413	$193,783	$250,303	$723,972	$63,589	$2,162,972	$326,474
	Men, 16 years and over—								
25	Average number	41,547	1,157	372	577	1,720	132	4,560	839
26	Wages	$18,753,326	$562,523	$175,808	$239,318	$698,245	$55,374	$2,082,923	$308,543
	Women, 16 years and over—								
27	Average number	7,930	268	79	37	93	28	291	98
28	Wages	$1,958,135	$70,890	$17,975	$9,602	$25,227	$4,964	$80,049	$17,931
	Children, under 16 years—								
29	Average number	169	.....	.....	9	3	20	.....	.....
30	Wages	$34,965	.....	.....	$1,383	$500	$3,251	.....	.....
	Average number of wage-earners, including pieceworkers, employed during each month:								
	Men, 16 years and over—								
31	January	41,737	1,194	355	563	1,752	150	4,661	960
32	February	41,899	1,173	354	608	1,733	159	4,614	977
33	March	42,420	1,185	352	609	1,805	155	4,686	995
34	April	42,967	1,201	355	554	1,803	152	4,665	1,015
35	May	42,983	1,193	368	575	1,793	87	4,700	1,009
36	June	39,309	1,050	354	578	1,720	118	4,626	823
37	July	38,981	1,013	372	561	1,688	123	4,286	678
38	August	40,580	1,138	389	554	1,655	98	4,274	695
39	September	40,762	1,187	390	599	1,633	126	4,270	717
40	October	41,259	1,191	398	595	1,605	120	4,362	730
41	November	42,708	1,191	389	566	1,750	153	4,737	736
42	December	42,959	1,165	387	562	1,706	148	4,843	732
	Women, 16 years and over—								
43	January	8,164	277	74	38	107	37	292	112
44	February	8,186	293	75	38	108	37	290	107
45	March	8,179	278	77	38	96	27	290	108
46	April	8,173	287	77	32	97	23	286	107
47	May	8,108	276	78	32	95	24	281	108
48	June	6,275	169	79	38	94	24	295	100
49	July	6,913	170	80	38	81	21	301	94
50	August	8,088	294	83	38	79	23	302	88
51	September	8,087	287	82	39	93	33	297	87
52	October	8,176	303	79	39	78	29	289	86
53	November	8,336	298	81	39	96	29	283	89
54	December	8,495	290	82	39	94	29	279	89
	Children, under 16 years—								
55	January	170	.....	.....	7	4	25	.....	.....
56	February	176	.....	.....	10	4	25	.....	.....
57	March	169	.....	.....	10	4	15	.....	.....
58	April	164	.....	.....	7	4	15	.....	.....
59	May	175	.....	.....	8	4	20	.....	.....
60	June	166	.....	.....	9	2	20	.....	.....
61	July	154	.....	.....	10	2	10	.....	.....
62	August	158	.....	.....	10	2	10	.....	.....
63	September	168	.....	.....	8	2	25	.....	.....
64	October	173	.....	.....	10	2	25	.....	.....
65	November	173	.....	.....	12	3	25	.....	.....
66	December	182	.....	.....	10	4	25	.....	.....
	Miscellaneous expenses—								
67	Total	$10,184,106	$279,962	$90,785	$72,650	$226,156	$13,350	$1,394,967	$105,571
68	Rent of works	$358,338	$3,255	.....	$23,050	$5,573	$2,500	$199,251	$1,983
69	Taxes, not including internal revenue	$977,877	$19,521	$5,168	$4,365	$25,792	$115	$122,071	$9,621
70	Rent of offices, insurance, interest, and all sundry expenses not hitherto included.	$8,527,045	$256,986	$85,617	$45,235	$192,791	$10,735	$1,067,754	$91,830
71	Contract work	$320,846	$200	.....	.....	$2,000	.....	$5,891	$2,137

PULP, BY STATES: 1900.

Massachusetts.	Michigan.	New Hampshire.	New Jersey.	New York.	Ohio.	Oregon.	Pennsylvania.	Vermont.	Virginia.	West Virginia.	Wisconsin.	All other states.[1]	
93	27	29	34	179	51	5	73	27	7	6	47	16	1
13	3	3	7	39	5	.....	31	3	.....	.....	3	2	2
13	3	7	7	44	6	1	20	6	.....	1	.....	4	3
67	21	19	20	96	40	4	22	18	7	5	44	10	4
$26,692,922	$4,505,741	$8,163,081	$3,670,717	$37,349,390	$7,872,913	$2,161,186	$16,424,107	$4,853,806	$2,281,903	$926,463	$16,580,140	$2,603,917	5
$3,572,658	$350,219	$830,300	$419,716	$6,389,909	$919,935	$188,162	$925,950	$1,162,959	$79,450	$260,850	$2,157,253	$295,443	6
$5,805,874	$973,918	$1,435,360	$776,201	$7,880,814	$1,585,571	$394,040	$2,752,790	$997,646	$505,180	$196,738	$4,143,680	$548,521	7
$7,156,007	$1,660,725	$2,974,608	$1,442,276	$12,239,407	$2,661,501	$1,035,550	$7,289,030	$1,378,484	$1,216,506	$302,245	$6,773,753	$1,287,776	8
$10,158,383	$1,520,879	$2,922,813	$1,032,524	$10,839,260	$2,705,906	$543,434	$5,456,337	$1,314,717	$480,767	$167,130	$3,505,454	$472,177	9
35	9	20	25	129	19	3	74	16	.....	2	3	11	10
510	107	113	93	604	196	28	281	88	34	22	199	53	11
$861,152	$142,812	$173,060	$162,738	$855,762	$277,984	$101,417	$385,478	$129,498	$58,250	$25,540	$307,927	$63,443	12
80	29	14	29	139	43	8	37	22	10	9	55	14	13
$273,675	$57,583	$43,326	$85,600	$297,212	$127,660	$82,307	$115,733	$35,368	$31,750	$14,000	$118,560	$20,850	14
430	78	99	64	465	153	20	244	66	24	13	144	39	15
$587,477	$85,229	$129,734	$77,138	$561,450	$150,324	$19,110	$269,745	$94,130	$26,500	$11,540	$189,367	$42,593	16
380	69	86	57	429	118	18	221	51	24	13	128	36	17
$561,288	$81,225	$124,202	$73,518	$545,751	$132,038	$18,620	$257,445	$86,908	$26,500	$11,540	$180,864	$41,213	18
50	9	13	7	36	35	2	23	15	.....	.....	16	3	19
$26,189	$4,004	$5,532	$3,620	$15,699	$18,286	$490	$12,300	$7,222	.....	.....	$9,003	$1,380	20
10,720	2,309	2,755	1,321	10,752	3,679	861	5,526	1,467	460	314	5,019	853	21
8,057	1,837	2,123	1,124	8,190	3,160	631	4,309	1,107	386	257	3,939	603	22
9,061	2,014	2,391	1,190	9,268	3,184	716	4,840	1,216	302	281	4,240	660	23
$3,938,400	$700,826	$1,036,856	$553,463	$4,099,771	$1,118,040	$282,896	$1,989,128	$571,018	$102,993	$98,329	$1,649,010	$251,190	24
5,626	1,534	2,223	1,030	8,811	2,542	708	4,033	1,129	242	263	3,437	612	25
$3,004,087	$608,722	$988,936	$517,783	$3,995,068	$971,232	$281,003	$1,809,391	$545,066	$92,145	$94,593	$1,480,633	$241,933	26
3,428	479	168	152	451	629	.....	756	86	60	18	775	34	27
$932,873	$91,823	$47,920	$34,084	$103,060	$143,630	.....	$170,721	$25,794	$10,848	$3,736	$159,998	$7,010	28
7	1	.....	8	6	13	8	51	1	.....	.....	28	14	29
$1,440	$281	.....	$1,596	$1,643	$3,178	$1,693	$9,016	$158	.....	.....	$8,379	$2,247	30
5,860	1,429	2,255	1,004	8,879	2,493	677	3,889	1,139	222	274	3,348	633	31
5,856	1,461	2,222	1,019	8,987	2,592	696	3,895	1,136	215	278	3,306	618	32
5,864	1,533	2,315	1,032	9,083	2,603	668	3,920	1,200	207	273	3,326	609	33
5,803	1,494	2,349	1,045	9,281	2,606	663	3,996	1,262	354	269	3,413	597	34
5,836	1,523	2,298	1,055	9,303	2,595	656	4,043	1,220	366	261	3,447	655	35
4,038	1,523	2,105	974	8,862	2,488	681	3,993	1,047	212	257	3,251	609	36
4,607	1,508	2,072	983	8,471	2,463	685	4,004	990	215	257	3,434	571	37
5,714	1,544	2,081	1,014	8,307	2,530	706	4,134	1,078	219	272	3,583	595	38
5,753	1,506	2,109	1,067	8,226	2,489	818	4,151	1,107	228	255	3,595	586	39
6,907	1,632	2,205	1,074	8,448	2,505	735	4,130	1,108	225	242	3,434	613	40
6,018	1,626	2,359	1,054	8,920	2,552	776	4,120	1,135	219	257	3,526	624	41
6,168	1,623	2,805	1,041	8,967	2,638	734	4,121	1,125	222	258	3,579	635	42
3,616	475	165	144	480	637	.....	755	87	62	18	749	39	43
3,586	465	163	140	481	695	.....	748	88	66	18	740	48	44
3,566	495	165	144	471	700	.....	751	88	63	18	750	54	45
3,588	479	161	143	487	684	.....	750	91	59	18	753	51	46
3,552	463	173	149	481	670	.....	750	86	57	18	766	49	47
2,190	463	172	146	423	504	.....	732	80	58	18	671	19	48
2,654	476	167	152	433	492	.....	764	84	57	18	812	19	49
3,552	474	168	152	426	619	.....	763	89	57	18	825	18	50
3,587	477	175	152	408	626	.....	757	84	57	18	810	18	51
3,652	488	172	167	428	634	.....	767	83	60	18	786	18	52
3,737	503	175	167	433	644	.....	766	88	60	18	799	31	53
3,850	493	164	169	461	640	.....	771	85	58	18	841	43	54
8	1	.....	8	6	11	5	54	1	.....	.....	26	14	55
8	1	.....	8	6	11	8	52	2	.....	.....	27	14	56
8	1	.....	8	6	11	12	50	4	.....	.....	26	14	57
8	1	.....	8	6	11	6	54	2	.....	.....	28	14	58
8	1	.....	8	6	13	10	52	2	.....	.....	29	14	59
8	1	.....	8	6	13	11	51	.....	.....	.....	26	13	60
5	2	.....	8	6	13	7	48	.....	.....	.....	29	13	61
6	2	.....	8	6	15	5	51	.....	.....	.....	30	13	62
6	2	.....	8	6	14	10	47	.....	.....	.....	27	13	63
6	2	.....	8	6	14	12	49	.....	.....	.....	25	13	64
8	1	.....	8	6	13	5	51	.....	.....	.....	27	13	65
8	2	.....	8	6	13	10	49	.....	.....	.....	34	14	66
8	1	.....	8	6	13	.....	.....	.....	.....	.....	.....	.....	67
$1,693,505	$264,373	$589,955	$242,793	$2,398,994	$479,386	$147,417	$1,090,321	$265,569	$57,829	$44,193	$664,501	$111,789	68
$9,654	$3,420	$1,910	$16,606	$30,628	$5,508	$1,800	$22,010	$975	$400	.....	$27,671	$2,144	69
$262,835	$24,957	$50,995	$16,356	$181,954	$40,881	$5,927	$64,069	$26,306	$6,388	$3,612	$97,530	$9,414	70
$1,416,117	$209,030	$365,898	$190,139	$2,086,983	$432,997	$139,690	$973,712	$237,313	$51,041	$40,581	$532,415	$100,181	71
$4,899	$26,966	$121,152	$19,692	$99,429	.....	.....	$30,530	$975	.....	.....	$6,975	.....	

[1] Includes establishments distributed as follows: California, 2; Colorado, 2; Georgia, 2; Kansas, 2; Minnesota, 2; North Dakota, 1; South Carolina, 1; Texas, 2; Washington, 2.

TABLE 7.—PAPER AND PULP,

		United States.	Connecticut.	Delaware.	Illinois.	Indiana.	Iowa.	Maine.	Maryland.
	Materials used:								
72	Total cost	$70,530,236	$1,982,080	$1,028,274	$798,370	$2,470,623	$106,615	$7,118,945	$1,730,910
	Wood—								
	Domestic spruce for ground wood—								
73	Cords	598,229	.....	.....	.....	6,300	.....	110,813	.....
74	Cost	$2,855,872	.....	.....	.....	$49,897	.....	$577,183	.....
	Domestic spruce for sulphite and soda fiber—								
75	Cords	561,889	.....	.....	.....	.....	.....	154,546	23,229
76	Cost	$2,731,070	.....	.....	.....	.....	.....	$747,982	$147,615
	Canadian spruce for ground wood—								
77	Cords	120,820	.....	.....	.....	9,000	.....	16,338	.....
78	Cost	$868,187	.....	.....	.....	$68,500	.....	$136,064	.....
	Canadian spruce for sulphite and soda fiber—								
79	Cords	228,264	.....	.....	.....	1,473	.....	4,250	.....
80	Cost	$1,404,308	.....	.....	.....	$4,419	.....	$34,012	.....
	Domestic poplar wood for soda fiber—								
81	Cords	236,820	.....	21,320	.....	20,301	.....	49,317	4,616
82	Cost	$1,103,132	.....	$131,467	.....	$79,707	.....	$199,377	$30,805
	Canadian poplar wood for soda fiber—								
83	Cords	20,139	.....	.....	.....	.....	.....	539	.....
84	Cost	$90,962	.....	.....	.....	.....	.....	$1,716	.....
	Other pulp wood for ground wood—								
85	Cords	67,791	.....	.....	864	4,157	.....	6,544	10,970
86	Cost	$293,304	.....	.....	$3,456	$17,913	.....	$21,757	$73,248
	Other pulp wood for sulphite and soda fiber—								
87	Cords	152,364	.....	.....	.....	.....	.....	.....	9,653
88	Cost	$490,681	.....	.....	.....	.....	.....	.....	$62,577
	Rags, including cotton and flax waste and sweepings—								
89	Tons	234,514	7,987	3,637	974	1,606	730	7,894	1,534
90	Cost	$6,595,427	$253,388	$85,636	$11,956	$46,523	$7,650	$241,359	$21,017
	Old or waste paper—								
91	Tons	356,193	45,446	2,105	12,681	25,925	1,274	1,010	3,939
92	Cost	$4,869,409	$558,024	$43,690	$136,176	$360,374	$9,258	$16,489	$51,881
	Manila stock, including jute bagging, rope, waste, threads, etc.—								
93	Tons	99,301	7,710	.....	900	5,580	.....	1,005	1,380
94	Cost	$2,437,256	$142,882	.....	$12,600	$108,973	.....	$16,797	$35,400
	Straw—								
95	Tons	367,305	.....	.....	75,350	119,414	12,350	.....	6,893
96	Cost	$1,395,659	.....	.....	$292,046	$470,464	$46,704	.....	$22,381
	Fiber—								
	Ground wood pulp purchased—								
97	Tons	261,962	2,403	222	1,500	7,530	.....	48,740	1,820
98	Cost	$4,361,211	$41,677	$4,999	$45,000	$157,308	.....	$599,129	$88,234
	Soda wood fiber purchased—								
99	Tons	94,042	920	7,380	.....	1,153	.....	8,718	150
100	Cost	$3,430,809	$42,521	$364,963	.....	$52,083	.....	$369,079	$9,000
	Sulphite wood fiber purchased—								
101	Tons	273,194	5,049	2,697	187	5,258	48	36,541	16,467
102	Cost	$10,112,189	$220,392	$117,236	$7,007	$188,040	$1,440	$1,061,125	$684,444
	Other chemical fiber purchased—								
103	Tons	14,808	57	.....	.....	.....	.....	.....	.....
104	Cost	$465,255	$3,208	.....	.....	.....	.....	.....	.....
105	Chemicals	$6,140,078	$114,059	$112,261	$42,013	$196,105	$7,432	$688,488	$193,851
106	Clay	$1,493,469	$23,722	$36,422	$800	$11,922	.....	$163,803	$41,020
107	Colors	$705,355	$68,056	$8,135	$3,084	$14,617	$100	$30,057	$6,545
108	Sizing	$826,245	$20,734	$3,042	$1,189	$12,105	$5	$91,146	$6,083
109	All other stock	$817,075	$16,610	$904	$10,863	$34,252	.....	$76,716	$5,229
110	Fuel	$6,879,797	$194,793	$77,089	$130,004	$197,668	$17,587	$658,679	$128,151
111	Rent of power and heat	$611,906	$16,959	$1,500	$4,175	$11,160	.....	$74,922	$120
112	Mill supplies	$2,696,797	$94,501	$40,130	$40,915	$59,658	$3,960	$391,399	$36,838
113	All other materials	$4,420,507	$55,398	.....	$17,040	$161,298	$2,000	$540,526	$113,416
114	Freight	$2,433,676	$115,156	$800	$40,046	$167,687	$10,529	$381,140	$23,055
	Products:								
115	Total value	$127,326,162	$3,565,021	$1,599,718	$1,431,618	$4,170,497	$243,776	$13,223,275	$2,589,540
	News paper—								
	In rolls, for printing—								
116	Tons	454,572	.....	.....	.....	3,500	.....	112,995	410
117	Value	$15,754,992	.....	.....	.....	$175,000	.....	$3,756,600	$24,800
	In sheets, for printing—								
118	Tons	114,640	.....	.....	.....	2,900	.....	9,743	400
119	Value	$4,336,882	.....	.....	.....	$145,000	.....	$365,450	$24,948
	Book paper—								
	Book—								
120	Tons	282,093	2,427	11,931	.....	3,887	.....	30,041	14,878
121	Value	$19,466,804	$264,041	$903,422	.....	$253,868	.....	$2,660,211	$1,017,164
	Cover—								
122	Tons	18,749	3,620	500	.....	.....	.....	.....	.....
123	Value	$1,665,376	$405,247	$37,500	.....	.....	.....	.....	.....
	Plate, lithograph, map, woodcut, etc.—								
124	Tons	22,366	29	1,440	.....	106	.....	.....	.....
125	Value	$2 018,958	$6,960	$115,550	.....	$7,000	.....	.....	.....
	Cardboard, bristol board, card middles, tickets, etc.—								
126	Tons	28,494	1,773	550	.....	117	.....	.....	.....
127	Value	$1,719,813	$80,223	$41,250	.....	$10,000	.....	.....	.....
	Fine paper—								
	Writing paper—								
128	Tons	90,204	2,001	.....	.....	.....	.....	.....	.....
129	Value	$12,222,870	$323,672	.....	.....	.....	.....	.....	.....
	All other fine paper—								
130	Tons	22,503	297	.....	.....	.....	.....	.....	.....
131	Value	$3,673,104	$37,740	.....	.....	.....	.....	.....	.....

BY STATES: 1900—Continued.

Massachusetts.	Michigan.	New Hampshire.	New Jersey.	New York.	Ohio.	Oregon.	Pennsylvania.	Vermont.	Virginia.	West Virginia.	Wisconsin.	All other states.[1]	
$11,918,802	$2,707,827	$3,953,334	$1,715,312	$14,563,222	$3,768,672	$582,078	$6,374,315	$1,684,922	$410,640	$274,316	$6,712,749	$628,330	72
3,052	4,517	41,035	.....	225,327	5,000	100,292	2,779	24,089	.....	5,729	66,296	3,000	73
$15,912	$16,768	$242,055	.....	$1,200,593	$32,500	$72,170	$16,895	$130,179	.....	$30,496	$398,715	$12,509	74
18,194	7,884	68,006	.....	138,098	.....	55,239	13,918	7,427	2,917	11,286	58,659	2,536	75
$94,090	$30,947	$413,141	.....	$724,822	.....	$37,993	$68,609	$41,666	$17,906	$39,123	$350,224	$16,952	76
8,465	.....	4,089	.....	54,923	2,000	350	.....	18,770	.....	.....	6,885	.....	77
$73,360	.....	$24,756	.....	$372,162	$18,000	$1,800	.....	$122,850	.....	.....	$50,695	.....	78
5,309	13,035	83,050	.....	86,606	.....	.....	10,000	6,672	.....	.....	17,869	.....	79
$39,419	$70,521	$474,578	.....	$573,210	.....	.....	$50,000	$44,363	.....	.....	$113,786	.....	80
3,050	4,718	.....	.....	32,114	10,000	.....	81,504	.....	8,513	.....	1,367	.....	81
$17,941	$30,300	.....	.....	$180,925	$34,000	.....	$347,626	.....	$38,596	.....	$12,388	.....	82
.....	.....	.....	.....	9,628	2,000	.....	7,966	.....	.....	.....	.....	.....	83
.....	.....	.....	.....	$56,600	$8,000	.....	$24,646	.....	.....	.....	.....	.....	84
900	283	720	.....	9,466	.....	4,250	6,926	2,262	3,200	1,519	10,603	5,127	85
$4,335	$740	$3,430	.....	$40,210	.....	$14,730	$33,519	$11,028	$7,200	$4,239	$35,029	$22,470	86
100	3,913	.....	.....	.....	12,000	6,000	58,757	.....	.....	.....	49,375	12,566	87
$600	$12,038	.....	.....	.....	$12,000	$25,000	$170,155	.....	.....	.....	$175,214	$33,097	88
86,715	4,902	2,700	7,620	17,899	19,416	700	34,969	2,363	1,433	.....	29,049	2,386	89
$3,306,599	$137,772	$61,573	$159,786	$420,870	$374,643	$10,500	$626,705	$43,978	$39,981	.....	$717,409	$28,082	90
42,866	32,836	6,327	37,244	51,691	26,087	1,350	46,697	1,438	3,436	1,829	7,725	4,287	91
$815,272	$700,270	$121,466	$428,531	$564,463	$309,884	$15,350	$465,872	$19,278	$35,565	$14,900	$165,777	$36,889	92
10,955	527	2,947	13,947	23,673	14,994	700	7,851	1,458	65	1,900	3,339	370	93
$236,238	$7,160	$64,684	$337,870	$646,776	$395,370	$12,200	$270,466	$28,848	$700	$56,200	$58,892	$5,200	94
26	13,193	.....	.....	17,624	93,127	3,500	3,606	100	.....	2,700	6,307	13,115	95
$197	$49,242	.....	.....	$130,695	$274,447	$14,000	$24,099	$2,000	.....	$15,900	$21,107	$32,377	96
21,038	4,054	21,266	253	93,749	5,186	.....	5,340	10,579	2,160	.....	36,089	33	97
$400,299	$81,267	$338,316	$6,145	$1,485,176	$98,899	.....	$116,993	$171,628	$69,000	.....	$708,130	$1,011	98
25,493	7,547	2,396	2	20,447	4,563	.....	9,513	373	497	.....	4,890	.....	99
$1,069,036	$314,947	$95,946	$84	$378,745	$211,015	.....	$284,449	$14,863	$20,057	.....	$204,021	.....	100
36,912	14,476	12,123	1,490	66,769	12,647	17	15,450	12,790	500	.....	32,252	1,521	101
$1,709,804	$335,682	$418,680	$53,721	$2,519,066	$410,693	$595	$527,624	$440,708	$22,390	.....	$1,328,710	$64,832	102
1,861	20	21	.....	8,554	4,295	.....	.....	.....	.....	.....	.....	.....	103
$99,566	$1,052	$372	.....	$212,027	$149,030	.....	.....	.....	.....	.....	.....	.....	104
$730,424	$195,947	$459,303	$124,413	$1,021,512	$363,509	$87,571	$876,966	$79,737	$70,666	$35,270	$633,944	$107,207	105
$340,267	$73,533	$52,902	$9,675	$296,241	$50,006	$11,770	$183,073	$23,363	$9,009	.....	$150,656	$15,285	106
$152,301	$23,210	$24,000	$8,702	$119,124	$56,254	$6,114	$85,956	$28,924	$5,123	$225	$54,745	$10,078	107
$348,650	$14,411	$11,421	$4,472	$94,993	$38,207	$1,730	$84,700	$10,431	$1,316	.....	$74,941	$6,669	108
$90,556	$10,017	$36,759	$77,560	$114,827	$82,900	$3,701	$147,779	$23,219	.....	.....	$59,163	$26,020	109
$1,035,131	$265,278	$490,765	$206,454	$1,349,880	$452,540	$99,387	$624,350	$163,989	$40,512	$29,035	$594,214	$124,396	110
$219,080	$1,042	$10,800	$5,030	$89,122	$32,755	$31,600	$3,016	$43,275	$8,300	.....	$51,539	$12,511	111
$314,058	$119,362	$154,014	$45,618	$623,662	$128,563	$53,124	$137,876	$103,766	$11,279	$7,818	$310,798	$24,458	112
$570,636	$96,947	$407,167	$195,069	$891,321	$107,378	$76,000	$641,655	$90,390	$15,999	$14,300	$391,577	$32,390	113
$235,081	$119,379	$47,206	$52,182	$396,250	$134,979	$6,743	$561,286	$46,439	$2,036	$26,810	$51,075	$15,897	114
$22,141,461	$4,217,869	$7,244,733	$3,195,802	$26,715,628	$6,543,513	$1,305,696	$12,267,900	$3,384,773	$850,386	$527,527	$10,895,576	$1,212,353	115
22,194	.....	45,643	.....	162,153	4,239	18,620	243	22,085	.....	.....	58,850	3,040	116
$840,705	.....	$1,606,955	.....	$5,405,452	$218,159	$744,806	$12,128	$822,685	.....	.....	$2,020,102	$127,600	117
.....	150	12,235	.....	42,804	3,278	2,796	788	3,481	1,320	.....	31,225	3,520	118
.....	$10,200	$471,649	.....	$1,473,561	$136,397	$111,840	$39,415	$108,133	$72,600	.....	$1,233,289	$144,400	119
39,551	44,433	9,137	3,650	27,611	13,861	.....	52,366	.....	.....	.....	25,206	3,119	120
$3,120,867	$2,048,178	$618.145	$249,640	$1,706,565	$942,642	.....	$3,849,919	.....	.....	.....	$1,615,549	$216,593	121
4,035	2,964	.....	.....	3,649	2,474	.....	1,414	.....	.....	.....	93	.....	122
$367,001	$221,084	.....	.....	$306,509	$186,624	.....	$136,297	.....	.....	.....	$5,114	.....	123
11,879	809	.....	.....	200	247	.....	7,356	.....	.....	.....	300	.....	124
$1,007,466	$81,528	.....	.....	$16,000	$16,749	.....	$743,705	.....	.....	.....	$24,000	.....	125
13,564	.....	1,933	.....	4,382	160	.....	727	4,481	799	.....	58	.....	126
$1,006,454	.....	$105,908	.....	$184,315	$12,680	.....	$36,778	$181,671	$51,223	.....	$9,311	.....	127
54,791	1,592	.....	60	519	3,315	.....	16,824	.....	720	50	10,332	.....	128
$8,751,556	$161,427	.....	$6,000	$70,115	$444,479	.....	$1,379,594	.....	$55,506	$6,000	$1,024,521	.....	129
13,264	.....	.....	.....	706	780	.....	3,120	.....	.....	.....	3,659	677	130
$2,547,072	.....	.....	.....	$66,844	$133,693	.....	$369,917	.....	.....	.....	$464,678	$53,160	131

[1] Includes establishments distributed as follows: California, 2; Colorado, 2; Georgia, 2; Kansas, 2; Minnesota, 2; North Dakota, 1; South Carolina, 1; Texas, 2; Washington, 2.

TABLE 7.—PAPER AND PULP,

		United States.	Connecticut.	Delaware.	Illinois.	Indiana.	Iowa.	Maine.	Maryland.
	Products—Continued:								
	Wrapping paper—								
	Manila (rope, jute, tag, etc.)—								
132	Tons	89,419	2,790	.....	.....	5,010	.....	.....	.....
133	Value	$5,929,764	$135,322	.....	.....	$264,429	.....	.....	.....
	Heavy wrapping (mill wrappers, etc.)—								
134	Tons	82,875	3,064	.....	.....	3,158	.....	953	69
135	Value	$4,143,240	$134,568	.....	.....	$88,950	.....	$27,830	$2,260
	Straw—								
136	Tons	91,794	.....	.....	29,993	8,621	4,790	.....	850
137	Value	$2,027,518	.....	.....	$440,261	$178,429	$160,776	.....	$25,789
	Bogus or wood manila, all grades—								
138	Tons	203,826	1,832	.....	.....	5,563	.....	31,849	4,856
139	Value	$9,148,677	$81,426	.....	.....	$225,082	.....	$1,608,605	$283,006
	All other wrapping—								
140	Tons	67,338	6,533	.....	2,987	658	200	6,857	2,270
141	Value	$3,293,174	$392,431	.....	$104,314	$29,700	$6,000	$455,863	$111,579
	Boards—								
	Binders and trunk—								
142	Tons	27,774	6,260	.....	.....	2,720	.....	.....	350
143	Value	$858,745	$176,650	.....	.....	$87,600	.....	.....	$12,750
	Leather—								
144	Tons	11,351	2,727	.....	.....	54	.....	1,540	.....
145	Value	$677,807	$110,717	.....	.....	$5,400	.....	$138,322	.....
	Press and album—								
146	Tons	3,745	1,886	.....	.....	.....	.....	.....	.....
147	Value	$325,017	$211,508	.....	.....	.....	.....	.....	.....
	Wood pulp—								
148	Tons	44,187	.....	.....	900	8,137	.....	11,802	.....
149	Value	$1,406,180	.....	.....	$38,250	$212,600	.....	$336,335	.....
	Strawboard—								
150	Tons	157,534	4,284	.....	20,100	70,081	.....	.....	4,822
151	Value	$3,187,342	$107,545	.....	$382,459	$1,350,636	.....	.....	$93,969
	News—								
152	Tons	32,119	4,520	.....	.....	2,102	.....	1,851	.....
153	Value	$930,531	$135,007	.....	.....	$44,600	.....	$40,530	.....
	All other boards—								
154	Tons	88,907	11,135	.....	16,428	10,681	.....	150	.....
155	Value	$2,967,747	$417,072	.....	$393,872	$341,045	.....	$4,900	.....
	Other paper products—								
	Tissue—								
156	Tons	28,406	1,740	.....	.....	325	.....	.....	.....
157	Value	$3,486,652	$283,378	.....	.....	$31,065	.....	.....	.....
	Blotting—								
158	Tons	4,351	635	.....	.....	.....	.....	.....	.....
159	Value	$580,750	$99,969	.....	.....	.....	.....	.....	.....
	Building, roofing, asbestos, and sheathing—								
160	Tons	96,915	1,789	700	.....	.....	2,500	.....	456
161	Value	$3,025,967	$41,147	$13,200	.....	.....	$50,000	.....	$13,308
	Carpet lining—								
162	Tons	16,622	2	.....	3,650	58	1,350	.....	.....
163	Value	$448,230	$52	.....	$72,962	$4,662	$27,000	.....	.....
	Hanging—								
164	Tons	54,330	113	.....	.....	.....	.....	.....	4,124
165	Value	$2,265,345	$11,208	.....	.....	.....	.....	.....	$139,791
	Curtain—								
166	Tons	208	.....	.....	.....	.....	.....	.....	.....
167	Value	$11,495	.....	.....	.....	.....	.....	.....	.....
	Miscellaneous—								
168	Tons	32,271	400	365	.....	3,850	.....	.....	58
169	Value	$2,336,116	$37,713	$58,483	.....	$235,952	.....	.....	$4,746
	Ground wood pulp—								
	Made for own use—								
170	Tons	306,322	.....	.....	.....	6,493	.....	50,924	.....
	Made to sell as such—								
171	Tons	280,052	.....	.....	.....	8,925	.....	78,954	.....
172	Value	$4,433,699	.....	.....	.....	$75,870	.....	$1,168,887	.....
	Soda fiber—								
	Made for own use—								
173	Tons	78,100	.....	.....	.....	.....	.....	11,206	1,245
	Made to sell as such—								
174	Tons	99,014	.....	8,823	.....	12,614	.....	32,956	2,702
175	Value	$3,612,602	.....	$480,318	.....	$378,409	.....	$1,269,141	$139,896
	Sulphite fiber—								
	Made for own use—								
176	Tons	144,452	.....	.....	.....	.....	.....	30,436	.....
	Made to sell as such—								
177	Tons	271,585	.....	.....	.....	.....	.....	27,143	15,987
178	Value	$10,451,400	.....	.....	.....	.....	.....	$1,390,601	$670,584
179	All other products, value	$919,415	$71,425	.....	.....	$25,250	.....	.....	$25,000
	Comparison of products:								
180	Number of establishments reporting for both years	439	34	6	8	12	1	19	10
181	Value for census year	$78,472,483	$2,777,764	$1,599,718	$794,909	$1,848,848	$102,776	$7,589,224	$2,063,281
182	Value for preceding business year	$70,268,892	$2,518,983	$1,268,175	$578,468	$1,574,048	$85,745	$7,514,724	$1,753,150
	Machinery:								
	Paper machines—								
	Fourdrinier—								
183	Number	663	19	9	.....	10	.....	56	16
184	Total width, inches	56,436	1,440	683	.....	930	.....	5,100	1,408
	Cylinder—								
185	Number	569	51	2	23	38	6	22	12
186	Total width, inches	36,860	2,752	146	1,624	2,926	368	1,554	724
187	Wet, number	1,049	20	2	.....	19	1	160	9

BY STATES: 1900—Continued.

Massachusetts.	Michigan.	New Hampshire.	New Jersey.	New York.	Ohio.	Oregon.	Pennsylvania.	Vermont.	Virginia.	West Virginia.	Wisconsin.	All other states.[1]	
6,697	4,840	1,956	7,377	22,760	18,579	300	6,930	5,722	.....	600	5,698	260	132
$546,388	$238,311	$119,862	$711,312	$1,419,659	$1,368,700	$24,000	$585,224	$188,826	.....	$60,000	$257,381	$10,400	133
10,254	4,976	930	3	38,556	5,646	90	5,921	873	.....	800	6,493	1,089	134
$668,118	$200,506	$32,219	$195	$2,164,496	$175,473	$3,960	$265,034	$23,134	.....	$24,000	$301,600	$30,898	135
1,187	2,305	.....	8,329	14,650	10,619	2,184	1,805	.....	.....	.....	2,861	3,600	136
$9,500	$40,150	.....	$177,138	$543,084	$211,234	$75,000	$54,110	.....	.....	.....	$52,897	$59,200	137
2,256	4,663	13,963	3,000	74,724	7,610	4,500	11,457	13,700	.....	.....	17,981	5,872	138
$107,762	$215,423	$629,401	$90,000	$3,092,370	$324,038	$225,000	$557,003	$761,832	.....	.....	$690,929	$256,850	139
1,844	3,586	84	250	6,695	7,400	1,200	9,997	.....	762	125	13,956	1,934	140
$109,528	$117,360	$2,940	$37,000	$246,577	$223,754	$48,000	$563,115	.....	$15,250	$5,000	$746,048	$78,720	141
1,518	700	.....	3,571	1,770	4,539	.....	6,346	.....	.....	.....	.....	.....	142
$41,700	$24,000	.....	$165,565	$58,102	$139,102	.....	$158,276	.....	.....	.....	.....	.....	143
2,874	.....	2,049	63	1,000	.....	.....	.....	1,044	.....	.....	.....	.....	144
$190,794	.....	$116,283	$4,410	$51,000	.....	.....	.....	$60,881	.....	.....	.....	.....	145
580	.....	960	.....	160	.....	.....	209	.....	.....	.....	.....	.....	146
$46,692	.....	$48,000	.....	$4,840	.....	.....	$13,977	.....	.....	.....	.....	.....	147
2,846	5,350	.....	.....	12,133	.....	.....	300	2,719	.....	.....	.....	.....	148
$144,435	$134,500	.....	.....	$411,655	.....	.....	$6,000	$122,355	.....	.....	.....	.....	149
800	4,110	.....	.....	7,806	40,531	.....	200	.....	.....	8,500	.....	1,300	150
$18,808	$76,620	.....	.....	$257,967	$800,088	.....	$5,000	.....	.....	$73,500	.....	$20,800	151
.....	641	292	15,931	3,775	221	.....	1,050	.....	2,236	.....	.....	.....	152
.....	$19,230	$8,760	$485,205	$103,316	$6,148	.....	$32,000	.....	$55,735	.....	.....	.....	153
8,620	3,250	2,317	1,600	13,750	8,595	.....	12,381	.....	.....	.....	.....	.....	154
$511,682	$94,597	$68,141	$48,000	$486,705	$222,072	.....	$380,161	.....	.....	.....	.....	.....	155
2,479	40	3,973	4,480	8,415	639	.....	1,377	1,918	60	.....	2,960	.....	156
$416,440	$8,915	$339,120	$943,877	$768,945	$62,131	.....	$201,747	$180,303	$5,400	.....	$250,331	.....	157
788	13	.....	.....	.....	825	.....	103	180	1,807	.....	.....	.....	158
$111,627	$1,380	.....	.....	.....	$74,598	.....	$12,360	$29,410	$251,400	.....	.....	.....	159
14,372	1,337	.....	7,133	8,044	7,275	1,410	45,923	.....	.....	.....	2,608	3,368	160
$615,088	$34,439	.....	$236,400	$260,051	$213,603	$58,580	$1,313,436	.....	.....	.....	$86,846	$94,919	161
4,425	.....	.....	218	1,076	3,247	100	2,223	.....	.....	.....	.....	273	162
$141,499	.....	.....	$8,380	$32,053	$84,764	$4,000	$67,188	.....	.....	.....	.....	$5,670	163
2,264	.....	.....	.....	39,593	.....	.....	4,416	900	2,800	.....	120	.....	164
$143,080	.....	.....	.....	$1,562,465	.....	.....	$192,731	$82,808	$126,000	.....	$7,267	.....	165
.....	.....	.....	.....	.....	88	.....	.....	104	.....	.....	16	.....	166
.....	.....	.....	.....	.....	$5,855	.....	.....	$4,680	.....	.....	$960	.....	167
1,427	2,971	2,815	810	8,480	1,195	.....	4,110	1,262	113	.....	4,415	.....	168
$85,025	$148,272	$136,122	$25,000	$780,640	$139,647	.....	$380,522	$89,306	$18,000	.....	$246,688	.....	169
13,010	6,420	24,161	.....	122,686	4,950	200	3,405	18,764	.....	.....	48,909	6,400	170
100	256	7,577	.....	122,607	.....	954	1,100	29,389	.....	6,794	28,396	.....	171
$2,000	$5,284	$205,575	.....	$1,896,783	.....	$15,510	$12,100	$460,748	.....	$112,381	$478,561	.....	172
.....	.....	.....	.....	9,312	1,835	.....	49,994	.....	1,188	.....	.....	3,330	173
1,771	1,033	.....	.....	15,034	.....	.....	11,668	9,000	3,413	.....	.....	.....	174
$70,840	$62,004	.....	.....	$555,746	.....	.....	$470,214	$108,000	$128,039	.....	.....	.....	175
3,014	6,103	7,184	.....	48,338	2,650	.....	15,205	3,798	.....	.....	24,532	3,242	176
7,069	6,895	80,718	.....	76,658	4,370	.....	4,061	4,000	1,516	6,677	35,261	1,230	177
$353,832	$279,228	$2,711,278	.....	$2,779,922	$174,809	.....	$228,225	$160,000	$71,238	$186,646	$1,377,392	$67,650	178
$165,557	$233	$24,375	$7,180	$64,892	$226,124	.....	$201,724	.....	.....	$60,000	$2,162	$45,493	179
62	17	16	16	102	31	4	47	10	4	4	28	8	180
$17,638,506	$2,435,825	$4,305,865	$1,289,945	$11,854,849	$4,756,886	$1,233,956	$9,533,402	$716,996	$597,418	$372,527	$6,122,706	$842,582	181
$16,408,627	$2,199,375	$3,626,116	$1,064,858	$10,699,175	$4,256,257	$1,115,119	$8,021,106	$618,191	$557,357	$342,688	$5,313,886	$753,344	182
152	23	31	10	139	33	6	59	16	8	.....	68	8	183
11,932	2,082	2,594	806	12,485	2,582	580	4,750	1,344	761	.....	6,289	670	184
50	23	16	42	127	48	2	63	18	4	5	7	10	185
3,084	1,382	967	2,953	8,224	3,390	144	3,934	1,016	312	292	504	564	186
34	20	89	8	396	26	17	52	69	4	15	97	11	187

[1] Includes establishments distributed as follows: California, 2; Colorado, 2; Georgia, 2; Kansas, 2; Minnesota, 2; North Dakota, 1; South Carolina, 1; Texas, 2; Washington, 2.

TABLE 7.—PAPER AND PULP,

		United States.	Connecticut.	Delaware.	Illinois.	Indiana.	Iowa.	Maine.	Maryland.
	Machinery—Continued:								
	Beaters—								
	Beating engines—								
188	Number	3,739	168	28	89	216	16	225	90
189	Capacity, pounds	3,343,966	144,800	28,200	62,111	227,650	9,400	217,750	70,525
	Washing engines—								
190	Number	900	38	16	10	22	.....	82	16
191	Capacity, pounds	893,300	35,100	17,700	16,000	23,600	.....	17,200	14,050
192	Jordan or refining engines, number	1,167	59	10	27	64	5	80	25
	For mills making their own soda or sulphite—								
	Digestors—								
193	Number	426	.....	10	.....	7	.....	83	19
194	Total capacity, tons	3,813	.....	8	.....	45	.....	416	536
	Boilers used for digestors—								
195	Number	307	.....	5	5	20	.....	45	11
196	Horsepower	45,510	.....	445	300	1,700	.....	7,325	1,250
197	Cooks per week, number	4,926	.....	222	48	126	.....	914	75
	For mills making ground wood pulp—								
198	Grinders, number	1,168	.....	.....	.....	37	.....	178	.....
	Yearly capacity of mills:								
199	In paper, tons	2,782,219	75,663	19,050	148,950	175,309	9,700	246,583	43,921
200	In pulp, tons	1,536,431	1,200	10,000	.....	28,420	.....	339,649	23,600
	Power:								
201	Number of establishments reporting	763	49	6	15	39	4	35	21
202	Total horsepower	764,847	14,641	4,018	9,551	28,809	1,225	92,720	8,513
	Owned—								
	Engines—								
	Steam—								
203	Number	2,016	95	31	41	135	11	135	57
204	Horsepower	255,854	6,656	3,360	5,461	21,285	1,110	15,620	7,633
	Gas or gasoline—								
205	Number	13	.....	.....	.....	2	.....	7	.....
206	Horsepower	1,062	.....	.....	.....	157	.....	846	.....
	Water wheels—								
207	Number	3,209	103	8	30	28	2	402	21
208	Horsepower	504,762	7,965	650	4,090	2,355	100	75,839	870
	Electric motors—								
209	Number	91	2	1	.....	1	1	10	2
210	Horsepower	2,729	20	8	.....	12	15	390	10
	Other power—								
211	Number	5	.....	.....	.....	.....	.....	.....	.....
212	Horsepower	180	.....	.....	.....	.....	.....	.....	.....
	Rented—								
213	Horsepower	3,400	.....	.....	.....	.....	.....	1,410	25
214	Furnished to other establishments, horsepower	260	.....	.....	.....	.....	.....	25	.....
	Establishments classified by number of persons employed, not including proprietors and firm members:								
215	Total number of establishments	763	49	6	15	39	4	35	21
216	No employees	1	.....	.....	.....	.....	.....	.....	.....
217	Under 5	21	2	.....	.....	.....	.....	.....	4
218	5 to 20	179	19	2	.....	5	1	3	5
219	21 to 50	230	18	.....	9	16	1	4	6
220	51 to 100	149	7	1	5	12	1	5	2
221	101 to 250	138	3	3	1	6	1	19	2
222	251 to 500	36	.....	.....	.....	.....	.....	2	2
223	501 to 1,000	9	.....	.....	.....	.....	.....	2	.....

BY STATES: 1900—Continued.

Massachusetts.	Michigan.	New Hampshire.	New Jersey.	New York.	Ohio.	Oregon.	Pennsylvania.	Vermont.	Virginia.	West Virginia.	Wisconsin.	All other states.[1]	
630	91	143	150	737	328	21	367	92	32	14	246	56	188
635,550	74,325	99,375	123,875	610,480	296,900	13,425	345,450	71,200	36,200	8,800	212,500	55,450	189
294	55	24	30	114	57	.....	75	15	7	.....	90	5	190
319,800	52,600	20,550	26,150	115,800	53,400	.....	75,150	16,800	6,200	.....	78,100	5,100	191
174	49	43	44	255	82	8	101	25	13	4	82	17	192
21	18	18	2	82	13	4	76	6	9	4	43	11	193
34	166	231	14	471	59	15	383	15	887	158	350	25	194
17	10	19	.....	49	18	6	37	4	3	2	45	11	195
1,975	1,125	6,400	.....	7,465	2,725	580	5,990	600	850	300	5,335	1,145	196
201	39	248	.....	1,000	125	72	977	80	107	45	491	156	197
42	26	77	.....	449	7	39	20	92	2	10	174	15	198
283,576	111,669	106,518	85,392	611,179	212,639	34,784	237,434	96,816	20,900	5,370	222,046	35,220	199
31,920	20,558	126,919	4,377	495,668	29,436	26,300	94,525	68,372	28,800	16,500	183,395	15,852	200
93	27	29	34	179	51	5	73	27	7	6	47	16	201
82,893	22,925	48,740	12,978	228,478	28,567	12,190	42,209	34,532	6,355	4,785	77,011	8,707	202
331	65	60	83	301	188	12	293	31	31	14	70	32	203
37,245	11,329	10,200	9,655	36,630	24,795	1,438	35,851	2,455	4,445	1,465	15,589	3,632	204
.....	.....	.....	.....	.....	2	.....	1	.....	.....	.....	.....	1	205
.....	.....	.....	.....	.....	24	.....	15	.....	.....	.....	.....	20	206
334	92	204	43	1,021	49	38	83	166	11	17	498	59	207
44,935	11,527	38,200	3,323	191,117	3,698	10,662	5,983	32,071	1,900	3,320	61,287	4,870	208
19	5	4	.....	13	4	4	18	2	1	.....	4	.....	209
693	69	150	.....	711	50	90	360	6	10	.....	135	.....	210
.....	.....	4	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	211
.....	.....	160	.....	20	.....	.....	.....	.....	.....	.....	.....	.....	212
775	.....	20	.....	900	100	.....	50	25	.....	75	20	.....	213
20	.....	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	214
93	27	29	34	179	51	5	73	27	7	6	47	16	215
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	216
1	.....	.....	1	6	.....	.....	7	.....	.....	.....	.....	.....	217
15	6	9	8	63	3	1	23	9	.....	1	3	3	218
19	8	10	17	55	22	1	19	9	2	2	7	5	219
17	4	4	4	29	19	.....	7	5	3	2	16	6	220
30	8	3	4	17	4	2	9	3	2	1	18	2	221
11	1	3	.....	5	2	.....	6	1	.....	.....	3	.....	222
.....	.....	.....	.....	4	1	1	1	.....	.....	.....	.....	.....	223

[1] Includes establishments distributed as follows: California, 2; Colorado, 2; Georgia, 2; Kansas, 2; Minnesota, 2; North Dakota, 1; South Carolina, 1; Texas, 2; Washington, 2.

PRINTING AND PUBLISHING.

PRINTING AND PUBLISHING.

By WILLIAM S. ROSSITER, *Expert Special Agent.*

The separation of the statistics of printing and publishing into "newspapers and periodicals" and "book and job printing" is necessarily so difficult that a complete division has not been attempted in the tables and discussion which appear in this report.

In this industry the practice of the large cities differs sharply from that of the smaller communities. In the former, book and miscellaneous printing and the printing and publishing of newspapers and periodicals are separated into two distinct industries. While it is true that type and printing presses are employed in both, the plant of a large city newspaper is adapted solely to its own routine requirements, would be practically useless in a job office, and seldom contains enough job material even to produce its own stationery. In the large communities newspaper proprietors have secured their experience in their own profession, and frequently are unfamiliar with job printing. The city job printer, on the other hand, considers his calling a distinct one, knows little of the mechanical requirements of the daily paper, and does not regard newspapers as competitors in the remotest sense. These are the extremes. Between them are the small publications and the numerous trade periodicals, which seldom own their own plants. Publications of this description patronize job printers to avoid the installation of individual plants, but in any division of the products of the industry they should, of course, be classed with newspapers.

In villages, towns, and cities of less than 20,000 inhabitants, with few exceptions, the newspaper office is the job office, and the accounts of the two ventures are so interwoven that satisfactory separation is impossible. The newspaper is merely one item of the total product, but generally gives the establishment its name, directs its policy, and often determines the success or failure of the office.

At the Tenth Census newspapers and periodicals were treated in an able and exhaustive report by Mr. S. N. D. North. The job office, however, received no attention, except in the most general way, at either the Tenth or the Eleventh Census. In 1900 the job offices in the large cities were so numerous, represented so great an investment, used such a diversity of materials, and turned out products of so great value, that more than passing reference to this branch of the industry is clearly due.

This report is divided into two parts: Part I, tables and analysis; Part II, progress in the printing and publishing industry. In Part I are presented 55 tables, preceded by a summary. Of these tables, 4 relate to the general subject of printing and publishing, 50 to newspapers and periodicals, and 1 to book and job printing. Of these tables the more important are so constructed as to be comparable with the tables presenting the statistics of this industry at the Eleventh Census. The remaining tables are merely comparisons derived from the 19 main tables, and with a few exceptions contain no original figures.

In Part II is presented a detailed description, also preceded by a summary, of the principal mechanical improvements, and of the changes in news gathering, which have marked this industry since 1890, and in some cases since 1880.

I. TABLES AND ANALYSIS.

The more important conclusions, which seem justified from careful consideration of the tables appearing in this report, may be thus summed up:

When the two branches of the industry are separated—as far as separation of products so closely related is possible—the total value of all book and job printing products is about equal to the total value of all distinctive newspaper products; the former, including the printing and publishing of music, being $168,930,707, or 48.7 per cent of the total, and the latter $175,789,610, or 50.7 per cent of the total.

The capital invested in both branches of this industry showed a marked increase, while the value of products per establishment declined. The number of establishments in the newspaper and periodical branch, proportionately 83 to every 100 publications in 1890, remained nearly stationary in 1900, being 84 to every 100 publications.

Of all newspaper and periodical establishments 63.3 per cent were owned by individuals, 19.7 per cent in partnership, and only 17.0 per cent by corporations, indicating that combinations of any consequence are unlikely in this industry.

The total number of wage-earners increased only 10

per cent, but the value of products earned by them increased 24 per cent. There was a much greater relative increase among women than men, suggesting that competition may have led to a search for a less expensive form of labor.

Of the total value of products, advertising formed 43 per cent, subscriptions and sales 35.8 per cent, and book and job printing, including miscellaneous products, 21.2 per cent. The proportion of subscriptions and sales steadily declined from 1880, while the proportion which advertising formed steadily increased until it was over half. This suggests that publications depend more and more upon advertising as their principal source of income.

In 1890 the increase in the number of all publications was greater than the increase in population, but in 1900 the increase in number of publications and in population was about the same. It appears, however, that the per cent of increase in the number of daily newspapers and the per cent of increase in urban population remained about the same for two decades, suggesting a certain degree of relationship between these figures.

During the decade there was an increase in the proportion of daily, triweekly, semiweekly, and monthly publications, indicating that the first three mentioned have attracted support from the weekly, and that the monthly has drawn away support from the quarterly.

There was a marked decline in the proportion of publications devoted to special topics, and an advance only in the classes devoted to news topics and to general reading. The total circulation per issue of dailies was enough to supply one for every five inhabitants. The total circulation per issue of weeklies and monthlies was one to two inhabitants.

Publications printed in English formed 94.3 per cent of all publications reporting for 1900, showing a considerable increase over the corresponding figures for the preceding decade. The figures for publications printed in foreign languages indicate a rather close connection with the movement of immigration. The publications printed in foreign languages appear to depend to a large extent upon recent arrivals speaking the language in which the publication is printed. The increase or decrease is, in general, in proportion with the increase or decrease in immigration. The decrease in the proportion of all publications printed in foreign languages may be compared with the facts brought out in Volume II, Twelfth Census, page cxxv, that in 1900 12.2 per cent, and in 1890 15.6 per cent of the foreign born white population at least 10 years of age were unable to speak English, suggests that the immigrants reaching the United States during the past decade have been more ignorant and less interested in the perusal of publications than those who preceded.

One and one-quarter billion pounds of paper were used during the census year. Of this amount 77.6 per cent was consumed for newspapers, 16.4 per cent for books and periodicals, and 6 per cent for job printing, but the proportionate cost was 58.7 per cent, 24.7 per cent, and 16.6 per cent, respectively.

Daily evening newspapers increased more rapidly than daily morning papers. In 1890 there were two evening papers to every morning paper; in 1900 the proportion was about one to three.

The circulation per issue of daily papers in certain large cities, compared with the population, indicates that the inhabitants of certain cities were tributary, in the matter of publication, to certain others. In the circulation of weeklies and monthlies, special publications issued in certain states had a marked effect upon the standing of the product of those states in this industry, as, for example, in Maine and Tennessee.

On analyzing the total circulation reported for each state, it is found that 10 leading states supplied four-fifths of the circulation per issue of all publications. This fact is shown to be true, to a greater or less degree, of all of the principal classes of publications, indicating the concentration of circulation in certain populous states.

However, the influence exerted by 10 states in circulation, is not maintained in number of establishments, capital, or value of products. During the last two decades the number of establishments increased more rapidly in states having a small number of establishments than in those having many. This also suggests, to some extent, concentration of establishments in the more populous states.

All but 16 states and territories showed an increase in the number of publications to each 1,000 inhabitants, but the per cent of increase in aggregate circulation per issue declined in 39 states.

The proportion of inhabitants to each weekly was far more uniform than the proportion to each daily, ranging in the former case from 2,016 for Nevada to 20,407 for Rhode Island; in the latter from 4,703 for Nevada to 191,474 for South Carolina.

Weekly publications were most numerous in proportion to inhabitants in the West and Northwest. New England ranked high in dailies but low in weeklies, suggesting that in that densely settled region the daily had to some extent supplanted the weekly. During the decade the number of inhabitants to each weekly publication increased in 26 out of 49 states, but in less than half of the states and territories did the increase in the number of weeklies keep pace with the increase in population.

The proportion of inhabitants to dailies decreased in 31 states and territories, showing a marked gain in the number of dailies in proportion to the population. All states bordering upon the Great Lakes, and 15 out of 21 seaboard states, showed an increase in the proportionate number of daily newspapers to the number of inhabitants. The states in which the daily lost

ground were, in general, those in the far Northwest, where the weekly made its principal gain.

Of all the minor geographic divisions, the Southern North Atlantic—New York, New Jersey, and Pennsylvania—show the most striking advance in the proportion of the total circulation reported. In circulation of daily newspapers all states and territories showed a decided increase. In circulation of weekly publications the Southern South Atlantic group showed a decrease, but all other groups of states and territories showed a moderate increase. In circulation of monthly publications a decrease was shown in the Southern South Atlantic and the Western South Central groups; elsewhere in the United States the increase was very large.

While circulation was centralized, both for the 10 states mentioned as possessing a preponderance of the circulation, and for geographic divisions, no such centralization existed in number of establishments. New England and the Southern North Atlantic states possessed but 21.6 per cent of all establishments, while all except 4 of the states bordering on the Atlantic and Pacific oceans and the Great Lakes showed a per cent of increase less than the average increase for the United States.

The distribution of capital by geographic divisions varied radically from that of the number of establishments. In 8 out of 11 minor geographic divisions the proportion of the total capital reported was less in 1900 than in 1890. The only marked advance was in the Southern North Atlantic group, and this advance was made at the expense of nearly all the others. This fact suggests that the centralization of the industry made most rapid progress in this group. It should be noted that in all divisions the increase was large. So great, however, was the increase in capital in the group mentioned, that it materially affected the per cent of increase for the United States; this was 52.4 per cent, but for the United States, exclusive of the Southern North Atlantic group, it was only 39.3 per cent.

The value of products, considered by minor geographic divisions, showed greater uniformity than the other items mentioned. All divisions showed advances in 1900 except the Southern North Atlantic group.

Table 1 presents the totals, at the census of 1900, for the three classes into which this industry is divided. As already explained, complete separation was impracticable. The value of products for newspapers and periodicals includes the value of a large amount of job printing—shown in Table 5 to be $44,859,226. If this amount be added to $124,071,481, the combined value of products reported for book and job printing and the printing and publishing of music in Table 1, the resulting amount, $168,930,707, or 48.7 per cent of the total value of the products of the industry, represents that share which properly may be claimed for book and job printing, as distinguished from newspapers and periodicals; for the latter the value of products amounted to $175,789,610, or 50.7 per cent of the total. The remaining six-tenths of 1 per cent is a miscellaneous item which can not be classified.

TABLE 1.—SUMMARY BY CLASSES OF PRINTING AND PUBLISHING, 1900.

CLASSES.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products.
			Number.	Salaries.	Average number.	Total wages.			
Total	22,312	$292,517,072	37,799	$36,090,719	162,992	$84,249,954	$55,897,529	$86,856,990	$347,055,050
Newspapers and periodicals	15,305	192,443,708	27,579	27,015,791	94,604	50,383,051	38,544,642	50,214,904	222,988,569
Book and job	6,920	97,759,398	9,906	8,830,413	67,610	33,541,701	16,690,190	36,191,712	121,799,096
Music	87	2,313,966	314	244,515	778	375,202	663,097	449,674	2,272,385

Classing the printing and publishing of music with book and job printing, the totals in Table 1 are divided between the two branches of the industry in the following proportions:

TABLE 2.—*Proportion in which the totals are divided between the two branches, 1900.*

	Newspapers and periodicals.	Book and job printing.
Number of establishments	68.6	31.4
Capital	65.8	34.2
Salaried officials, clerks, etc	73.0	27.0
Salaries	74.9	25.1
Wage-earners	58.0	42.0
Wages	59.7	40.3
Miscellaneous expenses	69.0	31.0
Cost of materials used	57.8	42.2
Value of products	64.3	35.7

It is here shown that newspapers and periodicals possessed a smaller proportion of capital than of number of establishments, indicating that the average capital per establishment was lower for that class than for book and job printing. Doubtless this is due to the fact, already explained, that book and job offices are generally located in the larger cities.

A comparison of the average capital, cost of materials, and value of products per establishment in the two main branches of the industry, not including the printing and publishing of music, is presented in Table 3.

TABLE 3.—*Comparison of the average capital, cost of materials, and value of products in the two main branches of the industry, 1900.*

	Newspapers and periodicals.	Book and job printing.
Capital	$12,574	$14,127
Cost of materials used	3,281	5,230
Value of products	14,569	17,601

From Table 1 it appears that 74.5 per cent of the value of all products of newspapers and periodicals was expended for wages, materials, and other items of expenditure, while the corresponding per cent for book and job printing was 78.2. In the newspaper and periodical class the cost of materials represented 22.5 per cent of the value of products, and in the book and job printing class 29.5 per cent, or about one-third greater. Were it possible to extricate from the statistics for the newspaper and periodical class the figures for book and job work produced in newspaper offices, it is probable the difference in these percentages would be still more significant. Newspapers and periodicals generally use inexpensive raw materials, while the materials required by the book and job printing office are varied and much more expensive.

If the ratio between cost of materials and value of products in the book and job printing class be applied to the value of book and job work produced in newspaper offices, it will appear that, of the total cost of materials shown in Table 5 for newspapers and periodicals, an expenditure of $36,891,714 was made for materials for newspapers and periodicals, and of $13,323,190 for those for book and job work produced in newspaper offices. According to these figures the cost of materials for newspapers and periodicals was 21 per cent of the value of newspaper products, and for book and job printing it was 29.7 per cent of the book and job products shown in Tables 1 and 5—indicating that the ratio of cost of materials to value of products was more than 40 per cent greater for book and job printing than for the printing and publishing of newspapers and periodicals.

Table 4 presents a comparative summary for the whole industry for 1890 and 1900. Comparison with the figures for the censuses of 1850 to 1880, although much to be desired, is impracticable. The figures for the earlier decades, and even some of those for 1880, are not comparable with those of the Eleventh and Twelfth censuses. The difficulty in separating the two parts of the industry, which already has been noted appears to have resulted in an underestimate of the number of establishments at one or more censuses. This, with other points of difference, renders the figures for 1850 to 1880, inclusive, practically valueless for purposes of comparison.

TABLE 4.—*Comparative summary of printing and publishing, 1890 and 1900, with per cent of increase.*

	1900	1890	Per cent of increase.
Number of establishments	22,312	16,566	34.7
Capital	$292,517,072	$195,387,445	49.7
Salaried officials, clerks, etc., number	37,799	[1]28,391	33.1
Salaries	$36,090,719	[1]$26,272,756	37.4
Wage-earners, average number	162,992	136,836	19.1
Total wages	$84,249,954	$78,810,319	6.9
Men, 16 years and over	125,964	110,484	14.1
Wages	$74,288,521	$71,310,415	4.2
Women, 16 years and over	28,765	19,026	51.2
Wages	$8,878,073	$6,604,046	34.4
Children, under 16 years	8,263	7,336	12.0
Wages	$1,083,360	$895,858	20.9
Miscellaneous expenses	$55,897,929	$46,971,768	19.0
Cost of materials used	$86,856,290	$68,758,915	26.1
Value of products	$347,055,050	$275,452,515	26.0

[1] Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table.

The figures for all the items appearing in Table 4 have become so great that a small per cent of increase now represents an absolute increase greater than that shown by a relatively high per cent in earlier decades. While the percentages of increase for the several items are very moderate, the absolute increases are gratifyingly large.

For the censuses from 1850 to 1880, inclusive, the statistics of capital were regarded, even at the time of enumeration, as difficult to secure and of uncertain value. Gen. F. A. Walker, Superintendent of the Ninth Census, expressed this opinion: "No man in business knows what he is worth; far less can he say what portion of his estate is to be treated as capital."[1] Prior to 1890 the inquiry concerning capital was a general one, different in form from that now employed.

NEWSPAPERS AND PERIODICALS.

A comparative summary of the figures relating to newspapers and periodicals, from 1880 to 1900, inclusive, is presented in Table 5.

To some extent this table also illustrates the difficulty of making satisfactory comparisons prior to 1890. Out of 23 items shown for 1890 and 1900, only 9 were reported in 1880, the number of establishments, capital, and certain other items being omitted.

TABLE 5.—*Comparative summary of newspapers and periodicals, 1880 to 1900, with per cent of increase for each decade.*

	DATE OF CENSUS.			PER CENT OF INCREASE.	
	1900	1890	1880	1890 to 1900	1880 to 1890
Number of establishments	15,305	12,362	[2]	23.8	.....
Capital	$192,448,708	$126,269,885	[3]$53,000,000	52.4	138.2
Salaried officials, clerks, etc., number	27,579	[3]20,120	[5]	37.1	.....
Salaries	$27,015,791	[4]$17,777,173	[5]	52.0	.....
Wage-earners, average number	94,604	85,975	71,615	10.0	20.1
Total wages	$50,333,051	$50,824,359	$28,559,336	[6]1.0	78.0
Men, 16 years and over	73,653	70,424	[5]	4.6	.....
Wages	$44,961,533	$46,960,047	[5]	[6]4.3	.....
Women, 16 years and over	14,815	9,587	[5]	54.5	.....
Wages	$4,628,221	$3,222,192	[5]	43.6	.....
Children, under 16 years	6,136	5,964	[5]	2.9	.....
Wages	$743,297	$642,120	[5]	15.8	.....
Miscellaneous expenses	$38,544,642	$35,727,039	[2]	7.9	.....
Materials used:					
Total cost	$50,214,904	$38,955,322	[2]	28.9	.....
Paper, pounds	1,233,142,248	522,876,161	189,145,048	123.0	192.3
Products:					
Total value	$222,983,569	$179,859,750	[2]	24.0	.....
Newspaper products	$175,789,610	$143,586,448	$89,009,074	22.4	61.3
Advertising	$95,861,127	$71,243,361	$39,136,306	34.6	82.0
Subscriptions and sales	$79,928,488	$72,343,087	$49,872,768	10.5	45.1
Book and job printing products	$44,859,226	$32,812,118	[2]	36.7	.....
All other products	$2,334,733	$3,461,189	[2]	[6]325	.....

[1] Tenth Census: The Newspaper and Periodical Press, by S. N. D. North, page 79.
[2] Not reported.
[3] Estimated.
[4] Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See Table 58.)
[5] Not reported separately.
[6] Decrease.

TABLE 5.—*Comparative summary of newspapers and periodicals, 1880 to 1900, with per cent of increase for each decade*—Continued.

	DATE OF CENSUS.			PER CENT OF INCREASE.	
	1900	1890	1880	1890 to 1900	1880 to 1890
Number of publications[1]	18,226	14,901	10,132	22.3	47.1
Aggregate circulation per issue[2]	114,299,334	69,138,934	31,779,686	65.3	117.6
Aggregate number of copies issued during the census year[3]	8,168,148,749	4,681,113,530	2,067,848,209	74.5	126.4

[1] Does not include certain publications which did not report operations as follows: In 1880, 1,182; in 1890, 2,715; in 1900, 3,046.
[2] "Aggregate circulation per issue" is the sum of the totals for the average circulation per issue reported by each establishment.
[3] Obtained for each class of publication by multiplying the aggregate circulation per issue by the number of issues during the year.

PUBLICATIONS NOT REPORTING.

In any discussion of the statistics of newspapers and periodicals, early reference should be made to the number of publications from which no report was received.

The numbers reporting and not reporting at the censuses of 1880, 1890, and 1900 were as follows:

TABLE 6.—*Publications reporting and not reporting, 1880 to 1900.*

YEAR.	NUMBER OF PUBLICATIONS.			Per cent those not reporting form of total.
	Total.	Reporting.	Not reporting.	
1900	21,272	18,226	3,046	14.3
1890	17,616	14,901	2,715	15.4
1880	11,314	10 132	1,182	10.4

The number of publications classed as not reporting was ascertained by reference to the standard newspaper directories. By this method of comparison it appears that at the Twelfth Census the number of publications not reporting amounted to 14.3 per cent of the total, a proportion slightly less than that for 1890. Of the 3,046 publications stated as not reporting, a considerable number undoubtedly had gone out of existence; many others were so small and unimportant that they were in no respect a factor in this enumeration; and still others were doubtless of a class not reported by the census. It is clear, therefore, that the number of unreported publications which, by reason of standing, capital, and value of products, were entitled to consideration, was so small that had the totals been obtained, they would have but slight influence upon the figures presented in this report. Therefore, the publications not reporting in 1900 will be regarded as a negligible quantity.

NUMBER OF ESTABLISHMENTS AND PUBLICATIONS.

As the census of 1880 did not record the number of establishments, the figures relating to this subject can be compared only for 1890 and 1900. The proportion of establishments to publications remained practically stationary during the decade, being 82.9 to every 100 publications in 1890, and 84 in 1900. In the absence of information concerning the number of establishments in 1880, it is interesting to observe that if the ratio for 1880 was the mean of those given above, the number of establishments in 1880 was approximately 8,450, but for obvious reasons no statistical value can be claimed for this figure.

By considering here the details presented in Table 58 concerning number of establishments, it appears that 9,686, or 63.3 per cent of the total number, were owned and operated by individuals; 3,016, or 19.7 per cent, were owned and operated by some form of partnership; and 2,603, or 17.0 per cent, were owned and operated by corporations (including 183 miscellaneous forms of ownership). These figures indicate the complete absence of the extended combinations and consolidations so frequently encountered in other industries.

Comparison of Tables 4 and 5 reveals the fact that the increase in the number of all establishments, 34.7 per cent, was more rapid than in the number in the newspaper and periodical class, which increased 23.8 per cent. This is due to the marked growth in the number of establishments in the book and job printing class, which increased 67.8 per cent.

It appears from Table 5 that the increase in the number of publications was less rapid from 1890 to 1900 than during the previous decade, and that the increase in the total number of copies of newspapers and periodicals issued during the census year, though very large, amounting to 74.5 per cent, was much less than that shown in 1890, which amounted to 126.4 per cent.

CAPITAL.

Analysis of the statistics of capital and products presented in Table 5, is given below:

TABLE 7.—*Average capital, average value of products, and per cent that value of products forms of capital, 1890 and 1900.*

YEAR.	Average capital.	Average value of products.	Per cent that value of products forms of capital.
1900	$12,574	$14,569	115.9
1890	10,214	14,549	142.4

In 1890 the average capital was $10,214, and in 1900 it was $12,574, an increase of 23.1 per cent. The average value of products, however, was almost stationary; therefore, the per cent of value of products to capital, which was 142.5 in 1890, fell to 115.9 in 1900. These figures are confirmatory of a change especially characteristic of the last decade, by which increasing capital is required to produce the same or even a smaller value of products.

Comparison of Tables 4 and 5 also shows that the increase in capital in newspaper and periodical estab-

lishments, 52.4 per cent, was more rapid than in all establishments, in which it was 49.8 per cent.

WAGE-EARNERS.

Table 5 shows that during the decade from 1890 to 1900 the total number of employees in the newspaper and periodical class increased 10 per cent. Table 8 shows the changes in the proportion of men, women, and children employed.

TABLE 8.—*Total number of wage-earners, and proportion of men, women, and children employed, 1890 and 1900.*

YEAR.	Total wage-earners.	PER CENT OF TOTAL.		
		Men.	Women.	Children.
1900	94,604	77.8	15.7	6.5
1890	85,975	81.9	11.2	6.9

The proportion of women to the total number increased from 11.2 to 15.7, a difference of 4.5 per cent. This gain was made practically at the expense of male wage-earners, the proportion of whom decreased from 81.9 to 77.9, a difference of 4.0 per cent. The proportion of children employed for wages remained practically stationary.

It has been explained in Volumes VII and VIII of the Twelfth Census Reports that for comparative purposes the figures for 1890 and 1900 relating to wage-earners and wages are less trustworthy than other items reported, because of changes in classification. In the reports mentioned these changes are explained in detail. Should the figures given in Table 5 be accepted as permitting an approximate comparison, it would appear that an increase of 10 per cent in wage-earners secured an increase of 24 per cent in value of products, and that the absolute increase in male wage-earners was but 3,229, while the absolute increase in female wage-earners was 5,228. Indeed, the latter figure would have been even larger had the age classification remained the same in 1900 as in 1890.

VALUE OF PRODUCTS.

The total value of all products of newspaper and periodical establishments increased $43,123,819, or 24 per cent, between 1890 and 1900. Of the items composing the total value of products, by far the lowest increase, 10.5 per cent, was shown for "subscriptions and sales." This fact, taken in connection with the decided increase in the amount of paper used, illustrates one of the marked features of the development of the industry—the increase in the number of pages issued by almost all newspapers and magazines. The causes of this increase in the size of publications are discussed elsewhere in this report.

Of the total value of products given in Table 5, advertising forms 43 per cent, subscriptions and sales 35.8 per cent, and book and job printing and all other products together 21.2 per cent. Of these three items book and job printing shows the largest per cent of increase during the last decade. Comparison of the percentages of increase in advertising and in subscriptions and sales for the decades from 1880 to 1890 and from 1890 to 1900 shows a shrinkage from 82 per cent to 34.6 per cent in the former and from 45.1 per cent to 10.5 per cent in the latter.

The decline in the relative importance of subscriptions and sales and the advance of advertising are clearly shown for three census years in Table 9.

TABLE 9.—*Proportion which advertising and subscriptions and sales form of total value of newspaper products, 1880 to 1900.*

YEAR.	Advertising, per cent.	Subscriptions and sales, per cent.
1900	54.5	45.5
1890	49.6	50.4
1880	44.0	56.0

A comparison, for 1890 and 1900, of the proportion contributed to the total value of all products by the two items referred to above, shows a decline in subscriptions and sales, an advance in advertising, and also a slight advance in book and job printing.

TABLE 10.—*Proportion which advertising, subscriptions and sales, and book and job printing form of the total value of all products, 1890 and 1900.*

YEAR.	Per cent which advertising forms of value of products.	Per cent which subscriptions and sales form of value of products.	Per cent which book and job printing forms of value of products.
1900	43.0	35.8	21.2
1890	39.6	40.2	20.2

Tables 9 and 10 establish the important fact that publishers are depending more on advertising and less on subscriptions and sales for financial return. This conclusion is confirmed by the fact that the most notable increases for the past decade, shown in Table 5—except that for paper, already referred to—are in "aggregate circulation per issue" and "aggregate number of copies issued during the census year," suggesting the conclusion that the publishers of newspapers and periodicals, pushed by competition and by the necessity for an increase of circulation to meet the exactions of the advertiser have increased their capital and forced a larger circulation, which has not shown a proportionate increase in the financial return.

PERIOD OF ISSUE AND CHARACTER OF PUBLICATION.

Publications are classified in Table 11 by period of issue and by character.

TABLE 11.—*Classified according to period of issue and character of publication, 1880 to 1900, with per cent of increase for each decade.*

	NUMBER OF PUBLICATIONS REPORTING.			PER CENT OF INCREASE.	
	1900	1890	1880	1890 to 1900	1880 to 1890
Total	18,226	14,901	[1]11,314	22.3	31.7
Period of issue:					
Daily	2,226	1,610	971	38.3	65.8
Triweekly	62	34	73	82.4	[2]53.4
Semiweekly	637	194	133	228.3	45.9
Weekly	12,979	10,814	8,633	20.0	25.3
Monthly	1,817	1,734	1,167	4.8	48.6
Quarterly	237	225	116	5.3	94.0
All other classes	268	290	221	[2]7.6	31.2
Character of publication:					
News, politics, and family reading	14,867	11,326	8,863	31.3	27.8
Religion	952	1,025	553	[2]7.1	85.4
Agriculture, horticulture, dairying, and stock raising	307	263	173	16.7	52.0
Commerce, finance, insurance, railroads, and trade	[3]710	671	363	5.8	84.8
General literature, including magazines	239	291	189	[2]17.9	54.0
Medicine and surgery	111	123	114	[2]9.8	7.9
Law	62	47	45	31.9	4.4
Science and mechanics	66	83	68	[2]20.5	22.1
Fraternal organizations	200	216	149	[2]7.4	45.0
Education and history	[4]259	256	248	1.2	3.2
Society, art, music, and fashion	88	152	72	[2]42.1	111.1
Miscellaneous	[5]365	448	477	[2]18.5	[2]6.1

[1] Includes 1,182 publications not reporting operations, as they can not be excluded from the classification.
[2] Decrease.
[3] Includes 520 "trade journals."
[4] Includes 139 "college and school periodicals."
[5] Includes 72 "Sunday newspapers."

It will be observed from Table 11 that while the triweekly, a class with unimportant totals, suffered a severe decline during the decade from 1880 to 1890, the other classes of publications under "period of issue" increased by percentages ranging from 25.3 to 94. In the decade from 1890 to 1900 there were no decreases, but the increases recorded for the daily, weekly, monthly, and quarterly classes were much smaller than for the same classes during the preceding decade. The most noteworthy increase was in the semiweekly publications, of which there were 133 in 1880, 194 in 1890, and 637 in 1900. The increase shown at the last-named date was 443 publications, or 228.4 per cent. This is in marked contrast to the moderate advances recorded for the other classes, and doubtless reflects an effort, on the part of a considerable number of publishers of weekly newspapers in towns located near large cities, to overcome the injurious effects of competition with city dailies. There have been many instances, during the decade, in which a weekly has been advanced to a semiweekly, thus doubling the number of issues with little or no increase in the subscription price.

As shown by this table, the absolute increase in the number of publications during the decade was 3,325. For the decade ending in 1890 the per cent of increase in the number of all publications was greater than the per cent of increase in population, the former being 31.7 per cent and the latter 24.9. In the decade from 1890 to 1900 the percentages for both items decreased, becoming 22.3 for all publications and 20.7 for population—a similarity which, while interesting, was doubtless merely a coincidence. It is worthy of note, however, that for two decades the per cent of increase in the number of daily newspapers has been nearly the same as the per cent of increase in urban population. The foregoing facts, together with the number of inhabitants to each publication, are presented in Table 12.

TABLE 12.—*Number of inhabitants to each publication, 1880 to 1900, and per cent of increase for each decade in urban population and in number of daily newspapers.*

YEAR.	Number of inhabitants to each publication.	PER CENT OF INCREASE IN PRECEDING DECADE.	
		In urban population.	In number of daily newspapers.
1900	4,170	36.8	38.3
1890	4,224	61.4	65.8
1880	4,433	.....	.....

The two following tabular comparisons give the percentage which each class forms of the total number of publications for 1880, 1890, and 1900, when classified by "period of issue" and by "character of publication."

TABLE 13.—*Per cent that each class, by period of issue, forms of total number of publications, 1880 to 1900.*

PERIOD OF ISSUE.	1900	1890	1880
Daily	12.2	10.8	8.6
Triweekly	0.3	0.2	0.6
Semiweekly	3.5	1.3	1.2
Weekly	71.2	72.6	76.3
Monthly	10.0	11.6	10.3
Quarterly	1.3	1.5	1.0
All other classes	1.5	2.0	2.0

TABLE 14.—*Per cent that each class, by character of publication, forms of total number of publications, 1880 to 1900.*

CHARACTER OF PUBLICATION.	1900	1890	1880
News, politics, and family reading	81.6	76.0	78.3
Religion	5.2	6.9	4.9
Agriculture, horticulture, dairying, and stock raising	1.7	1.8	1.5
Commerce, finance, insurance, railroads, and trade	3.9	4.5	3.2
General literature, including magazines	1.3	2.0	1.7
Medicine and surgery	0.6	0.8	1.0
Law	0.3	0.3	0.4
Science and mechanics	0.4	0.6	0.6
Fraternal organizations	1.1	1.4	1.3
Education and history	1.4	1.7	2.2
Society, art, music, and fashion	0.5	1.0	0.7
Miscellaneous	2.0	3.0	4.2

From Table 13 it will be observed that for the twenty-year period from 1880 to 1900 the daily, the semiweekly, and the quarterly show small relative advances, and the weekly and the monthly show small declines. The changes shown for the past decade are of especial interest; the quarterly falls out of the advancing class, but the daily and the semiweekly continue to show mod-

erate advances, made at the expense of the quarterly as well as of the weekly and the monthly. This result is a manifestation of the energetic and impatient spirit of the period.

Examination of the above comparison of character of publications reveals the fact that during the decade from 1880 to 1890 there was a slight decline in the relative importance of publications devoted to news, politics, and general reading, but that publications devoted to religion, to agriculture and kindred pursuits, to business interests, to general literature, to fraternal orders, and to society, art, music, and fashion, benefiting by the decline of the first-named class, showed small advances. The figures for the Twelfth Census show that a marked change took place during the last decade. The advance of publications devoted to special subjects was checked, while those devoted to news, politics, and general reading made a decided relative increase at the expense of all others, except those devoted to law, a relatively insignificant class, which remained stationary. The reason for the change thus indicated is unmistakable. Publications devoted to specialties slowly yielded ground to the large daily newspapers, which invaded every field of journalism.

This noteworthy situation seems to have been due principally to three causes: The resistless activity of the period, which made the Sunday edition of the daily newspaper a department store of journalism, ransacking all lines of thought and every public interest for material to present; the perfection of the composing machine, by the use of which one competent operator can accomplish the work of from 5 to 10 compositors; and the development of the inexpensive and satisfactory methods of illustration known as the "line cut" and the "half-tone," which made possible the rapid transference of a photograph to the columns of a newspaper.

It is impossible to measure the effect of the invention of mechanical composition. If it were not for the entirely new situation which it produced, the will and the ability to expand the daily from old-fashioned proportions might have struggled in vain against the high cost of hand composition, notwithstanding the mental activity of the period. The daily press and many other periodicals have been prompt to seize upon this advance in the industry, and are now equipped for machine composition. In this manner a revolution has been accomplished in the output of many publications; the number of printed pages has been greatly increased; the freer use of composition has made possible the introduction of departments or columns devoted to periodic or even daily consideration of special subjects, often cleverly treated; and the daily paper, or the Sunday edition of the daily, has to some extent supplanted publications devoted to specialties. The reading matter now presented is not only satisfying to the reader, but, in amount, often beyond his capacity to assimilate. This is true especially of many of the Sunday publications, which varied in 1900 from 24 to 120 pages, with special departments or supplements devoted to leading subjects, such as literature, art, religion, science, sports, music, the drama, etc.

Table 15 presents the number and circulation of newspapers and periodicals, classified according to period of issue, from 1850 to 1900.

TABLE 15.—NUMBER AND CIRCULATION OF NEWSPAPERS AND PERIODICALS, CLASSIFIED ACCORDING TO PERIOD OF ISSUE, 1850 TO 1900.

YEAR.	ALL CLASSES.			DAILY.		TRIWEEKLY.		SEMIWEEKLY.	
	Number.	Total circulation per issue.	Aggregate number of copies issued during the census year.	Number.	Total circulation per issue.	Number.	Total circulation per issue.	Number.	Total circulation per issue.
1900	18,226	114,299,334	[1]8,168,148,749	2,226	15,102,156	62	228,610	637	2,832,868
1890	14,901	69,138,934	4,681,113,530	1,610	8,387,188	34	50,067	194	561,743
1880	[2]11,314	[3]31,779,686	2,067,848,209	971	3,566,395	78	68,086	133	264,910
1870	5,871	20,842,475	1,508,548,250	574	2,601,547	107	155,105	115	247,197
1860	4,051	13,663,409	927,951,548	387	1,478,435	86	107,170	79	175,165
1850	2,526	5,142,177	426,409,978	254	758,454	115	75,712	31	63,511

YEAR.	WEEKLY.		MONTHLY.		QUARTERLY.		ALL OTHER CLASSES.[4]	
	Number.	Total circulation per issue.	Number.	Total circulation per issue.	Number.	Total circulation per issue.	Number.	Total circulation per issue.
1900	12,979	39,852,052	1,817	39,519,897	237	11,217,422	268	5,546,329
1890	10,814	28,954,515	1,734	19,624,038	225	8,124,500	290	3,486,883
1880	8,633	[3]16,266,330	1,167	[3]8,139,881	116	[3]1,944,299	221	[3]1,379,285
1870	4,295	10,594,643	622	5,650,843	49	211,670	109	1,381,470
1860	3,173	7,581,930	280	3,411,959	30	101,000	16	807,750
1850	1,902	2,944,629	100	740,651	19	25,875	105	543,345

[1] Obtained, for each class of publications, by multiplying the average circulation for each issue by the number of issues during the year.
[2] Includes 1,182 publications not reporting circulation, as they can not be excluded from the classification.
[3] The circulation of 5 weeklies, 1 semimonthly, 14 monthlies, and 12 quarterlies not reported separately, amounting to 150,000, is given only for "all classes."
[4] Includes publications issued semimonthly, semiannually, annually, etc.

By dividing a total circulation of 100 per cent proportionately among the different classes, for a period of half a century, the following results are obtained:

TABLE 16.—*Per cent that circulation per issue of each class forms of total circulation per issue, 1850 to 1900.*

PERIOD OF ISSUE.	1900	1890	1880	1870	1860	1850
All classes	100.0	100.0	100.0	100.0	100.0	100.0
Daily	13.2	12.1	11.2	12.5	10.8	14.7
Triweekly	0.2	0.1	0.2	0.8	0.8	1.5
Semiweekly	2.5	0.8	1.9	1.2	1.3	1.0
Weekly	34.9	41.9	51.2	50.8	55.5	57.3
Monthly	34.6	28.4	26.0	27.1	25.0	14.4
Quarterly	9.8	11.7	6.1	1.0	0.7	0.5
All other classes	4.8	5.0	4.4	6.6	5.9	10.6

From Table 16 it will be observed that the daily class, after fluctuating during the period from 1850 to 1880, advanced from 11.2 per cent in 1880 to 13.2 per cent in 1900; that the weekly declined steadily in relative importance from 57.3 per cent, or more than half of the circulation of all newspapers and periodicals, in 1850, to 34.9 per cent in 1900. Of the other classes the most notable change in circulation was shown by the monthlies, which advanced 6.2 per cent during the last decade. It is probable that this change is due to the establishment of inexpensive magazines, which have a large circulation, and which, in their present perfection, are distinctly a product of the decade from 1890 to 1900. Among the causes which have made them possible are cheapened composition and illustration, and the improvements in the manufacture of printing presses.

TABLE 17.—*Absolute increase in the total circulation per issue of each class, 1850 to 1900.*

PERIOD OF ISSUE.	1890 to 1900	1880 to 1890	1870 to 1880	1860 to 1870	1850 to 1860
All classes	45,160,400	37,359,248	10,937,211	7,179,066	8,521,282
Daily	6,714,968	4,820,793	964,848	1,123,112	719,981
Triweekly	178,543	[1]18,019	[1]87,019	47,935	31,458
Semiweekly	2,271,125	296,833	17,718	72,032	121,654
Weekly	10,897,537	12,687,685	5,672,187	3,012,713	4,637,301
Monthly	19,895,859	11,484,157	2,489,088	2,238,884	2,671,308
Quarterly	3,092,922	6,180,201	1,792,629	110,670	75,125
All other classes	2,109,446	2,057,598	[1]2,185	573,720	264,405

[1] Decrease.

This comparison, drawn from Table 15, throws additional light upon the increase in the circulation of newspapers and periodicals during the past decade. With the exception of the weekly and the quarterly, each class showed a greater absolute increase from 1890 to 1900 than during any other decade of the half century. For both the weekly and the quarterly, the increase during the decade from 1890 to 1900 was exceeded only by that of the preceding decade. This statement emphasizes the rapid growth in the circulation of monthly publications. The normal increase in the circulation of this class of periodicals, which during the twenty years from 1860 to 1880 remained nearly constant at about 2,500,000, advanced in 1890 to 11,484,157, and in 1900 this figure was almost doubled, the absolute increase being 19,895,859.

TABLE 18.—*Aggregate circulation per issue of daily, weekly, and monthly publications, and circulation per 1,000 inhabitants, 1880 to 1900.*

PERIOD OF ISSUE.	AGGREGATE CIRCULATION PER ISSUE.			CIRCULATION PER 1,000 INHABITANTS.		
	1900	1890	1880	1900	1890	1880
Daily	15,102,156	8,387,188	3,566,395	199	133	71
Weekly	39,852,052	28,954,515	16,266,830	524	460	324
Monthly	39,519,897	19,624,038	8,139,881	520	312	162

From Table 18 it appears that the total circulation per issue of daily newspapers was sufficient to supply about one in every five inhabitants, and of weeklies and monthlies each about one in every two inhabitants. In this respect the increase was most marked in the monthly class.

The average circulation per issue of newspapers and periodicals, by period of issue, from 1880 to 1900, is presented in Table 19.

TABLE 19.—*Average circulation per issue, 1880 to 1900.*

PERIOD OF ISSUE.	AVERAGE CIRCULATION PER ISSUE.		
	1900	1890	1880
All classes	6,271	4,640	3,122
Daily	6,784	5,209	4,137
Triweekly	3,687	1,473	1,001
Semiweekly	4,447	2,896	2,136
Weekly	3,071	2,678	2,113
Monthly	21,750	11,317	7,334
Quarterly	47,331	36,109	16,505
All other classes	20,695	11,851	6,474

Representing by percentages the fluctuations shown in this table, the movement of circulation for the past two decades was as follows:

TABLE 20.—*Per cent of increase in average circulation, by periods of issue, from 1880 to 1890 and from 1890 to 1900.*

PERIOD OF ISSUE.	1890 to 1900	1880 to 1890
All classes	35.2	48.6
Daily	30.2	25.9
Triweekly	150.3	47.2
Semiweekly	53.6	35.6
Weekly	14.7	26.7
Monthly	92.2	44.5
Quarterly	31.1	118.8
All other classes	74.6	83.1

The tendencies already pointed out appear again in this comparison. Of the important classes, the daily, semiweekly, and monthly show decided advances in the percentage of increase in average circulation during the decade just ended, while the weekly shows a marked decline.

PUBLICATIONS IN DIFFERENT LANGUAGES.

Table 21 presents an interesting classification of the total number of publications reported, into the languages in which they are published.

TABLE 21.—*Newspapers and periodicals classified according to language in which printed, 1880 to 1900.*

LANGUAGE.	NUMBER OF PUBLICATIONS.		
	1900	1890	1880
Total	18,226	14,901	[1]11,314
English	17,194	13,848	10,515
Armenian	.....	1	.....
Bohemian	28	22	13
Bohemian and English	1	1	.....
Catalan	.....	.....	1
Chinese	5	3	2
Dutch	12	16	9
Finnish	7	4	.....
French	27	40	41
French and English	4	5	.....
Gaelic	.....	1	.....
Gaelic and English	3	3	.....
German	613	727	641
German and English	20	27	.....
German and Hebrew	3	4	.....
Hebrew	13	5	.....
Hungarian	2	1	.....
Indian and English	3	1	3
Irish	.....	.....	1
Italian	35	13	4
Italian and English	.....	1	.....
Lithuanian	9	1	.....
Polish	33	18	2
Portuguese	2	2	2
Scandinavian[2]	115	112	49
Slavonic, not specified	4	3	.....
Spanish	39	.....	26
Spanish and English	1	7	.....
Volapuk	.....	1	.....
Volapuk and English	.....	1	.....
Welsh	.....	4	5
Welsh and English	1	1	.....
All other languages	52	.....	.....

[1] Includes 1,182 publications not reporting operations, as they can not be excluded from the classification.
[2] Includes Danish, Norwegian, and Swedish.

There were 15 different languages or combinations of languages represented in 1880, 30 in 1890, and 25 in 1900. The principal languages in which increases in the number of periodicals published were shown in 1900, were English, Bohemian, Hebrew, Italian, Polish, Scandinavian, and Spanish. Decreases were shown in the number of periodicals published in Dutch, French, and German. The languages represented by publications in 1880 or in 1890, but not in 1900, were Armenian, Catalan, Gaelic, Irish, "Volapuk," and Welsh. The proportion of the total number of publications printed in each of the principal languages in 1880, 1890, and 1900 is best shown by percentages, as follows:

TABLE 22.—*Per cent that number of publications in each of the principal languages forms of the total number, 1880 to 1900.*

LANGUAGE.	1900	1890	1880
English	94.3	92.9	92.9
Bohemian	0.2	0.2	0.1
French	0.2	0.3	0.4
German	3.4	4.9	5.7
Italian	0.2	0.1	.....
Polish	0.2	0.1	.....
Scandinavian	0.6	0.8	0.4
Spanish	0.2	0.2	0.2

In 1880, 92.9 per cent of all publications were printed in English; in 1890, although the number of languages or combinations represented was doubled, the proportion of periodicals printed in English remained unchanged; but in 1900 it had advanced to 94.3 per cent. This advance is significant, when considered in connection with the accompanying decrease from 7.1 per cent in 1890 to 5.7 per cent in 1900 in the proportion of publications printed wholly or in part in other languages. On closer examination of Table 22 it will be observed that during the past decade there was an increase in the proportionate number of publications printed in Italian and in Polish; that there was a decline in the relative importance of publications printed in French, German, and the Scandinavian tongues; and that the proportion of publications printed in Bohemian and Spanish remained the same in 1900 as in 1890.

By considering the percentages of increase or decrease in the number of publications printed in the principal languages, in connection with the statistics of population born in the countries in which those languages are spoken, additional light is thrown on the figures presented in Table 21.[1]

TABLE 23.—*Comparison of the per cent of increase or decrease in the number of publications printed wholly or partly in the principal foreign languages, with the per cent of increase or decrease in population born in the countries in which those languages are spoken, from 1880 to 1890 and from 1890 to 1900.*

COUNTRY.	PER CENT OF INCREASE OR DECREASE IN NUMBER OF PUBLICATIONS.		PER CENT OF INCREASE OR DECREASE IN FOREIGN BORN POPULATION.	
	1890 to 1900	1880 to 1890	1890 to 1900	1880 to 1890
France	[1]31.1	9.8	[1]7.8	5.8
Germany	[1]16.0	17.6	[1]4.2	41.6
Italy	160.0	250.0	165.2	312.8
Poland and Russia	85.0	900.0	144.7	291.1
Scandinavia	2.7	128.6	14.0	112.0

[1] Decrease.

The percentages of increase and decrease in number of publications appearing in Table 23, though based upon figures too small to be of any value in themselves, are of great interest in comparison with the percentages given in the second part of the statement, because they indicate the degree of sympathy existing between the increase or decrease in the number of publications printed in the language and devoted to the interests of any one country, and the movement of emigration from that country. From these figures it is reasonable to conclude that publications of this character depend for support, to a large extent, upon comparatively recent arrivals, and that in general, when emigration from a country decreases, the number of publications printed in the language of that country decreases, and when immigration shows an increase the number of publications also increases. In 1900 the Scandinavian countries furnished the only exception to the conclusion that immigrants, after settling in the United States, soon lose interest in their native land to the extent of ceasing to support publications printed in their mother tongue. The immigration of Scandinavians decreased, while the

[1] Twelfth Census, Population, Part I, page clxxi.

number of publications printed in the Scandinavian languages showed a slight increase.

If the number of residents of the United States in 1900 reporting birth in each of six important foreign countries be divided by the total number of publications printed in the language of their native country, the following figures appear:

TABLE 24.—*Number of residents of the United States born in specified countries to each publication printed in the languages of those countries, 1880 to 1900.*

COUNTRY.	1900	1890	1880
Bohemia	5,413	5,135	6,566
France	3,866	2,515	2,609
Germany	4,213	3,693	3,068
Holland	8,754	5,114	6,454
Italy	13,834	13,041	11,058
Scandinavia	9,255	8,333	8,985

It will be recalled that the number of inhabitants to each publication in 1900 has been shown to be 4,169. From Table 24 it appears that the number of residents of the United States in 1900 born in each of the above-named countries, except France and Germany, to each publication printed in their native tongue, was much larger than the average for the United States. In each case, also, the figures for 1900 show an increase over 1890—that is, a decrease in the proportionate number of publications printed in the language of each of these countries to the number of natives of each residing in the United States.

QUANTITY AND COST OF PAPER USED.

Table 25 shows the quantity and cost of paper used, and the average cost per pound, in 1900.

TABLE 25.—*Quantity, cost, and average cost per pound of paper used, 1900.*

KIND.	Pounds.	Cost.	Average cost per pound (cents).
Total	1,233,142,248	$37,823,856	3.1
News	956,335,921	22,197,060	2.3
Book and periodical	202,296,263	9,356,490	4.6
Job printing	74,510,064	6,270,306	8.4

In this table is presented a division of the paper used in 1900, according to the several classes of products which, combined, produced the total value of products of newspaper and periodical establishments. About one and a quarter billions of pounds were used during the census year. This large quantity was utilized in the following proportions:

	Per cent.
News	77.6
Book and periodical	16.4
Job printing	6.0

It is important, however, to observe that these proportions in weight do not by any means hold good in cost. The latter shows the following proportions:

	Per cent.
News	58.7
Book and periodical	24.7
Job printing	16.6

TABLE 26.—*Per cent that quantity and cost of paper used form of total, 1890 and 1900.*

KIND.	QUANTITY.		COST.	
	1900	1890	1900	1890
Newspapers	77.6	74.1	58.7	61.1
Books and periodicals	16.4	25.9	24.7	38.9
Job printing	6.0		16.6	

It is clear that while the quantity of paper used for newspapers far exceeds that consumed in the other branches of the industry, it is proportionately much less expensive.

The average cost per pound shown in Table 25 adds confirmation to the deduction drawn from Table 5, that the cost of materials for book and job work was over 40 per cent greater than that for newspapers and periodicals. If the item of paper alone were considered, this per cent would be increased. The average cost per pound of paper consumed by newspapers and periodicals combined was 2.3 cents. The average cost per pound of paper for books and periodicals and job printing combined was 5.6 cents.

VALUE OF PRODUCTS.

The items composing the total value of products of newspaper and periodical establishments are presented in detail in Table 27.

TABLE 27.—*Value of products, with per cent which each class forms of the total, 1900.*

	Value.	Per cent of total.
Total	$222,983,569	100.0
Newspaper products:		
Advertising	95,861,127	43.0
Subscriptions and sales	79,928,483	35.9
Book and job printing products:		
Book and pamphlet publications	18,407,528	8.3
Sheet music and books of music	544,802	0.2
Job printing	22,793,322	10.2
Bookbinding	2,067,450	0.9
Blank books	654,557	0.3
Electrotyping, engraving, etc.	491,567	0.2
All other products	2,334,733	1.0

The relative importance of these items was considered at some length under Table 5.

RANK OF STATES AND TERRITORIES ACCORDING TO CIRCULATION.

In Table 28 is shown the rank of the several states and territories, according to aggregate circulation, in each class of newspapers and periodicals, by period of

issue. This table is of interest as showing relative position at the Twelfth Census, but obviously presents nothing of statistical value, since a decline in rank does not necessarily imply a decrease in aggregate circulation, but may be due, on the contrary, to greater increase of population, or greater increase in the circulation of publications of other classes, or in other sections of the country.

TABLE 28.—RANK OF STATES AND TERRITORIES ACCORDING TO AGGREGATE CIRCULATION PER ISSUE OF NEWSPAPERS AND PERIODICALS, 1900.

STATES AND TERRITORIES.	All classes.	Daily.	Triweekly.	Semi-weekly.	Weekly.	Monthly.	Quarterly.	All other classes.
Alabama	32	30	16	37	32	38	.....	20
Arizona	47	45	.....	.....	48	49	.....	.....
Arkansas	30	35	14	27	26	30	20	39
California	14	7	18	20	16	17	10	14
Colorado	24	18	19	38	28	22	26	34
Connecticut	25	15	.....	18	31	25	25	17
Delaware	44	36	.....	41	43	42	.....	.....
District of Columbia	20	25	.....	44	21	11	24	10
Florida	43	37	14	34	40	33	.....	.....
Georgia	23	24	.....	14	19	23	28	21
Idaho	46	47	.....	36	45	46	.....	37
Illinois	3	3	6	6	2	4	4	7
Indiana	11	9	.....	12	10	9	11	12
Indian Territory	45	49	.....	.....	42	47	.....	.....
Iowa	13	13	2	7	8	13	14	11
Kansas	16	28	15	22	14	12	15	15
Kentucky	17	17	12	9	17	15	.....	9
Louisiana	28	22	10	15	35	31	18	29
Maine	5	28	.....	23	24	2	16	28
Maryland	21	11	.....	24	20	20	22	33
Massachusetts	6	5	.....	16	5	5	7	4
Michigan	10	8	5	5	12	8	13	18
Minnesota	12	10	8	11	9	10	21	6
Mississippi	37	43	17	43	38	39	.....	35
Missouri	7	6	20	2	6	7	6	5
Montana	40	34	.....	28	41	40	17	.....
Nebraska	18	20	13	13	15	16	26	26
Nevada	50	46	21	40	50	48	.....	.....
New Hampshire	34	33	7	.....	30	43	.....	.....
New Jersey	9	12	.....	39	18	29	8	1
New Mexico	49	48	.....	.....	47	48	29	32
New York	1	1	1	1	1	1	1	2
North Carolina	29	31	.....	19	25	34	30	27
North Dakota	39	41	.....	32	38	36	.....	.....
Ohio	4	4	3	4	4	6	3	3
Oklahoma	42	44	.....	46	39	45	.....	40
Oregon	26	29	.....	25	28	21	.....	31
Pennsylvania	2	2	4	3	3	3	2	8
Rhode Island	36	21	22	33	44	44	22	.....
South Carolina	38	40	20	21	36	35	.....	36
South Dakota	31	42	.....	42	34	28	.....	13
Tennessee	8	16	.....	31	7	14	5	23
Texas	19	19	.....	10	13	24	27	24
Utah	41	39	11	17	46	32	32	19
Vermont	35	38	.....	29	37	27	31	22
Virginia	22	26	9	26	22	19	9	25
Washington	27	27	19	30	29	26	19	30
West Virginia	33	32	.....	35	27	41	.....	33
Wisconsin	15	14	14	8	11	18	12	16
Wyoming	48	50	19	45	49	37	.....	.....

It will be observed that the four most populous states—New York, Pennsylvania, Illinois, and Ohio—maintain the same rank in aggregate circulation that they do in population. At that point uniformity in rank ceases, except in the case of Nevada, which is last in rank, both in population and in aggregate circulation.

Table 29 presents statistics relating to daily publications in 50 cities, for 1900; Table 30 gives the same information for 27 cities, for 1880, 1890, and 1900.

TABLE 29.—STATISTICS RELATING TO DAILY PUBLICATIONS IN 50 CITIES, 1900.

CITIES.	Population of cities.	DAILY PAPERS.				Number of inhabitants to each copy per issue.	Rank of cities according to increasing number of inhabitants to each copy per issue.
		Total.	Morning.	Evening.	Aggregate circulation per issue.		
New York, N. Y.	3,437,202	58	29	29	2,732,089	1.26	8
Chicago, Ill	1,698,575	37	16	21	1,099,555	1.54	17
Philadelphia, Pa	1,293,697	21	10	11	1,008,752	1.28	10
St. Louis, Mo	575,238	13	7	6	373,030	1.54	17
Boston, Mass	560,892	16	8	8	761,039	0.74	3
Baltimore, Md	508,957	9	6	3	232,252	2.19	27
Cleveland, Ohio	381,768	11	3	8	258,473	1.48	14
Buffalo, N. Y	352,387	12	3	9	217,989	1.62	18
San Francisco, Cal	342,782	23	15	8	304,185	1.13	6
Cincinnati, Ohio	325,902	13	7	6	516,708	0.63	1
Pittsburg, Pa	321,616	11	7	4	421,741	0.76	4
New Orleans, La	287,104	9	5	4	96,360	2.98	39
Detroit, Mich	285,704	8	3	5	207,110	1.38	11
Milwaukee, Wis	285,315	11	4	7	132,805	2.15	25
Washington, D. C	278,718	8	3	5	100,848	2.76	38
Newark, N. J	246,070	3	1	2	71,882	3.43	40
Jersey City, N. J	206,433	2	.....	2	19,580	10.54	43
Louisville, Ky	204,731	8	5	3	136,950	1.49	15
Minneapolis, Minn	202,718	9	6	3	137,906	1.47	13
Providence, R. I	175,597	3	1	2	76,000	2.31	31
Indianapolis, Ind	169,164	9	4	5	135,698	1.25	7
Kansas City, Mo	163,752	9	4	5	226,252	0.72	2
St. Paul, Minn	163,065	7	2	5	114,446	1.42	12
Rochester, N. Y	162,608	7	2	5	88,489	1.84	21
Denver, Colo	133,859	7	2	5	104,485	1.28	10
Toledo, Ohio	131,822	7	3	4	76,850	1.72	19
Columbus, Ohio	125,560	7	2	5	115,728	1.08	5
Worcester, Mass	118,421	5	2	3	49,440	2.40	32
Syracuse, N. Y	108,374	6	1	5	71,982	1.51	16
New Haven, Conn	108,027	5	2	3	42,000	2.57	35
Paterson, N. J	105,171	5	1	4	23,108	4.55	41
Fall River, Mass	104,863	4	.....	4	18,850	5.56	42
St. Joseph, Mo	102,979	7	3	4	45,058	2.29	30
Omaha, Nebr	102,555	8	4	4	80,740	1.27	9
Los Angeles, Cal	102,479	6	3	3	48,250	2.12	24
Memphis, Tenn	102,320	3	2	1	95,000	1.08	5
Scranton, Pa	102,026	4	2	2	46,822	2.18	26
Lowell, Mass	94,969	7	2	5	45,160	2.10	23
Albany, N. Y	94,151	8	2	6	75,521	1.25	7
Cambridge, Mass	91,886	1	1	.....	2,000	45.94	44
Portland, Oreg	90,426	4	3	1	37,400	2.42	33
Atlanta, Ga	89,872	3	2	1	46,061	1.95	22
Grand Rapids, Mich	87,565	4	2	2	56,900	1.54	17
Dayton, Ohio	85,333	5	1	4	34,200	2.50	34
Richmond, Va	85,050	6	4	2	37,810	2.25	29
Nashville, Tenn	80,865	2	1	1	30,000	2.70	37
Seattle, Wash	80,671	5	3	2	44,580	1.81	20
Hartford, Conn	79,850	4	2	2	33,000	2.42	33
Reading, Pa	78,961	5	1	4	80,528	2.59	36
Wilmington, Del	76,508	6	2	4	34,277	2.23	28

TABLE 30.—STATISTICS RELATING TO DAILY PUBLICATIONS IN 27 CITIES, 1880 TO 1900.

CITIES.	Year.	Population of cities.	DAILY PAPERS.				Number of inhabitants to each copy per issue.	Rank of cities according to increasing number of inhabitants to each copy per issue.
			Total.	Morning.	Evening.	Aggregate circulation per issue.		
New York, N. Y.	1900	3,437,202	[1]58	29	[1]29	[2]2,732,089	1.26	.....
Manhattan and Bronx boroughs	1900	2,050,600	47	28	19	2,632,213	0.78	5
	1890	1,515,301	50	34	16	1,698,553	0.89	1
	1880	1,206,209	29	20	9	765,843	1.58	2
Brooklyn borough	1900	1,166,582	6	1	5	95,476	12.22	25
	1890	806,343	5	.....	5	82,448	9.78	27
	1880	566,663	4	.....	4	48,587	11.67	22
Chicago, Ill	1900	1,698,575	37	16	21	1,099,555	1.54	15
	1890	1,099,850	27	14	13	644,000	1.71	11
	1880	503,185	18	10	8	220,577	2.28	9
Philadelphia, Pa	1900	1,293,697	21	10	11	1,008,752	1.28	9
	1890	1,046,964	24	13	11	804,008	1.30	6
	1880	847,170	24	13	11	375,274	2.26	8

[1] Queens borough had 5 evening daily newspapers, with a circulation of 4,400.

TABLE 30.—STATISTICS RELATING TO DAILY PUBLICATIONS IN 27 CITIES, 1880 TO 1900—Continued.

CITIES.	Year.	Population. of cities.	DAILY PAPERS.				Number of inhabitants to each copy per issue.	Rank of cities according to increasing number of inhabitants to each copy per issue.
			Total.	Morning.	Evening.	Aggregate circulation per issue.		
St. Louis, Mo.	1900	575,238	13	7	6	373,030	1.54	15
	1890	451,770	15	9	6	238,525	1.89	13
	1880	350,518	9	8	1	99,364	3.52	14
Boston, Mass.	1900	560,892	16	8	8	761,039	0.74	3
	1890	448,477	12	5	7	466,471	0.96	2
	1880	362,839	11	6	5	221,315	1.64	4
Baltimore, Md	1900	508,957	9	6	3	232,252	2.19	19
	1890	434,439	7	6	1	133,510	3.25	22
	1880	332,313	9	6	3	128,643	2.58	10
Cleveland, Ohio	1900	381,768	11	3	8	258,473	1.48	13
	1890	261,353	13	4	9	133,800	1.95	14
	1880	160,146	8	2	6	48,730	3.29	12
Buffalo, N. Y	1900	352,387	12	3	9	217,989	1.62	16
	1890	255,664	10	3	7	120,800	2.12	17
	1880	155,134	7	2	5	26,100	5.94	19
San Francisco, Cal.	1900	342,782	23	15	8	304,185	1.13	6
	1890	298,997	21	14	7	286,912	1.04	5
	1880	233,959	21	11	10	143,282	1.63	3
Cincinnati, Ohio	1900	325,902	13	7	6	516,708	0.63	1
	1890	296,908	14	10	4	213,500	1.39	7
	1880	255,139	12	8	4	117,549	2.17	7
Pittsburg, Pa	1900	321,616	11	7	4	421,741	0.76	4
	1890	238,617	10	7	3	232,462	1.03	4
	1880	156,389	9	6	3	111,001	1.41	1
New Orleans, La.	1900	287,104	9	5	4	96,360	2.98	22
	1890	242,039	9	4	5	73,900	3.28	23
	1880	216,090	10	6	4	37,565	5.76	18
Detroit, Mich	1900	285,704	8	3	5	207,110	1.38	10
	1890	205,876	8	2	6	134,388	1.53	8
	1880	116,340	6	3	3	41,583	2.80	11
Milwaukee, Wis	1900	285,315	11	4	7	132,805	2.15	18
	1890	204,468	10	5	5	63,200	3.24	21
	1880	115,587	7	4	3	24,300	4.76	16
Washington, D. C.	1900	278,718	8	3	5	100,848	2.76	21
	1890	230,392	4	2	2	62,651	3.68	25
	1880	147,293	5	3	2	34,500	4.27	15
Newark, N. J	1900	246,070	3	1	2	71,332	3.43	23
	1890	181,830	6	3	3	50,600	3.59	24
	1880	136,508	6	4	2	18,300	7.46	20
Jersey City, N. J	1900	206,433	2	.....	2	19,580	10.54	24
	1890	166,003	4	1	3	28,300	5.76	26
	1880	120,722	2	.....	2	11,176	10.80	21
Louisville, Ky	1900	204,731	8	5	3	136,950	1.49	14
	1890	161,129	5	3	2	95,100	1.69	10
	1880	123,758	5	4	1	22,215	5.57	17
Minneapolis, Minn	1900	202,718	9	6	3	137,906	1.47	12
	1890	164,738	9	4	5	92,323	1.78	12
	[1]1880	.....	.....	.....	.....	.....	.....	.....
Providence, R. I.	1900	175,597	3	1	2	76,000	2.31	20
	1890	132,146	3	1	2	52,000	2.54	20
	1880	104,857	5	2	3	29,900	3.51	13
Indianapolis, Ind	1900	169,164	9	4	5	135,698	1.25	7
	1890	105,436	7	3	4	64,213	1.64	9
	1880	75,056	4	3	1	35,587	2.11	6
Kansas City, Mo.	1900	163,752	9	4	5	226,252	0.72	2
	1890	132,716	9	6	3	130,700	1.02	3
	[1]1880	.....	.....	.....	.....	.....	.....	.....
St. Paul, Minn.	1900	163,065	7	2	5	114,446	1.42	11
	1890	133,156	7	3	4	67,350	1.96	15
	1880	41,473	6	3	3	19,893	2.08	5
Rochester, N. Y	1900	162,608	7	2	5	88,489	1.84	17
	1890	133,896	7	2	5	65,276	2.05	16
	[1]1880	.....	.....	.....	.....	.....	.....	.....
Denver, Colo	1900	133,859	7	2	5	104,485	1.28	9
	1890	106,713	5	3	2	48,000	2.22	18
	[1]1880	.....	.....	.....	.....	.....	.....	.....
Omaha, Nebr.	1900	102,555	8	4	4	80,740	1.27	8
	1890	140,452	8	2	6	60,329	2.33	19
	[1]1880	.....	.....	.....	.....	.....	.....	.....

[1] Not reported separately.

DAILY NEWSPAPERS IN LARGE CITIES.

Scrutiny of Table 29 reveals the fact that in the 50 largest cities in the United States in 1900 there were published 451 daily newspapers, of which 204 were published in the morning and 247 in the evening, showing an excess of 43, or 17.4 per cent, for evening publications. The average number of dailies per city was 9—4.1 for morning and 4.9 for evening newspapers. Six cities reported the same number of morning as of evening newspapers; 14 cities reported more morning than evening newspapers; and 28 cities reported a greater number of evening than morning newspapers. An examination of the data given in Table 30 reveals the following figures:

TABLE 31.—*Number of morning and evening daily newspapers in 26 cities, with number of cities showing excess in each class, 1880 to 1900.*

YEAR.	DAILY NEWSPAPERS.			NUMBER OF CITIES SHOWING EXCESS IN—		Number of cities showing no difference.
	Total.	Morning.	Evening.	Morning.	Evening.	
1900	332	157	175	8	15	3
1890	309	163	146	11	12	3
1880[1]	217	124	93	15	4	2

[1] Five cities not separately reported.

Table 31 presents an interesting proof that evening newspapers have been increasing more rapidly than morning newspapers. In 1880, 21 leading cities reported 124 morning dailies and 93 evening dailies. In 1900 the same cities, with 5 new ones added because of increase in population, reported 157 morning newspapers and 175 evening newspapers—an increase of 33 publications in the former class and of 82 in the latter. Considering the cities as units, 15 out of 21 showed, in 1880, an excess of morning dailies, and 4, an excess of evening dailies, while in 2 cities the classes were equal. Out of the 26 largest cities in the United States in 1900, 15 showed an excess of evening publications and 8 an excess of morning publications, and 3 reported the same number in each class.

The tendency here shown for a limited number of large cities is confirmed by the figures for the United States.

In 1890 the total number of daily newspapers was 1,610, of which 559 were published in the morning and 1,051 in the evening; in 1900 there were 595 morning papers, an increase of 6.4 per cent, and 1,631 evening papers, an increase of 55.2 per cent. This difference appears more striking when it is recalled that the increase, during the decade, in all daily publications was 38.3 per cent. In 1890 the proportion of evening dailies to morning dailies was about 2 to 1; in 1900 about 3 to 1.

Intelligent consideration of the figures, for the cities treated in Tables 29 and 30, drawn from a comparison of aggregate circulation per issue with population, presupposes knowledge of their limitations. The figures thus secured, while interesting in themselves, possess no especial statistical value, because they are seriously affected by local conditions. It will be observed that the "rank of cities according to number of inhabitants to each copy per issue" bears no relation to the rank of these cities in population. What the aggregate circulation within a city really is, has never been ascertained. Were these statistics obtainable, it would doubtless appear that a fairly constant ratio exists between aggregate circulation and number of inhabitants.

According to figures presented in Tables 29 and 30, the rank of a city depends upon its ability to market, outside of its own limits, its newspaper and periodical products. The most important factors affecting rank as here recorded are the existence of a large adjacent community; of very populous and extended suburbs; and of a large tributary section. Of the first class, New York is the most conspicuous example: Brooklyn, which, although a part of New York city, is given separately in Table 30 for purposes of comparison, depends almost exclusively upon New York for newspaper and periodical service; Jersey City and Hoboken, N. J., are equally dependent; while Newark and Paterson, N. J., both within a radius of 20 miles, rely upon New York, to a great extent, for newspapers and periodicals. In this class, also, should be mentioned Allegheny, Pa., an independent municipality, but virtually a part of Pittsburg. Of the second class, Philadelphia, Pa., and Cincinnati, Ohio, are examples. Boston, Mass., is an example of the third class; the publications of that city not only fulfill most of the requirements of the many near-by cities, but circulate freely throughout all parts of New England.

The effect of these local conditions is twofold—the rank of the larger city is advanced, and that of the adjacent smaller city is reduced.

TABLE 32.—*Comparison of the number of inhabitants to each copy per issue in certain large cities, with that of adjacent smaller cities, 1900.*

LARGE CITIES.	Rank.	Number of inhabitants to each copy per issue.	ADJACENT SMALLER CITIES.	Rank.	Number of inhabitants to each copy per issue.
New York (Manhattan and Bronx boroughs)	[1]5	0.78	Brooklyn	[1]25	12.22
			Newark	40	3.43
			Jersey City	43	10.54
			Paterson	41	4.55
			Camden	.....	4.69
Philadelphia	10	1.28	Fall River	42	5.56
Boston	3	0.74	Cambridge	44	45.94
San Francisco	6	1.13	Oakland	.....	4.03
Cincinnati	1	0.63	Covington	.....	13.42
Pittsburg	4	0.76	Allegheny	.....	[2]
Kansas City, Mo.	2	0.72	Kansas City, Kans.	.....	22.35

[1] As shown in Table 30. [2] No daily papers.

Table 32 shows that in 1900 Cambridge, Mass., was a conspicuous example of dependence upon a larger

city for newspapers and periodicals. Cambridge is practically a part of Boston. While it is a community noted for intelligence and cultivation, and the seat of a famous university, it has patronized the publications of its larger neighbor, thus elevating the rank of the latter and establishing an apparently low record for itself.

Business managers of daily newspapers in the larger cities have been prompt to take advantage of the constantly improving mail service, and of the increased ease and speed of railway communication. The improvements along these lines during the past twenty years are reflected in the changes shown by Table 29. In 1880 no city reported a circulation as great as the number of its inhabitants. The five cities having the smallest number of inhabitants to a copy per issue were—

Pittsburg	1.41
New York	1.58
San Francisco	1.63
Boston	1.64
St. Paul	2.08

The figures here given for Pittsburg would have entitled it to eleventh place in 1900. In 1880 there were but 4 cities with less than 2 inhabitants to a copy; in 1890 there were 15 cities with less than 2, and 2 cities with less than 1; but the city which ranked first in that year would have been fifth in 1900, when 19 cities had less than 2 inhabitants to a copy, and 4 cities had less than 1. It is likely that the figures for 1880 approximately reflect local demand, while those for 1900 reflect systematic and elaborate extension.

CIRCULATION.

In Table 33 are presented, for each state and territory, the population, circulation, and number of inhabitants to each copy per issue, in 1900.

TABLE 33.—*Aggregate circulation and number of inhabitants to each copy per issue, by states and territories, 1900.*

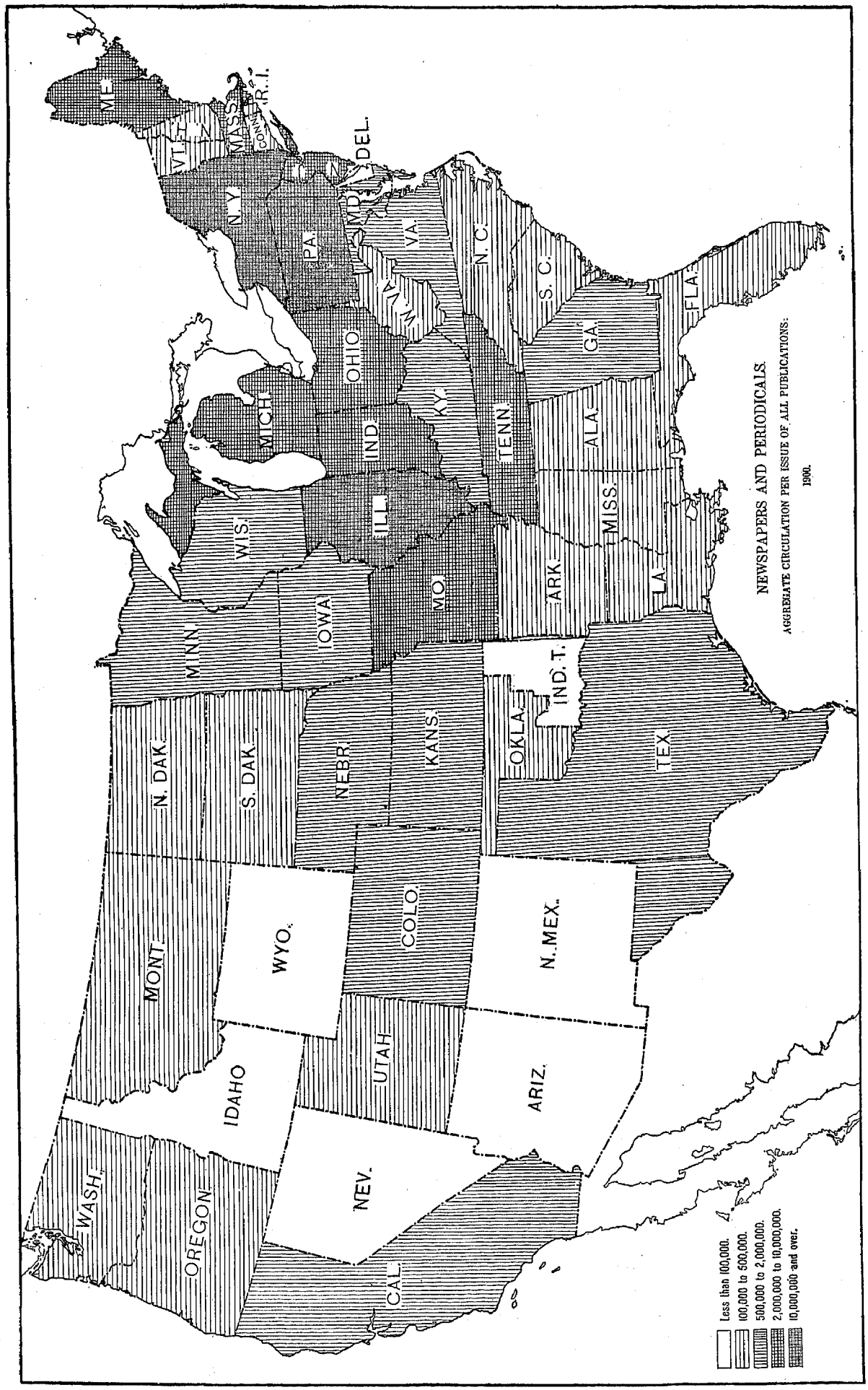
STATES AND TERRITORIES.	Population.	Aggregate circulation per issue.	Number of inhabitants to each copy per issue.
United States	[1] 75,994,575	114,299,334	0.66
Alabama	1,828,697	230,079	7.95
Arizona	122,931	34,054	3.61
Arkansas	1,311,564	262,903	4.99
California	1,485,053	1,448,656	1.03
Colorado	539,700	521,213	1.04
Connecticut	908,420	457,622	1.99
Delaware	184,735	85,900	2.15
District of Columbia	278,718	820,335	0.34
Florida	528,542	112,302	4.71
Georgia	2,216,331	549,493	4.03
Idaho	161,772	48,795	3.32
Illinois	4,821,550	10,429,368	0.46
Indiana	2,516,462	2,108,805	1.19
Indian Territory	392,060	50,141	7.82
Iowa	2,231,853	1,884,875	1.18

[1] Exclusive of Alaska, Hawaii, and persons in the military and naval service of the United States (including civilian employees, etc.) stationed abroad, not credited to any state or territory.

TABLE 33.—*Aggregate circulation and number of inhabitants to each copy per issue, by states and territories, 1900*—Continued.

STATES AND TERRITORIES.	Population.	Aggregate circulation per issue.	Number of inhabitants to each copy per issue.
Kansas	1,470,495	1,144,320	1.29
Kentucky	2,147,174	1,099,172	1.95
Louisiana	1,381,625	300,072	4.60
Maine	694,466	6,434,065	0.11
Maryland	1,188,044	679,867	1.75
Massachusetts	2,805,346	6,199,127	0.45
Michigan	2,420,982	2,374,408	1.02
Minnesota	1,751,394	1,949,630	0.90
Mississippi	1,551,270	168,942	9.18
Missouri	3,106,665	5,495,802	0.57
Montana	243,329	127,148	1.91
Nebraska	1,066,300	1,095,588	0.97
Nevada	42,335	18,153	2.33
New Hampshire	411,588	211,819	1.94
New Jersey	1,883,669	3,009,104	0.63
New Mexico	195,310	32,420	6.02
New York	7,268,894	37,626,095	0.19
North Carolina	1,893,810	287,916	6.58
North Dakota	319,146	138,890	2.30
Ohio	4,157,545	7,467,358	0.56
Oklahoma	398,331	120,077	3.32
Oregon	413,536	311,950	1.33
Pennsylvania	6,302,115	11,280,367	0.56
Rhode Island	428,556	170,594	2.51
South Carolina	1,340,316	161,988	8.27
South Dakota	401,570	232,166	1.73
Tennessee	2,020,616	3,131,017	0.65
Texas	3,048,710	1,054,761	2.89
Utah	276,749	123,279	2.24
Vermont	343,641	188,646	1.82
Virginia	1,854,184	627,280	2.96
Washington	518,103	307,128	1.69
West Virginia	958,800	226,013	4.24
Wisconsin	2,069,042	1,426,499	1.45
Wyoming	92,531	32,687	2.83

The conditions described in connection with Tables 29 and 30, as to "number of inhabitants to each copy per issue," apply also to this table. The large cities showing heavy circulation in Tables 29 and 30 are important publishing centers, distributing their products far beyond city and state boundaries. This improves the relative standing of the states which produce, as compared with those which consume. The most notable example is New York, which may be termed the national producing center for leading publications of nearly all classes, as it distributes periodical literature over the entire United States, recording the enormous total of 37,626,095 aggregate circulation per issue of all classes, or more than three times the product of any other state. Another example is Maine, which records the noteworthy aggregate circulation per issue of all classes of 6,434,065 copies, the number of inhabitants to each copy per issue being a fraction so small that in this particular Maine heads the list of states. It is clear that the market for the products of these centers of commercial activity is a national one. The relation, therefore, of population to aggregate circulation might almost be termed fortuitous. On the other hand, it must not be overlooked that the states which are large exporters are likely to be also large importers of periodical literature.


NEWSPAPERS AND PERIODICALS.
AGGREGATE CIRCULATION PER ISSUE OF ALL PUBLICATIONS:
1900.
Less than 100,000.
100,000 to 500,000.
500,000 to 2,000,000.
2,000,000 to 10,000,000.
10,000,000 and over.
ME.
VT.
N.H.
MASS.
CONN.
R.I.
N.Y.
PA.
DEL.
MD.
VA.
N.C.
S.C.
GA.
FLA.
OHIO
MICH.
IND.
KY.
TENN.
ALA.
MISS.
LA.
ARK.
WIS.
ILL.
MINN.
IOWA
MO.
N. DAK.
S. DAK.
NEBR.
KANS.
OKLA.
IND. T.
TEX.
MONT.
WYO.
COLO.
N. MEX.
IDAHO
UTAH
ARIZ.
WASH.
OREGON
NEV.
CAL.

The aggregate circulation per issue attained by the periodicals of each state, when considered as representing the extent to which the enterprise of citizens markets the product of an industry at home and abroad, possesses much significance. This feature of Table 33 is considered in detail in connection with Tables 34 and 35.

Table 34 presents a comparative summary of the main facts relating to the industry, by states and territories, 1880 to 1900. Table 35 presents a comparative summary of average and aggregate circulation per issue, classified according to period of issue, by states and territories, 1880 to 1900.

TABLE 34.—COMPARATIVE SUMMARY OF NEWSPAPERS AND PERIODICALS, BY STATES AND TERRITORIES, 1880 TO 1900.

STATES AND TERRITORIES.	Year.	NUMBER OF PUBLICATIONS.			Aggregate circulation per issue.	Aggregate number of copies issued during the census year.	WAGE-EARNERS.		Pounds of paper used.	VALUE OF NEWSPAPER PRODUCTS.		
		Total.	Reporting.	Not reporting.[1]			Average number.	Total wages.		Total.	Advertising.	Subscriptions and sales.
United States	1900	21,272	18,226	3,046	114,299,334	[2]8,168,148,749	[3]94,604	[3]$50,338,051	1,233,142,248	$175,789,610	$95,861,127	$79,928,483
	1890	17,616	14,901	2,715	69,138,934	4,681,113,580	[3]75,437	[3]40,074,937	552,876,161	[4]143,586,448	71,243,861	72,342,087
	[5]1880	11,314	[6]11,314	.....	31,779,686	2,067,848,209	71,615	28,559,336	189,145,048	89,009,074	39,136,306	49,872,768
Alabama	1900	288	175	58	230,079	25,758,633	543	241,525	2,950,889	704,767	410,090	294,677
	1890	177	136	41	246,347	19,277,464	478	225,018	2,007,288	698,114	365,654	332,460
	1880	125	125	.....	93,073	6,778,544	480	110,083	480,354	423,911	220,665	203,246
Arizona	1900	54	43	11	34,054	5,161,096	139	73,640	548,651	170,083	110,143	59,940
	1890	35	29	6	22,309	2,551,928	84	51,079	189,620	114,630	59,680	54,950
	1880	17	17	.....	13,550	1,413,600	107	45,828	105,048	95,700	58,000	37,700
Arkansas	1900	261	236	25	262,903	25,077,996	600	215,410	2,455,256	532,869	268,424	264,445
	1890	193	164	29	192,749	13,768,353	480	214,083	1,083,505	461,261	232,376	228,885
	1880	117	117	.....	103,501	4,990,595	488	119,048	383,857	340,103	182,201	157,902
California	1900	709	622	87	1,448,656	205,789,752	2,683	1,804,619	35,113,672	5,801,721	3,437,976	2,363,745
	1890	555	455	100	1,151,389	163,716,618	2,376	1,681,240	20,229,809	5,595,605	3,099,453	2,496,152
	1880	361	361	.....	640,026	72,861,836	2,349	1,300,140	6,375,390	3,936,288	2,150,917	1,785,321
Colorado	1900	329	248	81	521,213	71,702,076	1,303	770,382	12,083,992	2,105,892	1,289,888	816,004
	1890	257	186	71	229,669	30,022,108	868	699,509	4,984,842	1,804,280	1,125,534	678,746
	1880	87	87	.....	95,744	8,877,881	617	338,345	721,305	1,015,110	567,442	447,668
Connecticut	1900	207	155	52	457,622	79,366,409	1,151	703,587	10,693,278	1,755,779	1,068,998	686,781
	1890	180	156	24	496,084	48,253,243	898	530,757	4,676,762	1,490,107	766,517	723,590
	1880	139	139	.....	237,660	20,366,449	911	378,566	1,782,060	939,482	460,070	479,412
Delaware	1900	42	30	12	85,900	15,037,901	220	86,208	1,299,582	174,933	116,116	58,817
	1890	41	32	9	55,582	8,033,402	153	63,634	580,218	169,646	105,316	64,330
	1880	26	26	.....	34,425	5,172,998	190	55,279	344,864	156,088	91,983	64,105
District of Columbia	1900	87	69	18	820,835	56,720,860	600	393,220	8,787,333	1,690,643	1,069,480	621,163
	1890	48	17	31	321,151	31,715,418	347	286,690	5,357,486	1,186,783	632,918	553,865
	1880	44	44	.....	213,923	15,874,432	343	205,924	1,157,520	569,657	225,928	343,729
Florida	1900	161	97	64	112,302	14,454,595	305	134,366	1,706,343	398,594	228,352	170,242
	1890	122	97	25	107,257	10,113,301	392	161,251	1,036,382	373,888	188,589	185,299
	1880	45	45	.....	27,332	2,086,644	182	43,253	118,891	116,700	66,659	50,041
Georgia	1900	366	265	101	549,493	57,001,092	1,050	450,878	7,689,963	1,441,968	808,284	633,684
	1890	279	230	49	733,223	48,512,208	1,031	478,436	7,028,445	1,633,286	838,034	795,252
	1880	200	200	.....	269,066	20,994,549	1,084	331,327	1,530,830	948,629	468,511	480,118
Idaho	1900	78	72	1	48,795	4,170,980	187	92,819	617,790	199,948	110,010	89,938
	1890	48	33	15	21,270	1,593,500	79	48,467	141,176	117,040	67,060	49,980
	1880	10	10	.....	5,650	367,600	32	18,000	23,853	38,000	19,190	18,810
Illinois	1900	1,755	1,548	207	10,429,368	746,880,247	7,478	3,704,341	114,853,569	16,386,952	9,029,291	7,357,661
	1890	1,416	1,241	175	7,891,219	465,924,592	6,718	3,712,616	60,907,589	13,525,673	7,072,055	6,453,618
	1880	1,017	1,017	.....	2,421,275	174,696,505	6,588	2,736,717	15,649,893	7,264,585	3,179,954	4,084,631
Indiana	1900	887	841	46	2,108,805	175,432,092	4,084	1,784,059	25,546,899	3,912,514	2,070,544	1,841,970
	1890	680	620	60	1,299,418	94,466,572	2,370	955,004	8,619,064	2,784,087	1,413,047	1,371,040
	1880	467	467	.....	661,111	44,908,191	2,676	745,850	3,502,848	2,036,113	1,057,688	978,425
Indian Territory	1900	85	64	21	50,141	3,554,882	138	48,389	396,180	110,916	60,394	50,522
	1890	13	9	4	8,995	480,740	19	7,728	43,766	18,290	9,360	8,930
	[5]1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iowa	1900	1,104	1,045	59	1,884,875	158,895,158	3,393	1,311,179	20,716,211	3,777,690	1,939,852	1,837,838
	1890	804	703	101	1,088,019	80,780,202	2,695	1,101,785	7,809,310	2,670,693	1,371,817	1,298,876
	1880	569	569	.....	547,340	35,747,302	2,637	647,407	2,765,927	2,088,170	1,150,806	937,364
Kansas	1900	711	684	27	1,144,320	75,387,961	1,766	623,783	8,512,671	1,698,656	893,780	804,876
	1890	786	693	93	756,746	57,469,332	1,865	681,404	5,276,496	1,881,248	1,007,019	874,229
	1880	347	347	.....	280,729	18,569,223	1,499	335,438	1,347,475	1,006,800	591,723	415,077
Kentucky	1900	332	282	50	1,099,172	96,862,156	1,154	521,739	11,416,789	1,818,706	942,010	876,696
	1890	270	218	52	727,781	71,543,310	1,350	692,959	5,780,580	1,831,485	953,254	878,231
	1880	205	205	.....	397,564	25,382,423	1,356	272,136	2,041,378	1,468,617	671,884	796,733
Louisiana	1900	195	160	35	300,072	49,348,430	873	532,895	6,982,114	1,300,338	751,304	549,034
	1890	178	129	44	358,133	40,145,248	634	383,429	3,906,224	1,281,005	717,586	563,419
	1880	112	112	.....	131,680	15,602,320	786	411,616	1,625,250	1,130,655	617,262	513,393
Maine	1900	178	177	1	6,424,065	106,420,850	1,309	473,026	16,055,803	1,876,214	1,044,695	831,519
	1890	172	146	26	2,442,046	53,206,443	853	353,407	5,779,649	1,405,150	575,122	830,028
	1880	123	123	.....	1,214,460	25,661,845	1,036	317,006	2,567,686	1,236,461	214,394	1,022,067

[1] Publications which were in existence, but from which no returns were received.
[2] Obtained, for each class of publications, by multiplying the aggregate circulation per issue by the number of issues during the year.
[3] Includes the employees engaged in the book and job printing branch of the industry, and their wages.
[4] For purposes of comparison the figures for "book and job printing" and "all other products" are excluded.
[5] In 1880 Indian Territory and Oklahoma were reported as Indian Territory, and North Dakota and South Dakota as Dakota; the 1880 figures are included only in the totals.
[6] Includes 1,182 publications not reporting operations, as they can not be excluded from the classification.

TABLE 34.—COMPARATIVE SUMMARY OF NEWSPAPERS AND PERIODICALS BY STATES AND TERRITORIES, 1880 TO 1900—Continued.

STATES AND TERRITORIES.	Year.	NUMBER OF PUBLICATIONS.			Aggregate circulation per issue.	Aggregate number of copies issued during the census year.	WAGE-EARNERS.		Pounds of paper used.	VALUE OF NEWSPAPER PRODUCTS.		
		Total.	Reporting.	Not reporting.[1]			Average number.	Total wages.		Total.	Advertising.	Subscriptions and sales.
Maryland	1900	213	166	47	679,867	98,959,220	1,529	$758,335	16,464,816	$2,263,338	$1,490,189	$773,149
	1890	170	124	46	392,068	56,855,415	857	424,666	6,477,706	1,739,705	1,039,291	700,414
	1880	143	143	.....	414,693	50,115,182	1,163	486,958	3,983,128	1,567,893	859,847	708,046
Massachusetts	1900	627	486	141	6,199,127	531,739,780	5,432	3,769,204	92,347,453	13,170,375	6,906,320	6,264,555
	1890	668	568	100	4,662,159	261,440,450	4,214	2,473,531	34,734,860	8,549,920	3,970,820	4,579,100
	1880	427	427	.....	2,012,929	149,319,978	3,416	2,074,749	15,118,634	6,367,760	2,512,522	3,855,238
Michigan	1900	802	698	104	2,374,403	200,457,376	2,916	1,302,493	24,267,484	3,819,560	2,187,461	1,682,099
	1890	657	589	68	1,511,915	122,904,401	2,772	1,122,366	11,680,577	3,274,089	1,711,309	1,562,780
	1880	464	464	.....	620,974	46,659,470	2,439	729,673	4,648,339	2,057,438	1,002,092	1,055,346
Minnesota	1900	669	622	47	1,949,630	169,257,418	2,714	1,304,229	26,663,512	3,981,874	2,295,482	1,686,392
	1890	445	392	53	1,023,005	95,551,359	1,919	1,045,013	10,193,158	3,153,605	1,639,186	1,514,469
	1880	223	223	.....	222,074	18,097,781	1,178	390,161	1,545,303	947,903	524,540	423,363
Mississippi	1900	223	178	45	168,942	13,398,752	440	164,435	1,560,884	395,068	195,133	199,935
	1890	161	119	42	108,061	7,266,800	272	90,159	493,593	279,025	139,576	139,449
	1880	123	123	.....	87,904	5,293,418	468	109,086	426,012	380,893	211,934	168,959
Missouri	1900	1,052	940	112	5,495,802	446,832,760	3,758	2,056,148	66,173,770	8,144,216	4,615,545	3,528,671
	1890	803	707	96	2,615,135	225,781,297	3,831	2,028,061	27,462,453	6,826,120	3,465,701	3,360,419
	1880	580	580	.....	965,285	79,265,309	3,215	1,284,831	9,925,367	3,578,921	1,710,241	1,868,680
Montana	1900	95	89	6	127,148	19,012,404	455	310,802	2,918,505	705,229	390,598	314,631
	1890	61	52	9	68,980	9,106,770	229	230,890	783,627	427,744	227,865	199,879
	1880	18	18	.....	20,827	1,280,480	94	66,700	114,990	177,750	84,130	93,620
Nebraska	1900	626	538	88	1,095,538	85,959,780	1,334	626,597	11,544,598	1,887,933	1,002,462	885,471
	1890	550	446	104	685,505	52,037,259	1,331	656,001	5,583,456	2,007,990	1,091,110	916,880
	1880	189	189	.....	154,570	11,717,103	762	250,732	903,207	712,544	391,825	320,719
Nevada	1900	36	35	1	18,153	2,395,582	68	35,024	156,576	93,702	49,272	44,430
	1890	25	15	10	14,530	3,010,210	51	46,121	158,962	93,209	51,835	41,374
	1880	37	37	.....	27,745	5,820,575	202	162,338	354,444	338,800	215,139	123,661
New Hampshire	1900	107	88	19	211,819	22,421,947	571	261,871	3,445,068	507,663	274,818	232,845
	1890	127	111	16	261,040	21,314,338	527	234,272	1,911,461	544,786	263,253	281,533
	1880	87	87	.....	185,968	9,635,410	412	119,203	581,916	359,859	179,015	180,844
New Jersey	1900	389	298	91	3,009,104	103,924,361	2,077	1,162,038	17,034,314	2,663,899	1,813,518	850,381
	1890	318	263	55	1,486,777	75,855,311	1,594	857,750	6,447,571	2,234,291	1,201,280	1,033,011
	1880	215	215	.....	249,478	22,150,095	1,364	454,533	1,698,173	1,175,015	694,157	480,858
New Mexico	1900	55	42	13	32,420	3,020,460	142	75,477	330,587	128,839	76,513	52,326
	1890	41	34	7	23,157	2,524,262	97	55,047	160,834	152,480	78,230	74,250
	1880	18	18	.....	6,355	838,860	79	31,292	56,352	70,972	35,883	35,089
New York	1900	2,067	1,477	590	37,626,095	2,324,952,983	16,460	10,924,755	378,603,033	49,216,268	25,369,048	23,847,220
	1890	1,938	1,627	311	18,031,391	1,177,147,744	11,838	7,654,864	165,413,361	37,842,822	17,861,315	19,981,507
	1880	1,411	1,411	.....	9,374,184	577,755,819	12,402	6,460,071	57,823,682	24,266,911	8,674,173	15,592,738
North Carolina	1900	261	200	61	287,916	28,081,732	653	230,941	2,562,834	610,418	290,566	319,852
	1890	176	135	41	178,077	14,821,936	460	161,616	1,111,101	440,710	211,733	228,977
	1880	142	142	.....	105,501	6,819,382	502	119,809	460,690	344,132	178,324	165,808
North Dakota	1900	157	139	18	138,890	12,544,161	326	143,096	1,662,800	420,195	259,041	161,154
	1890	112	87	25	86,425	6,357,508	260	140,563	510,604	307,392	179,216	128,176
	[2]1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio	1900	1,236	1,039	197	7,467,358	591,526,155	6,360	3,119,596	73,544,764	9,643,982	4,863,620	4,780,362
	1890	1,093	932	161	5,639,781	306,568,217	5,407	2,554,436	29,823,811	8,360,115	3,850,306	4,509,809
	1880	774	774	.....	3,093,931	152,579,380	5,313	1,761,038	11,065,159	6,109,448	2,460,642	3,648,806
Oklahoma	1900	127	110	17	120,077	10,698,566	379	139,021	1,407,298	250,681	138,587	112,144
	1890	30	21	9	14,654	1,462,382	69	25,183	98,445	45,495	26,300	19,195
	[2]1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon	1900	207	188	19	311,950	29,434,167	610	292,579	4,276,251	825,455	463,172	362,283
	1890	137	126	11	208,855	19,159,764	509	346,317	2,150,770	951,827	544,328	407,499
	1880	74	74	.....	85,786	8,578,218	343	128,480	709,336	367,189	177,095	190,094
Pennsylvania	1900	1,444	1,365	79	11,280,367	923,178,870	9,565	5,094,769	155,846,813	18,364,867	10,741,028	7,623,339
	1890	1,476	1,271	205	9,472,083	633,014,599	7,587	3,841,669	71,130,406	16,380,582	7,345,234	9,035,348
	1880	973	973	.....	5,031,061	297,559,892	7,288	2,913,162	28,026,402	9,819,497	4,218,770	5,100,727
Rhode Island	1900	61	40	21	170,594	42,692,180	488	318,219	5,564,505	866,401	555,503	310,898
	1890	72	54	18	148,868	26,228,741	432	288,611	3,135,927	727,040	443,901	283,139
	1880	44	44	.....	97,121	14,496,498	443	206,526	123,745	455,726	244,155	211,571
South Carolina	1900	134	117	17	161,988	15,355,730	413	156,924	1,849,953	416,594	198,422	218,172
	1890	100	84	16	121,672	11,248,784	380	146,287	1,007,108	445,661	212,081	233,580
	1880	81	81	.....	69,902	5,774,415	393	110,081	432,478	309,238	145,907	163,331
South Dakota	1900	269	218	51	232,166	14,597,255	422	164,456	1,569,169	475,668	245,737	229,931
	1890	227	174	53	142,862	10,336,288	416	192,575	813,714	450,415	249,433	200,982
	[2]1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	1900	298	251	47	3,131,017	124,423,368	951	456,418	9,786,819	1,715,886	761,785	954,101
	1890	254	219	35	1,450,118	72,094,743	965	489,948	5,185,720	1,479,767	737,741	742,026
	1880	193	193	.....	293,288	18,293,872	901	265,456	1,423,483	784,081	373,450	410,631
Texas	1900	820	722	98	1,054,761	100,811,006	1,829	916,029	11,075,808	2,864,387	1,600,616	1,263,771
	1890	512	437	75	658,183	55,640,136	1,455	761,824	5,345,193	2,212,990	1,263,338	949,652
	1880	280	280	.....	268,289	19,888,792	1,457	772,059	1,791,588	1,100,295	570,089	530,206

[1] Publications which were in existence, but from which no returns were received.
[2] In 1880 Indian Territory and Oklahoma were reported as Indian Territory, and North Dakota and South Dakota as Dakota; the 1880 figures are included only in the totals.

TABLE 34.—COMPARATIVE SUMMARY OF NEWSPAPERS AND PERIODICALS BY STATES AND TERRITORIES, 1880 TO 1900—Continued.

STATES AND TERRITORIES.	Year.	NUMBER OF PUBLICATIONS.			Aggregate circulation per issue.	Aggregate number of copies issued during the census year.	WAGE-EARNERS.		Pounds of paper used.	VALUE OF NEWSPAPER PRODUCTS.		
		Total.	Reporting.	Not reporting.[1]			Average number.	Total wages.		Total.	Advertising.	Subscriptions and sales.
Utah	1900	80	72	8	123,279	14,304,587	431	$235,174	2,424,121	$455,498	$234,087	$221,411
	1890	39	28	11	68,000	9,626,740	294	183,651	1,206,050	483,555	271,770	211,785
	1880	22	22	.....	36,175	3,867,500	168	88,580	321,039	177,058	81,270	95,788
Vermont	1900	80	79	1	188,646	15,281,431	436	176,748	1,943,599	371,110	200,307	170,803
	1890	76	70	6	207,565	9,189,590	307	134,386	996,377	322,160	141,027	181,133
	1880	82	82	.....	130,192	5,681,464	371	92,959	538,301	262,719	102,619	160,100
Virginia	1900	255	204	51	627,280	51,213,030	771	338,618	4,581,295	907,025	510,729	396,296
	1890	231	185	46	346,056	28,172,077	652	272,684	1,977,387	818,078	424,255	393,818
	1880	194	194	.....	256,471	18,422,845	961	261,362	1,352,980	698,826	356,204	342,622
Washington	1900	223	199	24	307,128	38,239,106	626	315,500	4,505,960	1,178,721	772,517	406,204
	1890	172	144	28	204,488	23,547,244	569	434,710	2,615,931	1,149,285	759,784	389,501
	1880	29	29	.....	16,751	1,062,103	109	34,975	76,968	87,400	48,840	38,560
West Virginia	1900	192	176	16	226,013	24,453,873	707	295,413	2,916,238	576,493	282,845	293,648
	1890	144	112	32	130,328	12,428,686	401	135,312	1,080,543	389,257	188,351	200,906
	1880	109	109	.....	85,958	4,903,466	511	99,671	378,670	301,411	169,280	132,131
Wisconsin	1900	654	595	59	1,426,499	132,510,954	2,679	1,174,242	17,383,974	2,900,231	1,414,475	1,485,756
	1890	521	456	65	1,053,389	86,422,737	2,040	769,046	7,574,249	2,354,825	1,015,423	1,339,402
	1880	340	340	.....	436,576	27,901,051	1,980	531,903	2,428,546	1,589,725	754,920	834,805
Wyoming	1900	44	42	2	32,687	2,446,644	86	47,840	302,462	108,851	62,150	46,701
	1890	31	25	6	24,370	2,478,860	62	48,942	172,995	149,242	88,028	61,214
	1880	11	11	.....	5,686	803,260	46	25,900	77,506	47,300	32,950	14,350

[1] Publications which were in existence, but from which no returns were received.

TABLE 35.—COMPARATIVE STATEMENT OF NEWSPAPERS AND PERIODICALS, AVERAGE AND AGGREGATE CIRCU-

	STATES AND TERRITORIES.	Year.	AVERAGE CIRCULATION PER ISSUE. All classes.	Daily.	Triweekly.	Semi-weekly.	Weekly.	Monthly.	Quarterly.	All other classes.
1	United States	1900	6,271	6,784	3,687	4,447	3,071	21,750	47,331	20,695
		1890	4,640	5,209	1,473	2,896	2,678	11,317	36,109	11,851
		1880	3,122	4,187	1,001	2,136	2,113	7,834	16,505	6,474
2	Alabama	1900	1,315	2,560	700	2,170	1,086	1,700	.....	2,392
		1890	1,815	2,297	.....	1,500	1,606	974	14,500	976
		1880	862	1,932	200	.....	778	1,175	.....	1,500
3	Arizona	1900	792	1,146	.....	.....	700	206	.....	.....
		1890	769	651	.....	.....	814	.....	.....	.....
		1880	968	720	.....	.....	1,106	.....	.....	.....
4	Arkansas	1900	1,114	1,907	1,000	2,821	943	2,363	5,000	333
		1890	1,175	1,137	.....	.....	1,172	1,393	.....	600
		1880	1,067	1,006	.....	1,500	927	500	.....	5,283
5	California	1900	2,329	4,065	480	1,061	1,557	2,744	18,750	2,975
		1890	2,531	4,591	375	619	1,942	3,336	7,000	1,650
		1880	2,006	3,288	2,750	2,071	1,580	3,064	1,725	1,425
6	Colorado	1900	2,102	3,738	500	667	1,595	3,338	1,250	992
		1890	1,235	2,983	1,300	720	842	4,875	.....	.....
		1880	1,294	1,884	.....	600	1,070	2,475	.....	.....
7	Connecticut	1900	2,952	4,746	.....	1,333	2,101	4,931	900	4,450
		1890	3,180	3,448	.....	745	1,921	9,264	4,500	1,275
		1880	1,917	2,968	.....	850	1,737	2,583	700	794
8	Delaware	1900	2,863	5,718	.....	1,700	2,084	3,075	.....	.....
		1890	1,737	4,090	.....	.....	1,310	1,250	.....	.....
		1880	1,484	3,950	.....	.....	928	1,000	.....	.....
9	District of Columbia	1900	11,896	12,606	.....	1,000	9,808	16,093	1,380	11,628
		1890	18,891	15,663	.....	.....	22,136	7,500	.....	.....
		1880	5,485	9,125	.....	.....	5,535	4,747	1,050	.....
10	Florida	1900	1,158	2,537	1,000	5,000	872	1,513	.....	.....
		1890	1,106	1,384	500	.....	1,088	2,000	.....	300
		1880	739	1,300	.....	500	719	.....	.....	.....
11	Georgia	1900	2,074	3,810	.....	3,771	1,619	3,966	1,000	2,058
		1890	3,188	3,713	.....	2,000	2,499	6,166	3,000	12,200
		1880	1,259	2,141	600	1,100	1,089	3,706	.....	700
12	Idaho	1900	678	1,020	.....	929	615	1,500	.....	625
		1890	645	567	.....	440	668	.....	.....	.....
		1880	628	.....	500	500	664	.....	.....	.....
13	Illinois	1900	6,737	7,356	1,335	2,371	3,867	14,032	73,193	5,481
		1890	6,359	6,401	450	1,541	4,007	8,941	64,407	5,252
		1880	2,551	3,955	1,085	1,713	2,269	4,463	1,500	2,478
14	Indiana	1900	2,507	2,214	.....	1,888	1,530	11,176	7,770	3,867
		1890	2,096	1,805	.....	1,420	1,504	6,097	4,867	5,056
		1880	1,552	1,913	858	2,250	1,464	2,410	.....	979
15	Indian Territory	1900	783	558	.....	.....	519	450	.....	.....
		1890	999	500	.....	.....	1,062	.....	.....	.....
		[1]1880	.....	.....	.....	.....	.....	.....	.....	.....
16	Iowa	1900	1,804	3,347	2,746	2,908	1,331	4,706	3,441	3,749
		1890	1,548	2,404	2,400	1,028	1,341	3,411	3,188	3,480
		1880	1,071	1,479	200	633	997	1,990	3,000	832
17	Kansas	1900	1,673	1,988	800	6,680	1,161	6,295	4,260	2,722
		1890	1,092	1,913	.....	827	960	3,317	700	743
		1880	961	1,528	.....	1,800	878	1,871	.....	1,200
18	Kentucky	1900	3,898	6,097	1,800	5,232	2,239	8,202	2,167	22,580
		1890	3,338	5,406	3,300	2,886	2,700	2,265	.....	18,456
		1880	2,184	3,045	900	1,141	1,743	1,272	.....	42,850
19	Louisiana	1900	1,875	4,652	1,200	5,450	1,227	983	.....	2,900
		1890	2,777	6,550	.....	5,200	2,282	3,123	1,700	2,967
		1880	1,380	3,460	1,000	8,000	969	475	.....	2,200
20	Maine	1900	36,351	3,989	.....	3,546	2,208	136,011	881	2,050
		1890	16,726	2,770	.....	1,350	2,621	54,574	1,000	50,403
		1880	11,041	1,894	480	.....	1,962	60,953	1,500	400
21	Maryland	1900	4,096	13,706	.....	8,680	2,492	6,217	3,000	767
		1890	3,162	12,462	.....	.....	2,062	3,679	6,925	2,916
		1880	3,166	9,472	.....	.....	2,508	1,976	900	1,413
22	Massachusetts	1900	12,755	11,589	.....	4,621	7,569	26,555	24,206	43,669
		1890	8,208	7,960	.....	3,634	5,363	10,795	25,223	18,611
		1880	5,122	7,789	400	2,671	4,273	7,870	8,157	1,406
23	Michigan	1900	3,402	5,298	1,595	8,352	1,441	15,139	10,080	2,128
		1890	2,567	4,096	1,700	1,338	1,843	7,709	10,552	3,611
		1880	1,465	2,167	2,083	1,822	1,347	1,958	6,875	1,707
24	Minnesota	1900	3,134	6,824	5,000	10,629	1,843	7,539	2,275	14,104
		1890	2,610	6,014	.....	15,000	1,667	3,546	1,000	26,346
		1880	1,116	3,562	750	.....	909	5,030	.....	475
25	Mississippi	1900	949	1,258	502	540	914	1,653	.....	850
		1890	908	1,225	500	.....	894	850	.....	1,018
		1880	806	840	733	400	773	2,033	.....	.....

[1] Includes 150,000 circulation for 5 weeklies, 1 semimonthly, 14 monthlies, and 12 quarterlies in Georgia and Illinois, not separately returned.
[2] Includes 6 semiannual publications, having a circulation of 19,750, distributed as follows: Illinois, 1; Michigan, 1; New York, 3; Pennsylvania, 1.
[3] Includes 50,000 circulation for 1 weekly, 1 semimonthly, and 1 monthly not separately returned.

LATION PER ISSUE, CLASSIFIED ACCORDING TO PERIOD OF ISSUE, BY STATES AND TERRITORIES, 1880 TO 1900.

AGGREGATE CIRCULATION PER ISSUE.								
All classes.	Daily.	Triweekly.	Semiweekly.	Weekly.	Monthly.	Quarterly.	All other classes.	
114,299,334	15,102,156	228,610	2,832,868	39,852,052	39,519,897	11,217,422	5,546,329	1
69,188,984	8,387,188	50,067	561,743	28,954,515	19,624,038	8,124,500	3,436,883	
[1]31,779,686	3,566,395	68,086	264,910	16,266,880	8,139,881	[2]1,964,049	1,359,535	
230,079	48,645	700	4,340	155,244	6,800	.....	14,350	2
246,847	32,154	.....	1,500	173,477	8,766	29,000	1,950	
93,078	9,660	200	.....	73,163	7,050	.....	3,000	
34,054	11,456	.....	.....	22,392	206	.....	.....	3
22,809	5,210	.....	.....	17,099	.....	.....	.....	
13,550	3,600	.....	.....	9,950	.....	.....	.....	
262,903	38,140	1,000	11,285	187,578	18,900	5,000	1,000	4
192,749	15,917	.....	.....	166,482	9,750	.....	600	
103,501	5,030	.....	1,500	80,621	500	.....	15,850	
1,448,656	475,506	480	23,342	618,146	194,792	112,500	23,800	5
1,151,389	399,454	750	6,810	604,050	123,425	7,000	9,900	
640,026	157,814	5,500	20,710	345,962	98,040	3,450	8,550	
521,213	157,016	500	2,000	285,425	72,947	1,250	2,075	6
229,669	68,150	1,300	2,160	128,809	29,250	.....	.....	
95,744	26,375	.....	600	58,869	9,900	.....	.....	
457,622	208,815	.....	29,325	155,507	44,375	1,800	17,800	7
496,084	117,246	.....	1,490	182,472	185,276	4,500	5,100	
237,660	47,490	.....	1,700	152,895	31,000	1,400	3,175	
85,900	34,277	.....	1,700	43,773	6,150	.....	.....	8
55,582	20,450	.....	.....	30,132	5,000	.....	.....	
34,425	15,800	.....	.....	17,625	1,000	.....	.....	
820,835	100,848	.....	1,000	304,037	354,050	2,760	58,140	9
321,151	62,651	.....	.....	243,500	15,000	.....	.....	
218,923	36,500	.....	.....	105,162	71,211	1,050	.....	
112,302	27,907	1,000	5,000	66,295	12,100	.....	.....	10
107,257	16,605	1,000	.....	87,052	2,000	.....	600	
27,332	2,600	.....	1,000	23,732	.....	.....	.....	
549,493	102,872	.....	33,941	331,905	67,425	1,000	12,350	11
733,223	70,546	.....	2,000	442,250	178,827	3,000	36,600	
[3]269,066	27,880	1,800	3,300	150,686	33,350	.....	2,100	
48,795	5,100	.....	4,645	36,300	1,500	.....	1,250	12
21,270	1,700	.....	880	18,690	.....	.....	.....	
5,650	.....	500	500	4,650	.....	.....	.....	
10,429,368	1,449,087	5,338	170,720	3,866,983	3,072,932	1,683,434	180,874	13
7,891,219	774,486	900	30,820	3,437,663	1,627,250	1,867,800	152,300	
[4]2,421,275	270,923	6,510	29,129	1,527,042	401,646	[5]31,500	54,525	
2,108,805	345,404	.....	77,185	858,424	715,292	77,700	34,800	14
1,299,418	166,051	.....	2,840	673,798	371,909	29,200	55,620	
661,111	72,698	1,716	2,250	518,322	60,250	.....	5,875	
50,141	3,350	.....	.....	45,891	900	.....	.....	15
8,995	500	.....	.....	8,495	.....	.....	.....	
1,884,875	217,589	19,224	168,672	1,105,666	301,205	27,529	44,990	16
1,088,019	110,563	4,800	14,397	795,077	133,032	12,750	17,400	
547,340	38,455	200	1,900	449,550	51,740	3,000	2,495	
1,144,320	105,348	800	20,040	653,507	321,050	21,890	21,775	17
756,746	82,266	.....	2,480	596,089	72,983	700	2,228	
280,729	21,396	.....	1,800	230,141	26,192	.....	1,200	
1,099,172	164,624	1,800	125,575	425,323	262,450	6,500	112,900	18
727,781	135,150	3,800	20,200	445,485	29,451	.....	94,195	
397,564	33,492	1,800	6,844	240,473	29,255	.....	85,700	
300,072	106,990	2,400	32,698	137,434	14,750	.....	5,800	19
358,183	78,600	.....	5,200	225,883	40,600	1,700	6,200	
181,630	38,065	1,000	8,000	81,415	950	.....	2,200	
6,434,065	59,888	.....	17,728	220,759	6,120,490	7,050	8,200	20
2,442,046	41,545	.....	1,350	230,642	1,964,659	2,000	201,850	
1,214,460	18,940	480	.....	156,940	1,036,200	1,500	400	
679,567	247,552	.....	17,360	316,505	93,250	3,000	2,200	21
392,068	137,085	.....	.....	210,310	22,075	13,850	8,748	
414,693	132,613	.....	.....	255,770	19,760	900	5,650	
6,199,127	1,130,820	.....	32,350	2,066,369	2,257,142	363,096	349,350	22
4,662,159	445,781	.....	25,440	1,802,125	1,327,740	781,910	279,163	
2,012,929	280,399	400	34,727	1,089,515	574,538	22,100	11,250	
2,374,403	370,848	7,975	192,098	752,032	984,025	50,400	17,025	23
1,511,915	212,975	1,700	6,690	869,764	377,784	10,552	32,500	
620,974	62,839	6,250	3,965	488,927	33,293	[5]18,750	11,950	
1,949,630	300,266	5,000	95,660	908,478	452,329	4,550	183,347	24
1,023,005	180,433	.....	15,000	518,563	148,933	2,000	158,076	
222,074	28,493	750	.....	167,206	25,150	.....	475	
168,942	16,348	502	1,080	142,702	6,610	.....	1,700	25
108,061	7,350	500	.....	91,206	5,950	.....	3,055	
87,904	4,200	2,200	400	75,004	6,100	.....	.....	

[4]Includes 100,000 circulation for 4 weeklies, 13 monthlies, and 12 quarterlies, not separately returned.
[5]Includes 1 semiannual.
[6]Indian Territory and Oklahoma were reported as Indian Territory in 1880. Average circulation, all classes, 2,030; weekly, 2,030. Aggregate circulation, all classes, 4,060; weekly, 4,060.

TABLE 35.—COMPARATIVE STATEMENT OF NEWSPAPERS AND PERIODICALS, AVERAGE AND AGGREGATE CIRCULA-

	STATES AND TERRITORIES.	Year.	AVERAGE CIRCULATION PER ISSUE.							
			All classes.	Daily.	Triweekly.	Semi-weekly.	Weekly.	Monthly.	Quarterly.	All other classes.
26	Missouri	1900	5,847	3,810	200	23,511	2,680	13,649	63,932	9,542
		1890	2,699	5,285	1,305	4,100	2,610	8,558	15,056	2,566
		1880	2,041	3,228	1,265	1,100	1,750	3,418	800	2,823
27	Montana	1900	1,429	3,333	.....	2,345	887	2,165	7,000	.....
		1890	1,327	2,130	960	1,250	1,209	617	.....	1,090
		1880	1,338	304	.....	.....	1,660	.....	.....	.....
28	Nebraska	1900	2,036	3,825	1,200	3,313	1,433	9,141	983	2,421
		1890	1,425	2,732	.....	450	1,134	7,623	.....	2,614
		1880	888	1,553	.....	500	791	2,173	.....	600
29	Nevada	1900	519	581	160	583	501	500	.....	.....
		1890	969	1,450	.....	.....	648	.....	.....	.....
		1880	841	1,225	.....	.....	561	500	.....	.....
30	New Hampshire	1900	2,407	3,030	2,625	.....	2,372	1,050	.....	.....
		1890	2,352	2,369	.....	725	2,431	1,994	.....	.....
		1880	2,296	907	.....	.....	1,800	5,614	.....	7,400
31	New Jersey	1900	10,098	4,556	.....	950	1,631	1,703	34,126	2,251,500
		1890	5,653	3,420	650	2,200	1,499	49,348	1,042	1,433
		1880	1,306	2,116	750	900	1,112	1,811	6,000	517
32	New Mexico	1900	772	1,273	.....	.....	714	500	800	1,150
		1890	681	1,284	.....	.....	604	.....	.....	500
		1880	530	667	.....	.....	484	.....	.....	.....
33	New York	1900	25,475	18,826	18,272	8,863	14,458	62,232	65,046	42,300
		1890	11,083	13,081	3,638	3,258	6,848	17,697	34,943	12,649
		1880	7,222	9,059	1,128	4,371	5,265	11,040	19,736	5,840
34	North Carolina	1900	1,440	1,716	.....	1,633	1,392	1,205	700	1,392
		1890	1,319	1,156	.....	667	1,371	1,810	500	1,275
		1880	894	793	375	700	878	1,125	.....	1,308
35	North Dakota	1900	999	2,002	.....	3,550	843	3,775	.....	.....
		1890	993	1,317	.....	1,000	897	2,200	.....	.....
		[2]1880	.....	.....	.....	.....	.....	.....	.....	.....
36	Ohio	1900	7,187	7,204	1,663	3,984	3,484	15,783	119,707	35,536
		1890	6,051	4,130	1,404	2,328	3,144	9,024	53,720	41,584
		1880	4,345	4,507	888	1,563	2,450	7,880	51,109	17,589
37	Oklahoma	1900	1,092	1,680	.....	800	1,041	1,383	.....	500
		1890	698	575	.....	.....	722	1,100	.....	.....
		[3]1880	.....	.....	.....	.....	.....	.....	.....	.....
38	Oregon	1900	1,659	2,438	.....	1,058	1,848	2,779	.....	2,200
		1890	1,658	2,045	.....	1,400	1,542	2,500	.....	600
		1880	1,320	1,581	.....	.....	1,133	2,555	1,600	.....
39	Pennsylvania	1900	8,264	9,783	1,641	6,003	4,181	18,240	47,424	10,146
		1890	7,462	8,682	1,900	5,006	4,067	10,390	43,912	16,726
		1880	5,628	6,285	1,500	4,600	3,255	10,926	29,180	20,096
40	Rhode Island	1900	4,265	9,904	100	2,251	1,794	2,112	3,000	.....
		1890	2,757	7,551	.....	425	1,989	1,574	350	.....
		1880	2,490	5,175	.....	700	1,984	1,018	.....	400
41	South Carolina	1900	1,384	2,698	200	1,555	1,327	800	.....	1,500
		1890	1,448	2,854	200	463	1,841	.....	3,500	2,000
		1880	971	1,937	450	500	959	555	700	.....
42	South Dakota	1900	1,065	1,029	.....	1,600	801	3,822	.....	9,422
		1890	818	727	.....	800	745	1,715	.....	4,000
		[2]1880	.....	.....	.....	.....	.....	.....	.....	.....
43	Tennessee	1900	12,474	10,357	.....	1,283	6,076	9,648	154,090	2,588
		1890	6,622	4,608	.....	2,070	4,474	4,929	82,583	3,213
		1880	1,822	3,099	.....	850	1,714	2,385	2,450	1,223
44	Texas	1900	1,461	1,778	.....	4,609	1,266	1,861	1,250	2,563
		1890	1,506	2,074	480	1,207	1,358	2,831	1,000	10,000
		1880	1,145	1,262	600	725	938	6,504	.....	650
45	Utah	1900	1,712	4,027	2,000	4,376	735	3,450	75	5,500
		1890	2,429	2,281	.....	2,868	1,367	3,000	.....	3,600
		1880	1,904	1,987	.....	2,050	1,707	1,525	.....	3,500
46	Vermont	1900	2,388	2,967	.....	4,200	2,030	3,525	300	2,600
		1890	2,965	2,140	.....	.....	1,729	13,800	.....	.....
		1880	2,245	1,050	.....	.....	1,492	17,167	1,100	285
47	Virginia	1900	3,075	2,496	1,033	2,172	2,315	4,213	20,083	3,233
		1890	1,871	2,243	192	620	1,632	3,127	5,833	1,250
		1880	1,449	1,892	740	699	1,073	2,363	1,767	6,308
48	Washington	1900	1,543	5,638	500	2,617	1,052	1,972	2,650	1,833
		1890	1,420	2,720	.....	.....	1,179	2,279	.....	450
		1880	698	367	.....	.....	745	.....	.....	.....
49	West Virginia	1900	1,284	2,294	.....	1,225	1,205	582	.....	1,200
		1890	1,164	2,511	.....	250	1,065	1,100	.....	425
		1880	868	2,050	500	625	852	961	1,000	150
50	Wisconsin	1900	2,397	3,565	1,000	7,714	1,666	4,523	13,920	6,167
		1890	2,310	2,289	.....	44,368	1,762	2,586	6,875	8,305
		1880	1,404	1,856	1,267	700	1,280	1,814	.....	4,138
51	Wyoming	1900	778	825	500	493	653	2,333	.....	.....
		1890	975	924	.....	.....	988	.....	.....	.....
		1880	632	662	.....	.....	617	.....	.....	.....

[1] Includes 3 semiannuals.

[2] North Dakota and South Dakota were reported as Dakota in 1880. Average circulation, all classes, 616; daily, 562; weekly, 612. Aggregate circulation all classes, 36,943; dailies, 4,500; weeklies, 32,443.

TION PER ISSUE, CLASSIFIED ACCORDING TO PERIOD OF ISSUE, BY STATES AND TERRITORIES, 1880 TO 1900—Cont'd.

AGGREGATE CIRCULATION PER ISSUE.								
All classes.	Daily.	Triweekly.	Semiweekly.	Weekly.	Monthly.	Quarterly.	All other classes.	
5,495,802	810,492	200	329,153	1,862,856	1,378,586	895,050	219,465	26
2,615,135	428,094	2,610	28,700	1,346,714	624,767	135,500	48,750	
965,285	122,660	10,120	1,100	645,747	153,800	800	31,058	
127,148	42,164	.....	9,380	62,109	6,495	7,000	.....	27
68,980	19,170	960	1,250	44,750	1,850	.....	1,000	
20,827	912	.....	.....	19,915	.....	.....	.....	
1,095,538	122,414	1,200	53,008	650,349	255,935	2,950	9,682	28
635,505	84,698	.....	900	447,757	88,850	.....	18,300	
154,570	18,630	.....	500	121,800	13,040	.....	600	
18,153	5,226	160	1,750	10,517	500	.....	.....	29
14,530	8,700	.....	.....	5,830	.....	.....	.....	
27,745	17,155	.....	.....	10,090	500	.....	.....	
211,819	42,419	5,250	.....	158,900	5,250	.....	.....	30
261,040	87,900	.....	1,450	201,752	19,938	.....	.....	
185,968	9,070	.....	.....	107,998	39,300	.....	29,600	
3,009,104	228,283	.....	1,900	367,021	28,950	136,500	2,251,500	31
1,486,777	160,746	1,300	2,200	278,791	1,036,315	3,125	4,300	
249,478	50,776	750	8,600	164,502	16,300	12,000	1,550	
32,420	3,820	.....	.....	25,000	500	800	2,300	32
23,157	5,134	.....	.....	17,523	.....	.....	500	
6,355	2,000	.....	.....	4,355	.....	.....	.....	
37,626,095	3,896,967	146,175	460,867	12,607,099	16,927,062	2,276,625	1,311,300	33
18,031,391	2,119,101	14,550	100,998	6,347,827	6,990,400	1,712,200	746,315	
9,374,184	996,561	4,510	100,544	4,253,908	2,903,527	[1]828,913	286,171	
287,916	44,620	.....	24,490	197,706	12,050	700	8,350	34
178,077	23,110	.....	2,000	139,867	9,050	1,500	2,550	
105,501	7,934	750	1,400	83,437	6,750	.....	5,230	
138,890	18,021	.....	7,100	106,219	7,550	.....	.....	35
86,425	9,220	.....	2,000	66,405	8,800	.....	.....	
7,467,358	1,224,715	18,300	211,161	2,411,172	1,420,501	1,795,609	390,900	36
5,639,781	499,712	9,825	44,230	1,996,400	956,522	1,342,997	790,095	
3,093,931	216,336	6,700	6,250	1,328,183	622,531	562,200	351,781	
120,077	14,674	.....	800	99,953	4,150	.....	500	37
14,654	3,450	.....	.....	10,104	1,100	.....	.....	
311,950	51,191	.....	14,810	166,511	75,038	.....	4,400	38
208,855	32,712	.....	1,400	154,248	20,000	.....	500	
85,786	11,070	.....	.....	57,786	15,330	1,600	.....	
11,280,367	1,917,426	8,206	282,142	3,691,954	3,246,779	1,991,819	142,041	39
9,472,083	1,241,514	5,700	65,078	3,135,664	2,763,798	1,624,741	635,588	
5,031,061	578,227	6,000	13,800	1,998,340	1,606,073	[4]466,886	361,735	
170,594	118,844	100	6,754	37,671	4,225	3,000	.....	40
148,868	67,959	.....	425	59,666	20,468	350	.....	
97,121	41,402	.....	700	51,579	3,040	.....	400	
161,988	18,850	200	23,327	110,111	8,000	.....	1,500	41
121,672	17,125	200	925	97,922	.....	3,500	2,000	
69,902	7,750	1,350	500	58,492	1,110	700	.....	
232,166	16,463	.....	1,600	151,438	34,400	.....	28,265	42
142,362	13,812	.....	2,400	105,000	17,150	.....	4,000	
3,131,017	165,718	.....	7,700	1,136,199	270,150	1,540,900	10,350	43
1,450,118	82,941	.....	4,140	756,105	98,582	495,500	12,350	
293,288	30,995	.....	1,700	224,503	23,850	4,900	7,340	
1,054,761	147,602	.....	101,392	732,867	61,400	1,250	10,250	44
658,183	87,123	480	7,240	498,557	53,783	1,000	10,000	
263,289	30,297	600	1,450	180,102	49,540	.....	1,300	
123,279	24,163	2,000	30,630	36,036	13,800	150	16,500	45
68,000	20,525	.....	20,075	8,200	12,000	.....	7,200	
36,175	7,950	.....	8,200	11,950	4,575	.....	3,500	
188,646	26,699	.....	8,400	107,597	35,250	300	10,400	46
207,565	10,700	.....	.....	100,265	96,600	.....	.....	
130,192	4,200	.....	.....	73,107	51,500	1,100	285	
627,280	92,370	3,100	13,030	291,690	96,890	120,500	9,700	47
346,056	47,106	192	3,720	218,748	56,290	17,500	2,500	
256,471	32,172	3,700	4,191	121,281	70,902	5,300	18,925	
307,128	84,570	500	7,850	161,990	41,418	5,300	5,500	48
204,488	48,954	.....	.....	139,134	15,950	.....	450	
16,751	1,100	.....	.....	15,651	.....	.....	.....	
226,013	43,577	.....	4,900	169,936	6,400	.....	1,200	49
130,328	22,600	.....	250	101,128	5,500	.....	850	
86,958	4,100	500	1,250	74,152	4,806	1,000	150	
1,426,499	213,882	1,000	161,995	771,574	189,948	69,600	18,500	50
1,053,389	107,594	.....	133,105	657,300	51,715	20,625	83,050	
436,576	33,400	3,800	1,400	316,179	36,282	.....	45,515	
32,687	3,300	500	985	20,902	7,000	.....	.....	51
24,370	4,620	.....	.....	19,750	.....	.....	.....	
5,686	1,986	.....	.....	3,700	.....	.....	.....	

[3] Indian Territory and Oklahoma were reported as Indian Territory in 1880. Average circulation, all classes, 2,030; weekly, 2,030. Aggregate circulation, all classes, 4,060; weekly, 4,060.

[4] Includes 1 semiannual.

Consideration of Tables 33, 34, and 35 permits a significant grouping of facts relating to aggregate circulation and to the circulation of daily, weekly, and monthly publications. Of a total of 114,299,334 aggregate circulation per issue for all newspapers and periodicals, 10 states—New York, Pennsylvania, Illinois, Ohio, Maine, Massachusetts, Missouri, Tennessee, New Jersey, and Michigan, ranking in the order given—supplied 79.5 per cent in 1880, 79.8 per cent in 1890, and 81.8 per cent in 1900. Of a total of 15,102,156 aggregate circulation per issue for all daily newspapers, 10 states—New York, Pennsylvania, Illinois, Ohio, Massachusetts, Missouri, California, Indiana, Michigan, and Minnesota, ranking in the foregoing order—supplied 78.1 per cent in 1880, 77.1 per cent in 1890, and 78.9 per cent in 1900. Of a total of 39,852,052 aggregate circulation per issue for all weekly newspapers and periodicals, 10 states—New York, Illinois, Pennsylvania, Ohio, Massachusetts, Missouri, Tennessee, Iowa, Minnesota, and Indiana, ranking in the order given—supplied 75.1 per cent in 1880, 71.9 per cent in 1890, and 76.6 per cent in 1900. Of a total of 39,519,897 aggregate circulation per issue of monthly newspapers and periodicals, 10 states—New York, Maine, Pennsylvania, Illinois, Massachusetts, Ohio, Missouri, Michigan, Indiana, and Minnesota, ranking in the order named—supplied 91 per cent in 1880, 87.4 per cent in 1890, and 92.5 per cent in 1900. These facts are shown in Tables 36, 37, 38, and 39.

TABLE 36.—*Aggregate circulation per issue of all classes in 10 states, and per cent that aggregate circulation in each forms of the total, 1880 to 1900.*

STATES.	AGGREGATE CIRCULATION PER ISSUE.			PER CENT AGGREGATE CIRCULATION IN EACH STATE FORMS OF TOTAL FOR THE UNITED STATES.		
	1900	1890	1880	1900	1890	1880
Total	93,446,706	55,202,624	25,276,815	81.8	79.8	79.5
New York	37,626,095	18,031,891	9,374,134	32.9	26.1	29.5
Pennsylvania	11,280,867	9,472,088	5,031,061	9.9	13.7	15.8
Illinois	10,429,368	7,891,219	2,421,275	9.1	11.4	7.6
Ohio	7,467,358	5,639,781	3,093,931	6.5	8.2	9.7
Maine	6,484,065	2,442,046	1,214,460	5.6	3.5	3.8
Massachusetts	6,199,127	4,662,159	2,012,929	5.4	6.7	6.3
Missouri	5,495,802	2,615,135	965,285	4.8	3.8	3.0
Tennessee	3,181,017	1,460,118	293,288	2.7	2.1	0.9
New Jersey	3,009,104	1,486,777	249,478	2.6	2.2	0.8
Michigan	2,374,403	1,511,915	620,974	2.1	2.2	2.0

TABLE 37.—*Aggregate circulation per issue of daily newspapers in 10 states, and per cent that aggregate circulation in each forms of the total, 1880 to 1900.*

STATES.	AGGREGATE CIRCULATION PER ISSUE.			PER CENT AGGREGATE CIRCULATION IN EACH STATE FORMS OF TOTAL FOR THE UNITED STATES.		
	1900	1890	1880	1900	1890	1880
Total	11,921,621	6,467,601	2,786,950	78.9	77.1	78.1
New York	3,896,967	2,119,101	996,561	25.8	25.3	27.9
Pennsylvania	1,917,426	1,241,514	578,227	12.7	14.8	16.2
Illinois	1,449,087	774,486	270,923	9.6	9.2	7.6
Ohio	1,224,715	499,712	216,336	8.1	6.0	6.1
Massachusetts	1,130,820	445,781	280,399	7.5	5.3	7.9
Missouri	810,492	428,094	122,660	5.4	5.1	3.4
California	475,596	399,454	157,814	3.1	4.8	4.4
Indiana	345,404	166,051	72,698	2.3	2.0	2.0
Michigan	370,848	212,975	62,339	2.5	2.5	1.8
Minnesota	300,266	180,483	28,493	2.0	2.2	0.8

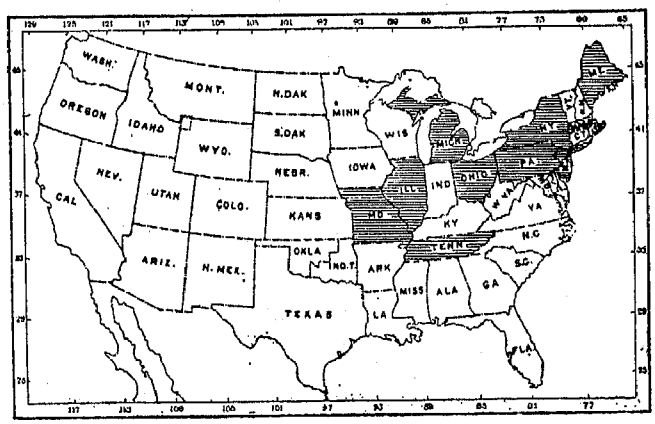
TABLE 38.—*Aggregate circulation per issue of weekly newspapers and periodicals in 10 states, and per cent that aggregate circulation in each forms of the total, 1880 to 1900.*

STATES.	AGGREGATE CIRCULATION PER ISSUE.			PER CENT AGGREGATE CIRCULATION IN EACH STATE FORMS OF TOTAL FOR THE UNITED STATES.		
	1900	1890	1880	1900	1890	1880
Total	30,515,200	20,809,936	12,202,266	76.6	71.9	75.1
New York	12,607,099	6,347,827	4,253,908	31.6	21.9	26.2
Illinois	3,866,988	3,487,663	1,527,042	9.7	11.9	9.4
Pennsylvania	3,691,954	3,135,664	1,998,340	9.3	10.8	12.3
Ohio	2,411,172	1,996,400	1,328,133	6.1	6.9	8.2
Massachusetts	2,066,369	1,802,125	1,089,515	5.2	6.2	6.7
Missouri	1,862,856	1,346,714	645,747	4.7	4.7	4.0
Tennessee	1,136,199	756,105	224,503	2.9	2.6	1.4
Iowa	1,105,666	795,077	449,550	2.8	2.7	2.8
Minnesota	908,478	518,563	167,206	2.3	1.8	1.0
Indiana	858,424	673,798	518,322	2.2	2.3	3.2

TABLE 39.—*Aggregate circulation per issue of monthly publications in 10 states, and per cent that aggregate circulation in each forms of the total, 1880 to 1900.*

STATES.	AGGREGATH CIRCULATION PER ISSUE.			PER CENT AGGREGATE CIRCULATION IN EACH STATE FORMS OF TOTAL FOR THE UNITED STATES.		
	1900	1890	1880	1900	1890	1880
Total	36,575,138	17,153,712	7,417,008	92.5	87.4	91.0
New York	16,927,062	6,990,400	2,903,527	42.8	35.6	35.7
Maine	6,120,490	1,964,659	1,036,200	15.5	10.0	12.7
Pennsylvania	3,246,779	2,763,798	1,606,073	8.2	14.1	19.7
Illinois	3,072,932	1,627,250	401,646	7.8	8.3	4.9
Massachusetts	2,257,142	1,327,740	574,538	5.7	6.8	7.1
Ohio	1,420,501	956,522	622,531	3.6	4.9	7.6
Missouri	1,378,586	624,767	153,800	3.5	3.2	1.9
Michigan	984,025	377,784	33,293	2.5	1.9	0.4
Indiana	715,292	371,909	60,250	1.8	1.9	0.7
Minnesota	452,329	148,933	25,150	1.1	0.8	0.3

CARTOGRAM 1.—*Ten states possessing 81.8 per cent of aggregate circulation per issue of all publications, 1900.*



By reference to cartogram 1, the geographic relation of the preponderance exerted by the 10 leading states is clearly perceived. The 10 states which possess 81.8 per cent of the aggregate circulation of all publications form a belt beginning at the eastern border of Kansas, and extending—with a break at Indiana—through Massachusetts, Maine, New York, and New Jersey to the Atlantic Ocean. From this belt Michigan is an offshoot northward and Tennessee southward. The 10 states leading in circulation of dailies form almost the same belt, made more marked by the addition

of Indiana; California and Minnesota, also, are added, and Maine, New Jersey, and Tennessee omitted. The 10 states possessing the largest weekly and monthly circulation per issue are similar in general location, showing a band which extends from the Kansas border to Maine—Maine and Minnesota being isolated in the monthly class.

The tabular statements relating to this subject show that the production of monthlies is centralized in a few states to a greater degree than that of any other class of periodicals, 10 states possessing 92.5 per cent of the aggregate circulation. The production of weekly periodicals is most decentralized, perhaps because the weekly is the publication of the average community, and as a class is less the particular product of any state, or group of states, than any other class of publications.

While the figures presented in the foregoing comparisons indicate clearly the great importance of a small number of states in the aggregate circulation per issue, as well as in the circulation per issue for different classes, the fact is important that in number of establishments, capital, and value of products this preponderance is not so clearly maintained. The states already shown to possess more than four-fifths of the aggregate circulation of all newspapers and periodicals, reported but 45.4 per cent of all establishments, namely, 8,279 out of a total of 18,226. Moreover, these states showed a steady and considerable decrease in the proportionate number of establishments, having 54.2 per cent of the total in 1880, 50.7 per cent in 1890, and 45.4 per cent in 1900. They were not the 10 states having the largest numbers of establishments. The 10 states having the largest number of establishments reported but 60.4 per cent of the whole number in the United States in 1880, 59.2 per cent in 1890, and 56.8 per cent in 1900. Thus the relation which the number of establishments in the states selected bore to the whole number in 1880, 1890, and 1900 was also a declining one. It is clear, therefore, that in the last two decades the number of establishments has increased more rapidly in some states with a comparatively small number of establishments than in those possessing the largest number. In the latter class of states there appears to have been an actual decrease in number of establishments, though, as previously shown, not in actual circulation—an evidence, possibly, of consolidation.

Of the total capital, the 10 states possessing the largest circulation per issue of all publications, reported 65.6 per cent in 1890 and 68.9 per cent in 1900. Of the total value of products, they reported 69.8 per cent in 1880, 69.6 per cent in 1890, and 71.1 per cent in 1900.

THE RELATION OF CIRCULATION TO POPULATION.

It has been pointed out, in connection with Tables 29, 30, and 33, that the circulation of newspapers and periodicals reported by each state and by each large city, is in reality a product not governed by local consumption, but intended for distribution regardless of state lines, distances being limited only by the ability and energy of the producers in securing patronage. While the circulation reported by each state is of great importance as representing a product, it is difficult to dissociate this product from the state's own requirement, and to remember that of the total circulation reported, the state itself may use but a fraction. In some respects the number of publications forms a more reliable basis of comparison than circulation—the latter being often so exceptional as to make the standing of the state or territory appear very different from what it really is. In Table 40 the number of publications has been used as a basis, except in the last two columns, which are inserted because they furnish several interesting conclusions.

TABLE 40.—*Number of publications to each 1,000 inhabitants, by states, per cent that number of publications in each state forms of total number, and per cent of increase in aggregate circulation per issue, 1890 and 1900.*

STATES.	NUMBER OF PUBLICATIONS TO EACH 1,000 INHABITANTS.		PER CENT THAT NUMBER OF PUBLICATIONS IN EACH STATE FORMS OF TOTAL NUMBER.		PER CENT OF INCREASE IN AGGREGATE CIRCULATION PER ISSUE.	
	1900	1890	1900	1890	1890 to 1900	1880 to 1890
Alabama	0.10	0.09	1.0	0.9	[1]6.8	165.2
Arizona	0.35	0.49	0.2	0.2	52.6	64.6
Arkansas	0.18	0.15	1.3	1.1	86.4	86.2
California	0.42	0.38	3.4	3.1	25.8	79.9
Colorado	0.46	0.45	1.4	1.2	126.9	139.9
Connecticut	0.17	0.21	0.8	1.0	[1]7.8	108.7
Delaware	0.16	0.19	0.2	0.2	54.5	61.5
District of Columbia	0.25	0.07	0.4	0.1	155.6	50.1
Florida	0.18	0.25	0.5	0.7	4.7	292.4
Georgia	0.12	0.13	1.5	1.5	[1]25.1	172.5
Idaho	0.45	0.39	0.4	0.2	129.4	276.5
Illinois	0.32	0.32	3.5	3.3	32.2	225.9
Indiana	0.33	0.28	4.6	4.2	62.3	96.6
Indian Territory	0.16	0.05	0.3	0.1	457.4	[2]
Iowa	0.47	0.37	5.7	4.7	73.2	98.8
Kansas	0.47	0.49	3.8	4.7	51.2	169.6
Kentucky	0.13	0.12	1.5	1.5	51.0	83.1
Louisiana	0.12	0.12	0.9	0.9	116.2	172.1
Maine	0.25	0.22	1.0	1.0	163.5	101.1
Maryland	0.14	0.12	0.9	0.8	73.4	[1]5.5
Massachusetts	0.17	0.25	2.7	3.8	33.0	131.6
Michigan	0.29	0.28	3.8	4.0	57.0	143.5
Minnesota	0.36	0.30	3.4	2.6	90.6	360.7
Mississippi	0.11	0.09	1.6	0.8	56.3	22.9
Missouri	0.30	0.26	5.2	4.7	110.2	170.9
Montana	0.37	0.39	0.5	0.3	84.3	281.2
Nebraska	0.50	0.42	2.9	3.0	72.4	311.1
Nevada	0.33	0.33	0.2	0.1	24.9	147.6
New Hampshire	0.21	0.29	0.5	0.7	[1]8.9	40.4
New Jersey	0.16	0.18	1.6	1.8	102.4	496.0
New Mexico	0.22	0.22	0.2	0.2	40.0	264.4
New York	0.20	0.27	8.1	10.9	108.7	92.4
North Carolina	0.11	0.08	1.1	0.9	61.7	68.8
North Dakota	0.44	0.48	0.8	0.6	60.7	[3]
Ohio	0.25	0.25	5.7	6.3	32.4	82.3
Oklahoma	0.28	0.34	0.6	0.1	719.4	[3]
Oregon	0.45	0.40	1.0	0.8	49.4	143.5
Pennsylvania	0.22	0.24	7.5	8.5	19.1	88.3
Rhode Island	0.09	0.16	0.2	0.4	14.6	53.3
South Carolina	0.09	0.07	0.6	0.6	33.1	74.1
South Dakota	0.54	0.53	1.2	1.2	63.1	[3]
Tennessee	0.12	0.12	1.4	1.5	115.9	394.4
Texas	0.24	0.20	4.0	2.9	60.3	150.0
Utah	0.26	0.13	0.4	0.2	81.3	88.0
Vermont	0.28	0.21	0.4	0.5	[1]9.1	59.4
Virginia	0.11	0.11	1.1	1.2	81.3	84.9
Washington	0.38	0.41	1.1	1.0	50.2	1,120.8
West Virginia	0.18	0.15	1.0	0.8	73.4	51.6
Wisconsin	0.29	0.27	3.3	3.1	35.4	141.3
Wyoming	0.45	0.41	0.2	0.2	34.1	328.6

[1] Decrease.
[2] See note 6, page 25.
[3] See note 2, page 26.

All but 16 states and territories showed an increase, during the past decade, in the number of publications to each 1,000 inhabitants, but in the majority of cases the increase was slight.

The number of publications to each 1,000 inhabitants was greatest in Nevada, where there was a marked decline in population—showing that the decreasing communities in that state retained local publications already in existence.

The states and territories showing, in 1900, an increase of more than 100 per cent in aggregate circulation per issue, were Colorado, the District of Columbia, Idaho, Indian Territory, Maine, Missouri, New Jersey, New York, Oklahoma, and Tennessee. Of these, Colorado, Idaho, Indian Territory, and Oklahoma doubtless owed their increase to the influx of population during the decade, and Maine and New Jersey to special publications producing a condition which is to some extent misleading for comparative purposes. The decline in the per cent of increase in aggregate circulation per issue, as compared with that shown in 1890, is very marked, appearing in no less than 39 states and territories. Upon this fact, however, the greater accuracy of enumeration in 1890, as compared with 1880, has an important bearing.

Table 41 presents the figures for the 16 states and territories showing a decrease in the number of publications to each 1,000 inhabitants.

TABLE 41.—*Comparison of increase in aggregate circulation per issue with increase in population, for the 16 states and territories showing decrease in number of publications per 1,000 inhabitants, 1900.*

STATES AND TERRITORIES.	Per cent of increase in aggregate circulation per issue.	Per cent of increase in population.
Arizona	52.6	68.0
Connecticut	[1]7.8	21.7
Delaware	54.5	9.6
Florida	4.7	35.0
Georgia	[1]25.1	20.6
Kansas	90.9	2.9
Massachusetts	33.0	25.3
Montana	84.3	75.2
New Hampshire	[1]18.9	9.3
New Jersey	102.4	30.4
New York	108.7	21.1
North Dakota	60.7	70.9
Oklahoma	719.4	518.2
Pennsylvania	19.1	19.9
Rhode Island	14.6	24.0
Washington	50.2	46.5

[1] Decrease.

It appears that in 8 of these 16 states and territories in which the number of publications per 1,000 inhabitants decreased, the circulation of existing publications nevertheless increased more rapidly than the population. These were Delaware, Kansas, Massachusetts, Montana, New Jersey, New York, Oklahoma, and Washington. This fact indicates clearly an extension of the circulation of existing publications, rather than the establishment of new ones. This tendency is not confined to the 7 states and the territory mentioned, but is characteristic of many of the states, especially the older ones.

Table 42 shows the total number of publications classified according to period of issue and character, by states and territories, from 1880 to 1900.

TABLE 42.—COMPARATIVE STATEMENT OF NEWSPAPERS AND PERIODICALS, NUMBER OF PUBLICATIONS

	STATES AND TERRITORIES.	Year.	Total number.	PERIOD OF ISSUE.								
				Daily.			Triweekly.	Semi-weekly.	Weekly.	Monthly.	Quarterly.	All other classes.
				Total.	Morning.	Evening.						
1	United States	1900	18,226	2,226	595	1,631	62	687	12,979	1,817	287	268
		1890	14,901	1,610	559	1,051	34	194	10,814	1,734	225	290
		[2]1880	[3] 11,314	971	438	533	73	133	8,633	1,167	116	221
2	Alabama	1900	175	19	8	11	1	2	143	4	.....	6
		1890	136	14	8	6	.....	1	108	9	2	2
		1880	125	6	3	3	1	.....	109	7	.....	2
3	Arizona	1900	43	10	4	6	.....	.....	32	1	.....	.....
		1890	29	8	6	2	.....	.....	21	.....	.....	.....
		1880	17	6	3	3	.....	.....	11	.....	.....	.....
4	Arkansas	1900	236	20	4	16	1	4	199	8	1	3
		1890	164	14	4	10	.....	.....	142	7	.....	1
		1880	117	6	2	4	.....	1	104	2	.....	4
5	California	1900	622	117	47	70	1	22	397	71	6	8
		1890	455	87	42	45	2	11	311	37	1	6
		1880	361	58	30	28	2	11	250	32	2	6
6	Colorado	1900	248	42	13	29	1	3	179	19	1	3
		1890	186	23	11	12	1	3	153	6	.....	.....
		1880	87	19	12	7	.....	1	63	4	.....	.....
7	Connecticut	1900	155	44	13	31	.....	22	74	9	2	4
		1890	156	34	12	22	.....	2	95	20	1	4
		1880	139	17	7	10	.....	2	99	15	2	4
8	Delaware	1900	30	6	2	4	.....	1	21	2	.....	.....
		1890	32	5	2	3	.....	.....	23	4	.....	.....
		1880	26	5	2	3	.....	.....	20	1	.....	.....
9	District of Columbia	1900	69	8	3	5	.....	1	31	22	2	5
		1890	17	4	2	2	.....	.....	11	2	.....	.....
		1880	44	5	3	2	.....	.....	23	15	1	.....
10	Florida	1900	97	11	4	7	1	1	76	8	.....	.....
		1890	97	12	4	8	2	.....	80	1	.....	2
		1880	45	3	3	.....	.....	2	40	.....	.....	.....
11	Georgia	1900	265	27	15	12	.....	9	205	17	1	6
		1890	230	19	11	8	.....	1	177	29	1	3
		1880	200	16	11	5	4	3	163	11	.....	3
12	Idaho	1900	72	5	3	2	.....	5	59	1	.....	2
		1890	33	3	2	1	.....	2	28	.....	.....	.....
		1880	10	.....	.....	.....	1	2	7	.....	.....	.....
13	Illinois	1900	1,548	197	44	153	4	72	1,000	219	23	33
		1890	1,241	121	44	77	2	20	858	182	29	29
		1880	1,017	74	30	44	6	17	758	118	21	23
14	Indiana	1900	841	156	26	130	.....	41	561	64	10	9
		1890	620	92	17	75	.....	2	448	61	6	11
		1880	467	49	12	28	3	1	390	27	.....	6
15	Indian Territory	1900	64	6	1	5	.....	.....	56	2	.....	.....
		1890	9	1	1	.....	.....	.....	8	.....	.....	.....
		[6]1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16	Iowa	1900	1,045	65	16	49	7	58	831	64	8	12
		1890	703	46	18	28	2	14	593	39	4	5
		1880	569	30	12	18	1	3	500	31	1	3
17	Kansas	1900	684	53	7	46	1	3	563	51	5	8
		1890	698	43	12	31	.....	3	621	22	1	3
		1880	347	20	8	12	.....	1	310	15	.....	1
18	Kentucky	1900	282	27	10	17	1	24	190	32	3	5
		1890	218	25	12	13	1	7	165	13	.....	7
		1880	205	11	7	4	2	7	160	23	.....	2
19	Louisiana	1900	160	23	8	15	2	6	112	15	.....	2
		1890	129	12	6	6	.....	1	99	13	1	3
		1880	112	13	8	5	1	1	94	2	.....	1
20	Maine	1900	177	15	5	10	.....	5	100	45	8	4
		1890	146	15	5	10	.....	1	88	36	2	4
		1880	123	12	4	8	1	.....	90	18	1	1
21	Maryland	1900	166	18	8	10	.....	2	127	15	1	3
		1890	124	11	9	2	.....	.....	102	6	2	3
		1880	143	15	10	5	.....	.....	111	12	1	4
22	Massachusetts	1900	486	98	25	73	.....	7	273	85	15	8
		1890	568	56	12	44	.....	7	336	123	31	15
		1880	427	39	16	23	1	13	279	80	7	8
23	Michigan	1900	698	70	14	56	5	23	522	65	5	8
		1890	589	52	12	40	1	5	472	49	1	9
		1880	464	33	13	20	3	3	397	19	1	8
24	Minnesota	1900	622	44	12	32	1	9	493	60	2	13
		1890	392	30	11	19	.....	1	311	42	2	6
		1880	228	10	4	6	1	.....	205	6	.....	1

[1] Includes 173 Sunday publications, not connected with daily newspapers.
[2] Includes publications for Dakota and Indian Territory.
[3] Includes 1,182 publications not reporting operations, as they can not be excluded from the classification.

BY PERIOD OF ISSUE AND CHARACTER OF PUBLICATION, BY STATES AND TERRITORIES, 1880 TO 1900.

CHARACTER OF PUBLICATION.															
News, politics, and family reading.	Religion.	Agriculture, horticulture, dairying, and stock raising.	Commerce finance, insurance, and railroads.	Trade journals.	General literature, including magazines.	Sunday newspapers.	Medicine and surgery.	Law.	Science and mechanics.	Fraternal organizations.	Education and history.	Society, art, music, and fashion.	College and school periodicals.	Miscellaneous.	
14,867	952	307	190	520	239	72	111	62	66	200	120	88	139	293	1
11,326	1,025	263	239	432	291	143	123	47	83	216	119	152	137	[1] 305	
8,863	653	178	[4] 363	[4]	189	[4]	114	45	68	149	[4] 248	72	[4]	[5] 477	
160	7	2	4				1							1	2
110	14	4		1	1	2	1		2	1					
114	5	2						1			3				
41		1											1		3
26		3													
17															
214	6	1			1	3	1			6	2	1		1	4
150	6	1					1		1	3			2		
106	5	2			1		1		1					1	
467	40	17	12	21	10	2	4	4	3	13	6	2	2	19	5
356	15	11	10	22	7	3	3	1	2	6	3	2		14	
270	12	7	27		4		3	3	3	7	6	3		16	
199	4	9	3	7		1	1	2	2	6	2	1	1	10	6
174	3	2	1	1		1			1	1		1		1	
78	2	1	1						2	1	1			1	
130	6	2	4	1		3	2			4	3				7
119	11	5	1	3	5	3	1		1	1	2		3	1	
110	3	4			2		1		1	5	11			2	
28										1	1				8
24	2	1				1						1	1	2	
24	1										1				
32	4	1	3	2	5	2	1	1	5	2	1	1	2	7	9
10	1					1		3						2	
20			2		2		1	2	1	3	2			11	
86	7	2			2										10
83	4	4	1	3								1		1	
41		2	1		1										
236	10	2	1	5	2		4	1					1	3	11
185	13	2	2	3	2	1	5		2	1	5	2	5	2	
177	7	4			2		3			1		1		5	
69		1		1						1					12
32				1											
10															
1,141	85	35	17	101	28	4	12	8	9	18	17	24	10	39	13
862	102	30	27	72	18	5	12	5	17	18	7	19	3	44	
736	49	15	66		9		8	5	5	13	19	7		85	
730	36	16	3	14	3	5	4			13	3	1	3	5	14
508	27	20	5	13	1	10	6		1	9	2	2	7	9	
422	13	7	3				2		2	6	9			3	
62	1										1			1	15
7	1														
942	39	14	2	4	2	1		1	1	13	5	3	9	9	16
630	26	7	5	1	3					9	4	2	8	8	
519	15	4			2			1	1	7	15	1		4	
608	16	16	2	6	2					11	6	1	7	9	17
647	9	8	1	1			1			5	4	4	6	7	
322	4	5			2		1			3	3			7	
220	22	8		10		1	3	1		3	1		8	5	18
177	15	4	2	6	1	4	1	1		1	1		3	2	
162	13	6	4		3		4			2	5			6	
134	6	4	1	3	3				1	1		1	3	3	19
86	10	5	6	2		1	2			2			3	12	
96	7	1	1				1			1	1			4	
128	9	1	4	1	21		1		1	3	1		4	3	20
97	6	5			21	2				4	4	3	3	1	
91	9	4	1		8				2	2	3			3	
130	12	3	2	6	1		1	2	4					5	21
106	5	2	1	2	1	1	2			1		1	1	1	
105	10	5	5		3		2	1	1	3	4			4	
312	48	6	8	27	27	8	2		5	7	8	7	5	16	22
326	77	14	12	18	27	5	2	1	11	15	13	12	8	27	
281	30	6	19		20		2	2	5	6	15	10		31	
615	28	7	3	18	3	1	5	1	1	5	4		3	4	23
495	36	8	2	3	6	7	4		1	9	4	2	6	6	
413	11	5	3		1		7		2	5	9	3		5	
516	20	11	5	21	6		4	4	2	12	6	1	5	9	24
316	19	5	5	6	8	4	1	2	3	5	3	3	5	7	
207	8	3	2							2	2			4	

[4] In 1880 "trade journals" were included with "commerce, finance, insurance, and railroads," "Sunday newspapers" with "miscellaneous," and "college and school periodicals" with "education and history."

[5] Includes 217 children's publications and Sunday school papers.

[6] Indian Territory and Oklahoma reported as Indian Territory in 1880.

TABLE 42.—COMPARATIVE STATEMENT OF NEWSPAPERS AND PERIODICALS, NUMBER OF PUBLICATIONS BY

	STATES AND TERRITORIES.	Year.	Total number.	PERIOD OF ISSUE.								
				Daily.			Triweekly.	Semi-weekly.	Weekly.	Monthly.	Quarterly.	All other classes.
				Total.	Morning.	Evening.						
25	Mississippi	1900	178	13	3	10	1	2	156	4	.....	2
		1890	119	6	2	4	1	.....	102	7	.....	3
		1880	123	5	3	2	5	1	109	3	.....	.....
26	Missouri	1900	940	92	24	68	1	14	695	101	14	23
		1890	707	81	27	54	2	7	516	73	9	19
		1880	530	43	22	21	8	2	415	50	1	11
27	Montana	1900	89	11	5	6	.....	4	70	3	1	.....
		1890	52	9	3	6	1	1	37	3	.....	1
		1880	18	4	4	.....	.....	.....	14	.....	.....	.....
28	Nebraska	1900	538	32	7	25	1	16	454	28	3	4
		1890	446	31	6	25	.....	2	395	11	.....	7
		1880	189	15	5	10	.....	1	165	7	.....	1
29	Nevada	1900	35	9	3	6	1	3	21	1	.....	.....
		1890	15	6	3	3	.....	.....	9	.....	.....	.....
		1880	37	14	5	9	.....	.....	22	1	.....	.....
30	New Hampshire	1900	88	14	2	12	2	.....	67	5	.....	.....
		1890	111	16	3	13	.....	2	83	10	.....	.....
		1880	87	10	2	8	.....	.....	66	7	.....	4
31	New Jersey	1900	298	49	7	42	.....	2	225	17	4	1
		1890	263	47	15	32	2	1	186	21	3	3
		1880	215	27	8	19	1	6	163	13	2	3
32	New Mexico	1900	42	3	.....	3	.....	.....	35	1	1	2
		1890	34	4	1	3	.....	.....	29	.....	.....	1
		1880	18	3	2	1	.....	.....	15	.....	.....	.....
33	New York	1900	1,477	207	63	144	8	52	872	272	35	31
		1890	1,627	162	64	98	4	31	927	395	49	59
		1880	1,411	115	46	69	5	24	892	282	40	53
34	North Carolina	1900	200	26	8	18	.....	15	142	10	1	6
		1890	135	20	9	11	.....	3	102	5	3	2
		1880	142	13	7	6	2	3	113	7	.....	4
35	North Dakota	1900	139	9	4	5	.....	2	126	2	.....	.....
		1890	87	7	3	4	.....	2	74	4	.....	.....
		[1]1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
36	Ohio	1900	1,039	170	24	146	8	53	692	90	15	11
		1890	932	121	27	94	7	19	635	106	25	19
		1880	774	56	22	34	8	4	584	90	11	21
37	Oklahoma	1900	110	9	2	7	.....	1	96	3	.....	1
		1890	21	6	3	3	.....	.....	14	1	.....	.....
		[2]1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
38	Oregon	1900	188	21	9	12	.....	14	124	27	.....	2
		1890	126	16	7	9	.....	1	100	8	.....	1
		1880	74	7	4	3	.....	.....	59	6	1	1
39	Pennsylvania	1900	1,365	196	52	144	5	47	883	178	42	14
		1890	1,271	143	45	98	3	13	771	266	37	38
		1880	978	98	42	56	4	3	674	159	16	19
40	Rhode Island	1900	40	12	3	9	1	3	21	2	1	.....
		1890	54	9	3	6	.....	1	30	13	1	.....
		1880	44	8	2	6	.....	1	31	3	.....	1
41	South Carolina	1900	117	7	3	4	1	15	83	10	.....	1
		1890	84	6	4	2	1	2	73	.....	1	1
		1880	81	4	3	1	3	1	69	3	1	.....
42	South Dakota	1900	218	16	4	12	.....	1	189	9	.....	3
		1890	174	19	7	12	.....	3	141	10	.....	1
		[1]1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
43	Tennessee	1900	251	16	9	7	.....	6	187	28	10	4
		1890	219	18	8	10	.....	2	169	20	6	4
		1880	193	12	7	5	.....	2	154	16	2	7
44	Texas	1900	722	83	22	61	.....	22	579	33	1	4
		1890	487	42	13	29	1	6	367	19	1	1
		1880	280	30	14	16	1	2	231	14	.....	2
45	Utah	1900	72	6	2	4	1	7	49	4	2	3
		1890	28	9	4	5	.....	7	6	4	.....	2
		1880	22	5	2	3	.....	4	8	4	.....	1
46	Vermont	1900	79	9	2	7	.....	2	58	10	1	4
		1890	70	5	2	3	.....	.....	58	7	.....	.....
		1880	82	5	2	3	.....	.....	72	3	1	1
47	Virginia	1900	204	37	15	22	3	6	126	23	6	3
		1890	185	21	11	10	1	6	134	18	3	2
		1880	194	20	15	5	5	6	124	33	3	3
48	Washington	1900	199	15	8	7	1	3	154	21	2	3
		1890	144	18	6	12	.....	.....	118	7	.....	1
		1880	29	4	4	.....	.....	.....	23	2	.....	.....

[1] North Dakota and South Dakota reported as Dakota in 1880.

PERIOD OF ISSUE AND CHARACTER OF PUBLICATION, BY STATES AND TERRITORIES, 1880 TO 1900—Continued.

CHARACTER OF PUBLICATION.															
News, politics, and family reading.	Religion.	Agriculture, horticulture, dairying, and stock raising.	Commerce, finance, insurance, and railroads.	Trade journals.	General literature, including magazines.	Sunday newspapers.	Medicine and surgery	Law.	Science and mechanics.	Fraternal organizations.	Education and history.	Society, art, music, and fashion.	College and school periodicals.	Miscellaneous.	
169	5	1											2	1	
105	7	3			1					1	2				25
115	4	3									1				
739	45	22	11	36	12	2	18	7	7	7	5	5	8	16	
526	58	15	20	30	5	2	11	4	4	5	6	7	3	11	26
425	28	7	17		5		8	3	2	9	11	2		13	
79	2	5								1				2	
45	2	3		1										1	27
17		1													
481	14	9	2	9	3			1	1	7		1	3	7	
414	3	8	2	5	2	1	1			2	1	2	3	2	28
178	2	3	1		2						2			1	
34										1					
15															29
35									2						
80	2	2		1	1									2	
97	5			1	5					1		1		1	30
74	3	1			5					1	1	1		1	
274	6	1	1	5	1					1	2	1	1	5	
218	10	1		1	5	5		2	1	9	2	3	3	3	31
194	3	1	2		3		1	1	1	4	4			1	
36	4	1											1		
32	1					1									32
17	1														
1,004	79	25	56	111	51	8	19	9	15	12	16	18	5	49	
862	155	23	81	147	98	24	27	12	24	34	26	52	11	51	33
816	97	29	125		77		38	6	28	16	35	28		116	
168	22	4	2	1		2							1		
114	12	3	1				1						2	2	34
118	12	4	2		2		1			2	1				
138													1		
81	1	1								1	1		1	1	35
880	55	8	10	29	9	3	5	6	1	7	3	5	9	9	
694	101	8	8	14	15	18	9	3	2	16	6	6	11	21	36
576	57	12	24		2		11	4	4	12	19	7		46	
106	2				1		1								
20	1														37
137	11	7	3	7	2		1	1		10	3	1	2	3	
108	6	2	2	1		1				1	1		1	3	38
60	5	1	2		2		1				2			1	
1,008	164	14	20	45	22	15	11	6	7	12	4	9	6	22	
784	175	15	28	50	35	20	23	12	8	35	13	19	15	39	39
675	75	13	41		18		13	13	3	15	23	5		79	
30	3	1		3	1								1	1	
33	4		2	2	3	3				3	1		3		40
39										3	2				
100	9	3		1									4		
75	7	1				1									41
68	10									2	1				
208		3	1	2	1				1	3	4				
162	4	1		1	1						2		3		42
198	32	5		3	1		3			3	2		3	1	
169	26	2	3	3	1	1	3		1	1	1	1	5	2	48
147	14		4		5		3			4	9			7	
648	25	12		9	1	6	1	1			3	2	6	8	
382	8	9	1	6	3	5	3			3	1	2	3	11	44
254	14	2	2		2			1		2	1	1		1	
55	6	3						3		2			2	1	
17	3	2		2	3									1	45
15	4	1												2	
63	3	4		1	2		1						3	2	
61	3			1	3		1				1				46
74	3	2			1						2				
153	32	4		3		2	2	1		1	1		5		
144	17	4	4	1	1		2	1		2	1	2	4	2	47
135	11	6	3		2		2	2	1	4	15	2		11	
152	8	5	9	1	2		1	1		9	3	1	3	4	
127	2	3	4	2		1					1		1	3	48
28	1														

[2] Indian Territory and Oklahoma reported as Indian Territory in 1880.

TABLE 42.—COMPARATIVE STATEMENT OF NEWSPAPERS AND PERIODICALS, NUMBER OF PUBLICATIONS BY

	STATES AND TERRITORIES.	Year.	Total number.	PERIOD OF ISSUE.								
				Daily.			Triweekly.	Semi-weekly.	Weekly.	Monthly.	Quarterly.	All other classes.
				Total.	Morning.	Evening.						
49	West Virginia	1900	176	19	6	13	.....	4	141	11	.....	1
		1890	112	9	4	5	.....	4	95	5	.....	2
		1880	109	2	2	.....	1	2	96	6	1	1
50	Wisconsin	1900	595	60	15	45	1	21	463	42	5	3
		1890	456	47	14	33	.....	3	373	20	3	10
		1880	340	21	9	12	3	2	283	20	.....	11
51	Wyoming	1900	42	4	1	3	1	2	32	3	.....	.....
		1890	25	5	2	3	.....	.....	20	.....	.....	.....
		1880	11	3	2	1	.....	.....	8	.....	.....	.....

PERIOD OF ISSUE AND CHARACTER OF PUBLICATION, BY STATES AND TERRITORIES, 1880 TO 1900—Continued.

CHARACTER OF PUBLICATION.															
News, politics, and family reading.	Religion.	Agriculture, horticulture, dairying, and stock raising.	Commerce, finance, insurance, and railroads.	Trade journals.	General literature, including magazines.	Sunday newspapers.	Medicine and surgery.	Law.	Science and mechanics.	Fraternal organizations.	Education and history.	Society, art, music, and fashion.	College and school periodicals.	Miscellaneous.	
165	5	3	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	1	.....	49
99	2	1	.....	3	1	2	.....	.....	.....	3	.....	.....	1	.....	
100	3	.....	.....	.....	1	.....	.....	.....	.....	1	2	.....	.....	2	
527	17	5	1	5	7	3	2	1	.....	3	7	2	3	12	50
392	10	16	2	3	8	7	.....	.....	1	8	1	2	3	3	
301	7	4	5	.....	2	.....	.....	.....	1	7	8	1	.....	4	
40	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	51
24	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	

RELATION OF WEEKLY AND DAILY NEWSPAPERS TO POPULATION.

From Table 42 may be derived a comparison of the relation of weekly and daily newspapers to population, by states and territories, as follows:

TABLE 43.—COMPARISON OF THE NUMBER OF INHABITANTS TO EACH WEEKLY AND DAILY PUBLICATION, BY STATES AND TERRITORIES, 1890 AND 1900.

STATES AND TERRITORIES.	POPULATION.		WEEKLY PUBLICATIONS.				DAILY PUBLICATIONS.			
			Number.		Population to each.		Number.		Population to each.	
	1900	1890	1900	1890	1900	1890	1900	1890	1900	1890
United States										
Alabama	1,828,697	1,513,017	143	108	12,788	14,009	19	14	96,247	108,078
Arizona	122,931	59,620	32	21	3,842	2,839	10	8	12,293	7,452
Arkansas	1,311,564	1,128,179	199	142	6,591	7,945	20	14	65,578	80,584
California	1,485,053	1,208,130	397	311	3,741	3,885	117	87	12,693	13,887
Colorado	539,700	412,198	179	153	3,015	2,694	42	23	12,850	17,922
Connecticut	908,420	746,258	74	95	12,276	7,855	44	34	20,646	21,949
Delaware	184,735	168,493	21	23	8,797	7,320	6	5	30,789	33,699
District of Columbia	278,718	230,392	31	11	8,991	20,945	8	4	34,840	57,598
Florida	528,542	391,422	76	80	6,955	4,893	11	12	48,049	32,618
Georgia	2,216,331	1,837,353	205	177	10,811	10,381	27	19	82,086	96,703
Idaho	161,772	84,385	59	28	2,742	3,014	5	3	32,354	28,128
Illinois	4,821,550	3,826,351	1,600	858	4,822	4,460	197	121	24,475	31,623
Indiana	2,516,462	2,192,404	561	448	4,486	4,894	156	92	16,131	23,830
Indian Territory	392,060	.....	56	8	7,001	.....	6	1	65,343	.....
Iowa	2,231,853	1,911,896	831	593	2,686	3,224	65	46	34,336	41,563
Kansas	1,470,495	1,427,096	563	621	2,612	2,298	53	43	27,745	33,188
Kentucky	2,147,174	1,858,635	190	165	11,301	11,264	27	25	79,525	74,345
Louisiana	1,381,625	1,118,587	112	99	12,336	11,299	23	12	60,071	93,216
Maine	694,466	661,086	100	88	6,945	7,512	15	15	46,298	44,072
Maryland	1,188,044	1,042,390	127	102	9,355	10,220	18	11	66,002	94,763
Massachusetts	2,805,346	2,238,943	273	336	10,276	6,664	98	56	28,626	39,981
Michigan	2,420,982	2,093,889	522	472	4,638	4,436	70	52	34,585	40,267
Minnesota	1,751,394	1,301,826	493	311	3,553	4,186	44	30	39,804	43,394
Mississippi	1,551,270	1,289,600	156	102	9,944	12,643	13	6	119,328	214,933
Missouri	3,106,665	2,679,184	695	516	4,470	5,192	92	81	33,768	33,076
Montana	243,329	132,159	70	37	3,476	3,572	11	9	22,121	14,684
Nebraska	1,066,300	1,058,910	454	395	2,349	2,681	32	31	33,322	34,158
Nevada	42,335	45,761	21	9	2,016	5,085	9	6	4,704	7,627
New Hampshire	411,588	376,530	67	83	6,143	4,537	14	16	29,399	23,533
New Jersey	1,883,669	1,444,933	225	186	8,372	7,768	49	47	38,442	30,743
New Mexico	195,310	153,593	35	29	5,580	5,296	3	4	65,103	38,398
New York	7,268,894	5,997,853	372	327	8,336	6,470	207	162	35,115	37,024
North Carolina	1,893,810	1,617,947	142	102	13,337	15,862	26	20	72,839	80,897
North Dakota	319,146	182,719	126	74	2,533	2,469	9	7	35,461	26,103
Ohio	4,157,545	3,672,316	692	635	6,008	5,788	170	121	24,456	30,350
Oklahoma	398,331	61,834	96	14	4,149	4,417	9	6	44,259	10,306
Oregon	413,536	313,767	124	100	3,335	3,138	21	16	19,692	19,610
Pennsylvania	6,302,115	5,258,014	883	771	7,137	6,820	196	143	32,154	36,769
Rhode Island	428,556	345,506	21	30	20,407	11,517	12	9	35,713	38,390
South Carolina	1,340,316	1,151,149	83	73	16,148	15,769	7	6	191,474	191,858
South Dakota	401,570	328,808	189	141	2,125	2,332	16	19	25,098	17,306
Tennessee	2,020,616	1,767,518	187	169	10,805	10,459	16	18	126,288	98,195
Texas	3,048,710	2,235,523	579	367	5,265	6,091	83	42	36,731	53,227
Utah	276,749	207,905	49	6	5,648	34,651	6	9	46,125	23,101
Vermont	343,641	332,422	53	58	6,484	5,731	9	5	38,182	66,484
Virginia	1,854,184	1,655,980	126	134	14,716	12,358	37	21	50,113	78,856
Washington	518,103	349,390	154	118	3,364	2,961	15	18	34,540	19,411
West Virginia	958,800	762,794	141	95	6,800	8,029	19	9	50,463	84,755
Wisconsin	2,069,042	1,686,880	463	373	4,469	4,522	60	47	34,484	35,891
Wyoming	92,531	60,705	32	20	2,892	3,035	4	5	23,133	12,141

Upon rearranging the states and territories in the order of increasing number of inhabitants to each publication in 1900, the following comparisons result:

TABLE 44.—*States and territories arranged in order of number of inhabitants to each weekly publication, 1900.*

Nevada	2,016	New Hampshire	6,143
South Dakota	2,124	Vermont	6,484
Nebraska	2,349	Arkansas	6,591
North Dakota	2,533	West Virginia	6,800
Kansas	2,612	Maine	6,945
Iowa	2,686	Florida	6,954
Idaho	2,742	Indian Territory	7,001
Wyoming	2,892	Pennsylvania	7,137
Colorado	3,015	New York	8,336
Oregon	3,335	New Jersey	8,372
Washington	3,364	Delaware	8,797
Montana	3,476	District of Columbia	8,991
Minnesota	3,553	Maryland	9,355
California	3,741	Mississippi	9,944
Arizona	3,842	Massachusetts	10,276
Oklahoma	4,149	Tennessee	10,805
Wisconsin	4,469	Georgia	10,811
Missouri	4,470	Kentucky	11,301
Indiana	4,486	Connecticut	12,276
Michigan	4,638	Louisiana	12,336
Illinois	4,822	Alabama	12,788
Texas	5,265	North Carolina	13,337
New Mexico	5,580	Virginia	14,716
Utah	5,648	South Carolina	16,148
Ohio	6,008	Rhode Island	20,407

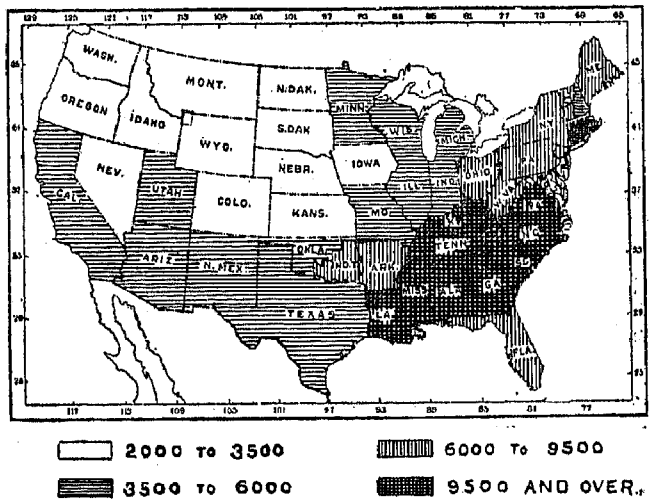
TABLE 45.—*States and territories arranged in order of number of inhabitants to each daily publication, 1900.*

Nevada	4,704	New York	35,115
Arizona	12,293	North Dakota	35,461
California	12,693	Rhode Island	35,713
Colorado	12,850	Texas	36,731
Indiana	16,131	Vermont	38,182
Oregon	19,692	New Jersey	38,442
Connecticut	20,646	Minnesota	39,804
Montana	22,121	Oklahoma	44,259
Wyoming	23,133	Utah	46,125
Ohio	24,456	Maine	46,298
Illinois	24,475	Florida	48,049
South Dakota	25,098	Virginia	50,113
Kansas	27,745	West Virginia	50,463
Massachusetts	28,626	Louisiana	60,071
New Hampshire	29,399	New Mexico	65,103
Delaware	30,789	Indian Territory	65,343
Pennsylvania	32,154	Arkansas	65,578
Idaho	32,354	Maryland	66,002
Nebraska	33,322	North Carolina	72,339
Missouri	33,768	Kentucky	79,525
Iowa	34,336	Georgia	82,086
Wisconsin	34,484	Alabama	96,247
Washington	34,540	Mississippi	119,328
Michigan	34,585	Tennessee	126,288
District of Columbia	34,840	South Carolina	191,474

From the rearrangement of states and territories given in Tables 44 and 45, it will be observed that in 1900 the proportion of inhabitants to each weekly publication was far more uniform than that to each daily. The range of number of inhabitants to each weekly publication is shown to be between 2,016, for Nevada, and 20,407, for Rhode Island.

On dividing the entire list of states and territories, arranged by rank according to the number of inhabitants to each weekly publication, into four groups, it appears that the first group is composed of the states and territorities having from 2,000 to 3,500 inhabitants to each weekly publication; the second, from 3,500 to 6,000; the third, from 6,000 to 9,500; and the fourth, from 9,500 upward. The geographic relations of the states and territories composing these groups are clearly illustrated in cartogram 2, in which the United States is divided into irregular but practically contiguous sections. The smallest numbers of inhabitants to each weekly publication are shown in the middle West and Northwest. The next class forms an irregular section beginning with California, and extending, with practically no break, through Texas, Oklahoma, and Missouri to Lake Michigan and Minnesota. It is clear that the inhabitants of the states shown in this class depend less

CARTOGRAM 2.—*Number of inhabitants to each weekly publication, by states and territories, 1900.*



upon weekly publications than do those of the preceding class. The third class appears principally in the group of populous states beginning with Ohio and extending northeast to Maine. The fourth class is composed of Massachusetts, Rhode Island, Connecticut, Kentucky, Tennessee, and all the Southern states except Florida.

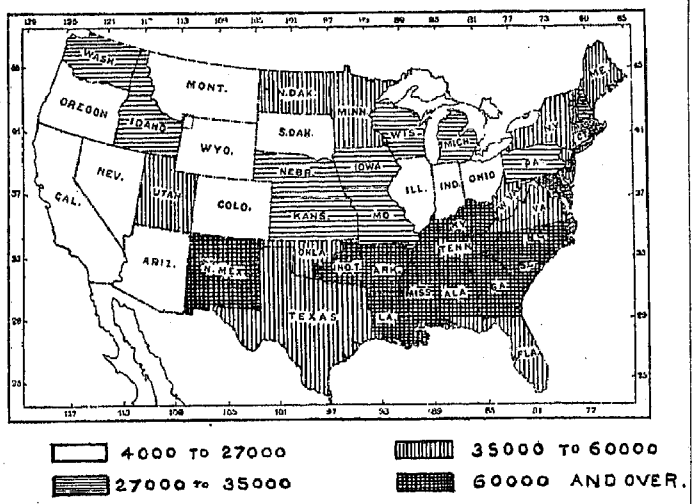
It is evident that the high ratio of inhabitants to weekly periodicals indicates either a low percentage of publications, in general, to number of inhabitants, or else the substitution, for weekly newspapers, of publications issued more frequently. In the case of the three New England states above mentioned it appears, by reference, in the comparative table, to the column relating to the number of inhabitants to each daily publication, that Massachusetts and Connecticut are shown in the two classes having the largest proportion of daily publications to inhabitants. In the case of Rhode Island, 81.2 per cent of the population resides in cities of over 8,000 inhabitants. Considering this exceptional rate and the small area, there is little probability of success in the publication of weekly newspapers in Rhode Island. The proportion of dailies to population is higher than that of weeklies, but proximity to New York and to the large cities of Massachusetts and Connecticut, has led to considerable dependence on those centers for daily newspapers, thus producing a comparatively low rank for dailies also.

By referring to page 68 it will be observed that the sections which are the most liberal patrons of the "patent insides" method of publishing weekly newspapers are the Eastern and Western North Central groups of states. Of the "patent insides" used in the United States, over 60 per cent were sent to these states. It will be noted by cartogram 2 that this section is the chief stronghold of the weekly.

When the number of inhabitants to each daily newspaper is made the basis of classification, the proportion varies from 4,704, for Nevada, to 191,474, for South Carolina. In the populous states the proportion of population to each daily publication varies from 20,000 to 40,000. On dividing the states and territories, as in the case of weekly publications, into 4 groups or classes, it appears that the proportion of population to each daily newspaper ranges, in the first class, from 4,000 to 27,000; in the second, from 27,000 to 35,000; in the third, from 35,000 to 60,000; and in the fourth, from 60,000 upward.

The conditions which surround the publication of daily newspapers are so complex—depending largely upon locality, character of the population, ambition of the community, proximity to large cities, and especially upon ability to be an active producer of circulation rather than a receiver of it from elsewhere—that it is not surprising to find that the comparison is less significant than that for weeklies. The proportions of inhabitants to daily publications are shown geographically in cartogram 3.

CARTOGRAM 3.—*Number of inhabitants to each daily publication, by states and territories, 1900.*



In general, the far Western states, which showed high averages in the proportion of population to weekly publications, showed a similar proportion for daily publications. Obviously, this is due to the ambition and energy of isolated communities, which by reason of distance must produce their own daily publication or go without one.

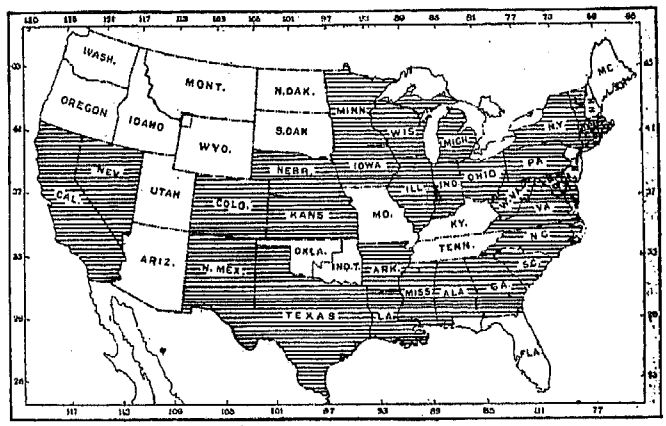
The region in which, with respect to population, both daily and weekly papers are least numerous, is in general the group of states east of the Mississippi and south of the Ohio and Potomac, where there is less than 1 daily to every 60,000 people, and less than 1 weekly to every 9,500. The region in which they are most numerous is in general the states of the Western division, in most of which there is more than 1 daily to every 35,000 people, and more than 1 weekly to every 3,500. In other words, publications of this character are most numerous in the western and northwestern parts of the country, and least numerous in the southeastern part.

The fact that the New England states with largest population are in the highest or next to the highest class in number of inhabitants to each daily newspaper, but rank low in number of inhabitants to each weekly publication suggests that in that densely peopled region, with highly developed facilities for rapid distribution to a numerous public, the daily has in some measure supplanted the weekly.

During the last decade the number of inhabitants to each weekly publication increased in 26 out of 49 states and territories, from which fact it appears that in more than half the states and territories the increase in the number of weekly publications failed to keep pace with the increase in population.

In the case of the daily newspaper the changes wrought during the decade from 1890 to 1900 are more striking. Out of 49 states and territories it appears that in 31 the proportion of inhabitants to each daily publication decreased, while in the other 18 the increase in number of publications failed to keep pace with the increase in population. The marked advance of the daily in proportion to population, shown in a majority of the states, is represented in cartogram 4.

CARTOGRAM 4.—*States and territories in which there was a gain in number of daily newspapers in proportion to population.*



It will be observed that those states and territories which showed a gain in the number of inhabitants to each daily newspaper were, for the most part, those containing large cities, which acted as purveyors of news to adjacent states or territories. Massachusetts, for example, supplied portions of New England; New York and Pennsylvania supplied New Jersey; Ohio supplied Kentucky; the large cities of Minnesota formed centers of distribution for North Dakota and South Dakota; and on the Pacific coast California was the center for publications of the daily class. All the states bordering upon the Great Lakes, and 15 out of 21 seaboard states, showed an increase in the proportionate number of daily newspapers to inhabitants. In this group are found all but 9 of the states and territories showing an increase in the number of daily publications to inhabitants. In general, the states in which the daily

lost ground during the decade ending in 1900 were those in the far Northwest, and in that section were recorded the most marked gains made by the weekly.

DISTRIBUTION, BY GEOGRAPHIC DIVISIONS, OF CIRCULATION, NUMBER OF ESTABLISHMENTS, CAPITAL, AND VALUE OF PRODUCTS.

The consideration of the geographic distribution of circulation, number of establishments, capital, and value of products which follows, employs the following grouping of the states and territories by minor geographic divisions:

NORTH ATLANTIC DIVISION.

New England.—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.

Southern North Atlantic.—New York, New Jersey, Pennsylvania.

SOUTH ATLANTIC DIVISION.

Northern South Atlantic.—Delaware, Maryland, District of Columbia, Virginia, West Virginia.

Southern South Atlantic.—North Carolina, South Carolina, Georgia, Florida.

NORTH CENTRAL DIVISION.

Eastern North Central.—Ohio, Indiana Illinois, Michigan, Wisconsin.

Western North Central.—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas.

SOUTH CENTRAL DIVISION.

Eastern South Central.—Kentucky, Tennessee, Alabama, Mississippi.

Western South Central.—Louisiana, Arkansas, Indian Territory, Oklahoma, Texas.

WESTERN DIVISION.

Rocky Mountain.—Montana, Idaho, Wyoming, Colorado, New Mexico.

Basin and Plateau.—Arizona, Utah, Nevada.

Pacific.—Washington, Oregon, California.

Circulation.—The preponderance of certain states in circulation, before noted, is again indicated upon examining aggregate circulation by geographic divisions.

TABLE 46.—*Aggregate circulation per issue of all classes of publications, by main geographic divisions, with per cent which circulation in each division forms of total, 1890 and 1900.*

DIVISION.	AGGREGATE CIRCULATION FOR ALL CLASSES.		PER CENT OF TOTAL.		Per cent of increase, 1890 to 1900.
	1900	1890	1900	1890	
United States	114,299,334	69,138,934	100.0	100.0	65.3
North Atlantic	65,577,439	37,208,013	57.4	53.9	76.2
South Atlantic	3,551,594	2,386,414	3.1	3.5	48.9
North Central	35,747,654	23,742,919	31.3	34.3	50.6
South Central	6,417,164	3,765,571	5.6	5.4	70.4
Western	3,005,483	2,087,017	2.6	2.9	47.5

The North Atlantic and North Central divisions combined possessed 88.2 per cent of the aggregate circulation per issue in 1890, and 88.7 per cent in 1900. The North Atlantic division advanced 3.5 per cent, while the North Central declined 3 per cent, during the decade.

In Table 47 the circulation per issue of all classes, and of dailies, weeklies, and monthlies, in 1890 and 1900, with the per cent of increase, is shown by minor geographic divisions, together with the per cent of the total circulation for the United States, in 1890 and in 1900, reported for each division.

TABLE 47.—*Aggregate circulation per issue of all classes, by minor geographic divisions, with per cent which circulation for each division forms of total, 1890 and 1900.*

DIVISION.	Per cent which population of each division forms of total, 1900.	AGGREGATE CIRCULATION OF ALL CLASSES.			PER CENT WHICH CIRCULATION IN EACH DIVISION FORMS OF TOTAL.	
		1900	1890	Per cent of increase.	1900	1890
United States	100.0	114,299,334	69,138,934	65.3	100.0	100.0
New England	7.4	13,661,873	8,217,702	66.2	12.0	11.9
Southern North Atlantic	20.3	51,915,566	28,990,251	79.1	45.4	41.9
Northern South Atlantic	5.9	2,439,895	1,245,185	95.9	2.1	1.8
Southern South Atlantic	7.9	1,111,699	1,140,229	[1] 2.5	1.0	1.6
Eastern North Central	21.0	23,806,433	17,895,722	33.0	20.8	25.2
Western North Central	13.6	11,941,221	6,347,197	88.1	10.4	9.2
Eastern South Central	9.9	4,629,210	2,532,807	82.8	4.0	3.7
Western South Central	8.6	1,787,954	1,232,764	45.0	1.6	1.8
Rocky Mountain	1.6	762,263	367,446	107.4	0.7	0.5
Basin and Plateau	0.6	175,486	104,839	67.4	0.2	0.1
Pacific	8.2	2,067,734	1,564,732	32.1	1.8	2.3

[1] Decrease.

A.—DAILIES.

DIVISION.	Per cent which population of each division forms of total, 1900.	AGGREGATE DAILY CIRCULATION.			PER CENT WHICH CIRCULATION IN EACH DIVISION FORMS OF TOTAL.	
		1900	1890	Per cent of increase.	1900	1890
United States	100.0	15,102,156	8,387,188	80.1	100.0	100.0
New England	7.4	1,587,435	721,181	120.1	10.5	8.6
Southern North Atlantic	20.3	6,037,626	3,521,361	71.5	40.0	42.0
Northern South Atlantic	5.9	518,624	289,892	78.9	3.4	3.5
Southern South Atlantic	7.9	194,249	127,386	52.5	1.3	1.5
Eastern North Central	21.0	3,603,936	1,760,818	104.7	23.9	21.0
Western North Central	13.6	1,590,593	909,086	75.0	10.5	10.8
Eastern South Central	9.9	395,335	257,595	53.5	2.6	3.1
Western South Central	8.6	310,756	185,590	67.4	2.1	2.2
Rocky Mountain	1.6	211,400	98,774	114.0	1.4	1.2
Basin and Plateau	0.6	40,845	34,435	18.6	0.3	0.4
Pacific	8.2	611,357	481,120	27.1	4.0	5.7

TABLE 47.—*Aggregate circulation per issue of all classes, by minor geographic divisions, with per cent which circulation for each division forms of total, 1890 and 1900*—Continued.

B.—WEEKLIES.

DIVISION.	Per cent which population of each division forms of total, 1900.	AGGREGATE WEEKLY CIRCULATION. 1900	1890	Per cent of increase.	PER CENT WHICH CIRCULATION IN EACH DIVISION FORMS OF TOTAL. 1900	1890
United States	100.0	39,852,052	28,954,515	37.6	100.0	100.0
New England	7.4	2,746,803	2,576,922	6.6	6.9	8.9
Southern North Atlantic	20.3	16,666,074	9,762,282	70.7	41.8	33.7
Northern South Atlantic	5.9	1,125,941	803,818	40.1	2.8	2.8
Southern South Atlantic	7.9	706,017	767,091	[1]8.0	1.8	2.6
Eastern North Central	21.0	8,660,185	7,634,925	13.4	21.7	26.4
Western North Central	13.6	5,438,513	3,875,605	40.3	13.6	13.4
Eastern South Central	9.9	1,859,468	1,466,273	26.8	4.7	5.1
Western South Central	8.6	1,203,723	909,521	32.3	3.0	3.1
Rocky Mountain	1.6	429,736	229,52[illegible]	87.2	1.1	0.8
Basin and Plateau	0.6	68,945	31,129	121.5	0.2	0.1
Pacific	3.2	946,647	897,427	5.5	2.4	3.1

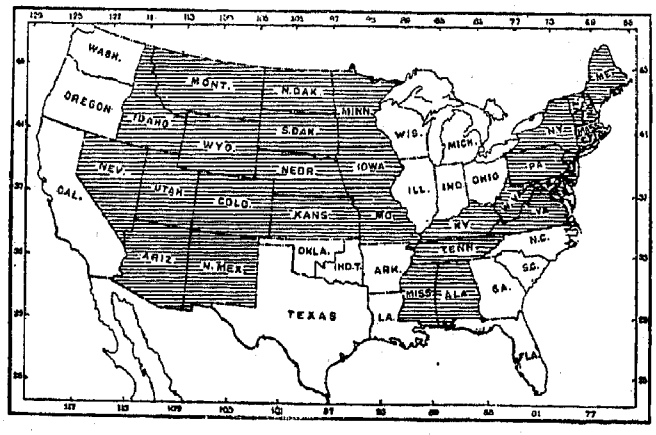
[1] Decrease.

C.—MONTHLIES.

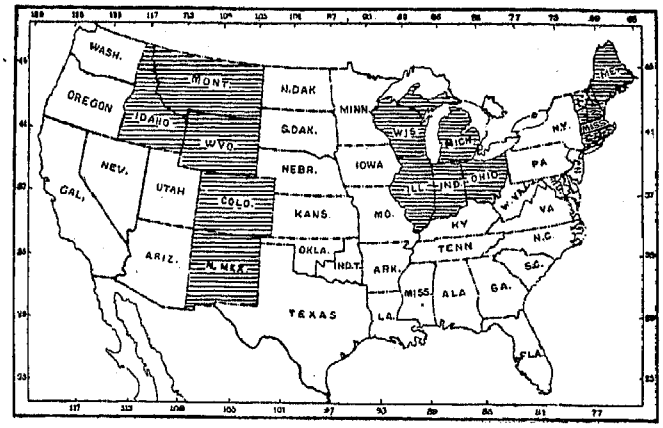
DIVISION.	Per cent which population of each division forms of total, 1900.	AGGREGATE MONTHLY CIRCULATION. 1900	1890	Per cent of increase.	PER CENT WHICH CIRCULATION IN EACH DIVISION FORMS OF TOTAL. 1900	1890
United States	100.0	39,519,877	19,624,038	101.3	100.0	100.0
New England	7.4	8,466,732	3,614,681	134.2	21.4	18.4
Southern North Atlantic	20.3	20,202,791	10,790,513	87.2	51.1	55.0
Northern South Atlantic	5.9	556,740	103,865	436.0	1.3	0.5
Southern South Atlantic	7.9	99,575	189,877	[1]47.6	0.3	1.0
Eastern North Central	21.0	6,382,698	3,385,130	88.6	16.2	17.2
Western North Central	13.6	2,751,055	1,089,515	152.5	7.0	5.6
Eastern South Central	9.9	546,010	142,749	282.5	1.4	0.7
Western South Central	8.6	100,100	105,233	[1]4.9	0.3	0.5
Rocky Mountain	1.6	88,422	31,100	184.4	0.2	0.2
Basin and Plateau	0.6	14,506	12,000	20.9	(2)	0.1
Pacific	3.2	311,248	159,375	95.3	0.8	0.8

[1] Decrease. [2] Less than one-tenth of 1 per cent.

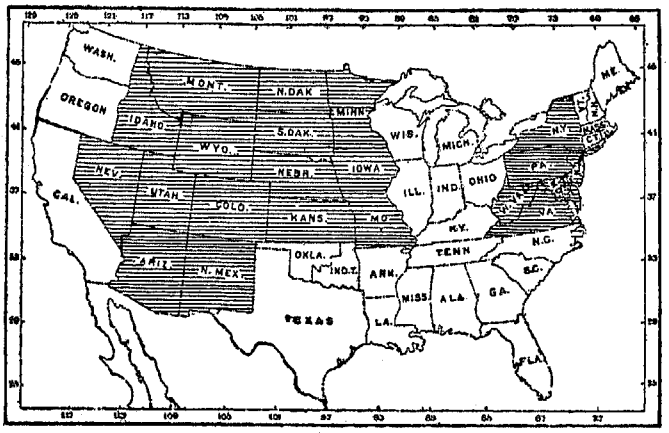
CARTOGRAM 5.—*Minor geographic divisions in which the rate of increase in circulation per issue of all classes was more rapid than the rate of increase for the United States, 1900.*



CARTOGRAM 6.—*Minor geographic divisions in which the rate of increase in circulation per issue of dailies was more rapid than the rate of increase for the United States, 1900.*



CARTOGRAM 7.—*Minor geographic divisions in which the rate of increase in circulation per issue of weeklies was more rapid than the rate of increase for the United States, 1900.*



CARTOGRAM 8.—*Minor geographic divisions in which the rate of increase in circulation per issue of monthlies was more rapid than the rate of increase for the United States, 1900.*

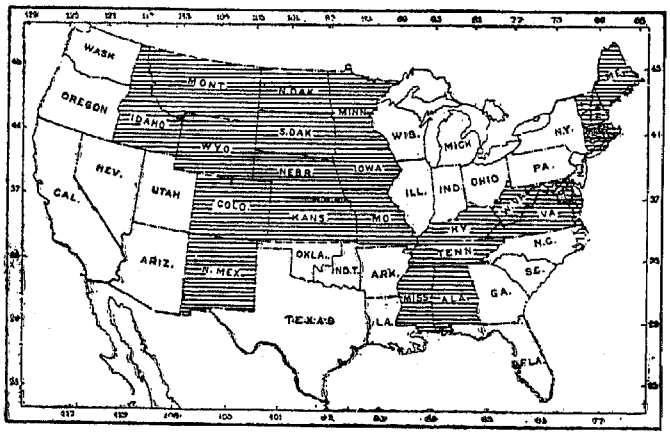


Table 47, in connection with cartograms 5, 6, 7, and 8, shows that in circulation of all classes there was a large increase in each division except the Southern South Atlantic. The most striking advance in the proportion of the total circulation reported was in the Southern North Atlantic group—New York, Pennsylvania,

and New Jersey. The Western North Central group—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas—also showed a decided advance. In daily circulation all divisions showed a large increase, though but three showed a greater proportion of the total circulation of daily newspapers for the United States than in 1890; of these the New England states and the Eastern North Central group—Ohio, Indiana, Illinois, Michigan, and Wisconsin—showed the most decided advance. In the circulation of weekly newspapers and periodicals the Southern South Atlantic group showed a slight decrease, while the remaining groups all showed a moderate increase. The most striking advance in the proportion of the total circulation of weekly publications reported was in the Southern North Atlantic group. In monthly circulation a decrease was shown in the Southern South Atlantic and Western South Central groups. In the other divisions a large increase was shown. The greatest advance in the proportion of the total circulation of monthly publications reported was shown for New England and the Western North Central group.

In Table 48 is presented a comparison of the aggregate number of copies issued during the census years 1890 and 1900, by main geographic divisions, with the per cent which the number of copies for each division forms of the total. The proportions in 1900 agree substantially with those for the circulation per issue of all publications for the same geographic divisions, the greatest difference being 6.6 per cent in the North Atlantic division.

TABLE 48.—*Aggregate number of copies issued during the census year, by main geographic divisions, with per cent which number for each division forms of total, 1890 and 1900.*

DIVISION.	AGGREGATE NUMBER OF COPIES ISSUED DURING THE CENSUS YEAR.		PER CENT WHICH NUMBER OF COPIES FOR EACH DIVISION FORMS OF TOTAL.		Per cent of increase, 1890 to 1900.
	1900	1890	1900	1890	
United States	8,168,148,749	4,681,113,530	100.0	100.0	74.5
North Atlantic	4,150,978,811	2,305,650,459	50.8	49.3	80.0
South Atlantic	361,278,033	221,901,227	4.4	4.7	62.8
North Central	2,810,281,262	1,604,549,714	34.4	34.3	75.1
South Central	449,933,789	281,679,126	5.5	6.0	59.7
Western	395,676,854	267,333,004	4.9	5.7	48.0

Table 49 is of interest principally as showing the relation between the distribution of aggregate circulation per issue and that of the aggregate number of copies issued during the census year.

TABLE 49.—CIRCULATION OF NEWSPAPERS AND PERIODICALS CLASSIFIED

	STATES AND TERRITORIES.	Total number of publications.	AGGREGATE CIRCULATION PER ISSUE.								
			All classes.	Daily.		Triweekly.	Semi-weekly.	Weekly.	Monthly.	Quarterly.	All other classes.
				Including Sunday.	Except Sunday.						
1	United States	18,226	114,299,334	8,645,536	6,456,620	228,610	2,832,868	39,852,052	39,519,897	11,217,422	5,546,329
2	Alabama	175	230,079	30,450	18,195	700	4,340	155,244	6,800	.....	14,350
3	Arizona	43	34,054	7,856	3,600	.....	.....	22,392	206	.....	.....
4	Arkansas	236	262,908	34,340	3,800	1,000	11,285	187,578	18,900	5,000	1,000
5	California	622	1,448,656	367,280	108,316	480	23,342	618,146	194,792	112,500	23,800
6	Colorado	248	521,213	125,477	31,539	500	2,000	285,425	72,947	1,250	2,075
7	Connecticut	155	457,622	39,400	169,415	.....	29,325	155,507	44,375	1,800	17,800
8	Delaware	30	85,900	34,277	.....	.....	1,700	48,773	6,150	.....	.....
9	District of Columbia	69	820,835	69,606	31,242	.....	1,000	304,037	354,050	2,760	58,140
10	Florida	97	112,302	27,907	.....	1,000	5,000	66,295	12,100	.....	.....
11	Georgia	265	549,493	55,841	47,031	.....	33,941	331,905	67,425	1,000	12,350
12	Idaho	72	48,795	3,000	2,100	.....	4,645	36,300	1,500	.....	1,250
13	Illinois	1,548	10,429,368	500,678	948,414	5,388	170,720	3,866,983	3,072,932	1,683,434	180,874
14	Indiana	841	2,108,805	96,599	248,805	.....	77,185	858,424	715,292	77,700	34,800
15	Indian Territory	64	50,141	2,100	1,250	.....	.....	45,891	900	.....	.....
16	Iowa	1,045	1,884,875	125,473	92,116	19,224	168,672	1,105,666	301,205	27,529	44,990
17	Kansas	684	1,144,820	36,619	68,729	800	20,040	653,507	321,050	21,800	21,775
18	Kentucky	282	1,099,172	77,124	87,500	1,800	125,575	425,323	262,450	6,500	112,900
19	Louisiana	160	300,072	88,900	18,090	2,400	32,698	137,434	14,750	.....	5,800
20	Maine	177	6,434,065	14,298	45,540	.....	17,728	220,759	6,120,490	7,050	8,200
21	Maryland	166	679,867	39,172	208,380	.....	17,360	316,505	93,250	3,000	2,200
22	Massachusetts	486	6,199,127	581,097	549,723	.....	32,350	2,066,369	2,257,142	363,096	349,350
23	Michigan	698	2,874,403	224,798	146,050	7,975	192,098	752,082	984,025	50,400	17,025
24	Minnesota	622	1,949,630	144,119	156,147	5,000	95,660	908,478	452,329	4,550	183,347
25	Mississippi	178	168,942	5,586	10,762	502	1,080	142,702	6,610	.....	1,700
26	Missouri	940	5,495,802	713,004	97,488	200	329,153	1,862,856	1,378,586	895,050	219,465
27	Montana	89	127,148	28,922	13,242	.....	9,380	62,109	6,495	7,000	.....
28	Nebraska	538	1,095,538	92,615	29,799	1,200	53,008	650,349	255,935	2,950	9,682
29	Nevada	35	18,153	.....	5,226	160	1,750	10,517	500	.....	.....
30	New Hampshire	88	211,819	.....	42,419	5,250	.....	158,900	5,250	.....	.....
31	New Jersey	298	3,009,104	6,545	216,688	.....	1,900	367,021	28,950	136,500	2,251,500
32	New Mexico	42	32,420	.....	3,820	.....	.....	25,000	500	800	2,300
33	New York	1,477	37,626,095	3,006,426	890,541	146,175	460,867	12,607,099	16,927,062	2,276,625	1,311,300
34	North Carolina	200	287,916	18,150	26,470	.....	24,490	197,706	12,050	700	8,350
35	North Dakota	139	138,890	10,600	7,421	.....	7,100	106,219	7,550	.....	.....
36	Ohio	1,039	7,467,358	494,512	730,203	13,300	211,161	2,411,172	1,420,501	1,795,609	390,900
37	Oklahoma	110	120,077	14,674	.....	.....	800	99,953	4,150	.....	500
38	Oregon	188	311,950	42,433	8,758	.....	14,810	166,511	75,038	.....	4,400
39	Pennsylvania	1,365	11,280,367	987,931	929,495	8,206	282,142	3,691,954	3,246,779	1,991,819	142,041
40	Rhode Island	40	170,594	72,200	46,644	100	6,754	37,671	4,225	3,000	.....
41	South Carolina	117	161,988	13,600	5,250	200	23,327	110,111	8,000	.....	1,500
42	South Dakota	218	232,166	6,000	10,468	.....	1,600	151,488	34,400	.....	28,265
43	Tennessee	251	3,131,017	58,168	107,550	.....	7,700	1,186,199	270,150	1,540,900	10,350
44	Texas	722	1,054,761	96,989	50,613	.....	101,392	782,867	61,400	1,250	10,250
45	Utah	72	123,279	15,538	8,625	2,000	30,630	36,086	13,800	150	16,500
46	Vermont	79	188,646	.....	26,699	.....	8,400	107,597	35,250	300	10,400
47	Virginia	204	627,280	67,995	24,375	3,100	13,080	291,690	96,890	120,500	9,700
48	Washington	199	307,128	35,250	49,320	500	7,850	161,990	41,418	5,300	5,500
49	West Virginia	176	226,013	26,200	17,377	.....	4,900	169,936	6,400	.....	1,200
50	Wisconsin	595	1,426,499	164,592	109,290	1,000	161,995	771,574	189,948	69,600	18,500
51	Wyoming	42	32,687	1,200	2,100	500	985	20,902	7,000	.....	.....

ACCORDING TO PERIOD OF ISSUE, BY STATES AND TERRITORIES: 1900.

AGGREGATE NUMBER OF COPIES ISSUED DURING THE CENSUS YEAR.									
All classes.	Daily.		Triweekly.	Semiweekly.	Weekly.	Monthly.	Quarterly.	All other classes.	
	Including Sunday.	Except Sunday.							
8,168,148,749	3,155,620,640	2,020,922,060	35,663,160	294,618,272	2,072,306,704	474,238,764	44,869,688	69,909,461	1
25,758,633	11,114,250	5,695,035	109,200	451,360	8,072,688	81,600	.....	234,500	2
5,161,096	2,867,440	1,126,800	.....	.....	1,164,384	2,472	.....	.....	3
25,077,996	12,534,100	1,189,400	156,000	1,173,640	9,754,056	226,800	20,000	24,000	4
205,789,752	134,057,200	33,902,908	74,880	2,427,568	32,143,592	2,337,504	450,000	396,100	5
71,702,076	45,799,105	9,871,707	78,000	208,000	14,842,100	875,364	5,000	22,800	6
79,366,409	14,381,000	53,026,895	.....	3,049,800	8,086,864	532,500	7,200	282,650	7
15,037,901	12,511,105	.....	.....	176,800	2,276,196	73,800	.....	.....	8
56,720,860	25,406,190	9,778,746	.....	104,000	15,809,924	4,248,600	11,040	1,362,360	9
14,454,595	10,186,055	.....	156,000	520,000	3,447,340	145,200	.....	.....	10
57,001,092	20,881,965	14,720,703	.....	3,529,864	17,259,060	809,100	4,000	296,400	11
4,170,980	1,095,000	657,800	.....	483,080	1,887,600	18,000	.....	30,000	12
740,880,247	182,745,645	296,853,582	832,728	17,754,880	201,083,116	36,875,184	6,783,736	4,001,376	13
175,132,092	85,258,635	77,875,965	.....	8,027,240	44,688,048	8,583,504	310,800	737,900	14
3,554,882	766,500	391,250	.....	.....	2,386,332	10,800	.....	.....	15
158,895,153	45,797,645	28,832,308	2,998,944	17,541,888	57,494,632	3,614,460	110,116	2,505,160	16
75,387,961	13,365,935	21,512,177	124,800	2,084,160	33,982,364	3,852,600	87,200	378,725	17
96,862,156	28,150,260	27,387,500	280,800	13,059,800	22,116,796	3,149,400	26,000	2,691,600	18
49,348,430	32,448,500	5,662,170	374,400	3,400,592	7,146,568	177,000	.....	139,200	19
106,420,850	5,218,770	14,254,020	.....	1,843,712	11,479,468	73,445,880	28,200	150,800	20
98,959,220	14,297,780	65,222,940	.....	1,805,440	16,458,260	1,119,000	12,000	43,800	21
531,739,780	212,100,405	172,063,299	.....	3,364,400	107,451,188	27,085,704	1,452,884	8,222,400	22
200,457,376	82,051,270	45,713,650	1,244,100	19,978,192	39,105,664	11,808,300	201,600	354,600	23
169,257,418	52,603,435	48,874,011	780,000	9,948,640	47,240,856	5,427,948	18,200	4,364,328	24
13,398,752	2,038,890	3,368,506	78,312	112,320	7,420,504	79,320	.....	300,900	25
446,832,760	260,246,460	30,513,744	31,200	34,231,912	96,868,512	16,543,032	3,580,200	4,817,700	26
19,012,404	10,556,530	4,144,746	.....	975,520	3,229,668	77,940	28,000	.....	27
85,959,730	33,804,475	9,327,087	187,200	5,512,832	33,818,148	3,071,220	11,800	226,968	28
2,395,582	.....	1,635,738	24,960	182,000	546,884	6,000	.....	.....	29
22,421,947	.....	13,277,147	819,000	.....	8,262,800	63,000	.....	.....	30
103,924,361	2,388,925	67,828,844	.....	197,600	19,085,092	347,400	546,000	13,536,000	31
3,020,460	.....	1,195,660	.....	.....	1,300,000	6,000	3,200	515,600	32
2,324,952,963	1,097,345,490	278,739,333	22,803,300	47,930,168	655,569,148	203,124,744	9,106,500	10,334,300	33
28,081,732	6,624,750	8,285,110	.....	2,546,960	10,280,712	144,600	2,800	196,800	34
12,544,161	3,869,000	2,322,773	.....	738,400	5,523,388	90,600	.....	.....	35
591,526,155	180,496,880	228,558,539	2,074,800	21,960,744	125,380,944	17,046,012	7,182,436	8,830,800	36
10,698,566	5,356,010	.....	.....	83,200	5,197,556	49,800	.....	12,000	37
29,484,167	15,488,045	2,741,254	.....	1,540,240	8,658,572	900,456	.....	105,600	38
923,178,870	360,594,815	290,931,935	1,280,136	29,342,768	191,981,608	38,961,348	7,967,276	2,118,984	39
43,692,180	26,353,000	14,599,572	15,600	702,416	1,958,892	50,700	12,000	.....	40
15,355,730	4,964,000	1,643,250	31,200	2,426,008	5,725,772	96,000	.....	469,500	41
14,597,255	2,190,000	3,274,919	.....	166,400	7,874,776	412,800	.....	678,360	42
124,423,368	21,231,320	33,663,150	.....	800,800	59,082,348	3,241,800	6,163,600	240,350	43
100,811,006	35,400,985	15,841,869	.....	10,544,768	38,109,084	736,800	5,000	172,500	44
14,304,587	5,671,370	2,699,625	312,000	3,185,520	1,873,872	165,600	600	396,000	45
15,281,431	.....	8,356,787	.....	873,600	5,595,044	423,000	1,200	31,800	46
51,213,080	24,818,175	7,629,375	483,600	1,355,120	15,167,880	1,162,680	482,000	114,200	47
38,239,106	12,866,250	15,487,160	78,000	816,400	8,423,480	497,016	21,200	99,600	48
24,453,873	9,563,000	5,439,001	.....	509,600	8,836,672	76,800	.....	28,800	49
132,510,954	38,176,080	34,207,770	156,000	16,847,480	40,121,848	2,279,376	278,400	444,000	50
2,446,644	438,000	657,300	78,000	102,440	1,086,904	84,000	.....	.....	51

Number of establishments.—It has already appeared that the circulation of newspapers and periodicals is largely centralized in certain states. Table 50 indicates that if the industry be measured by number of establishments, rather than by output, no such centralization exists.

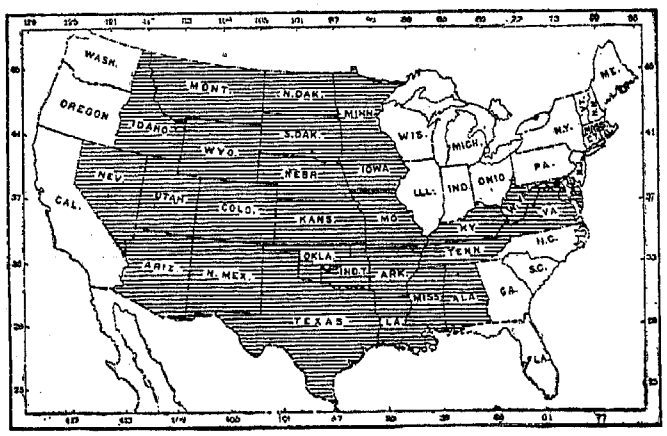
TABLE 50.—*Number of establishments, by minor geographic divisions, with per cent which number in each forms of total, 1890 and 1900.*

DIVISION.	NUMBER OF ESTABLISHMENTS.		PER CENT WHICH NUMBER IN EACH DIVISION FORMS OF TOTAL.		Per cent of increase, 1890 to 1900.
	1900	1890	1900	1890	
United States	15,305	12,362	100.0	100.0	23.8
New England	800	815	5.2	6.6	[1]1.8
Southern North Atlantic	2,509	2,479	16.4	20.1	1.2
Northern South Atlantic	536	412	3.5	3.3	30.1
Southern South Atlantic	582	483	3.8	3.9	20.5
Eastern North Central	3,820	3,110	25.0	25.2	22.8
Western North Central	3,700	2,846	24.2	23.0	30.0
Eastern South Central	786	597	5.1	4.8	31.7
Western South Central	1,161	674	7.6	5.5	72.3
Rocky Mountain	429	281	2.8	2.3	52.7
Basin and Plateau	123	53	0.8	0.4	132.1
Pacific	859	848	5.6	6.9	1.3

[1] Decrease.

From Table 50 it appears that of the total number of establishments in 1900, New England—already shown to be an important factor in the publishing industry—possessed only 5.2 per cent, and that the Southern North Atlantic states—a group immensely influential in the production of periodicals—showed only 16.4 per cent. Thus, these two groups combined represented but 21.6 per cent of the total number of establishments. The changes in relative importance from 1890 to 1900 were not marked; 5 divisions showed declines, and in but 2 was the advance sufficiently great to be worthy of notice. Cartogram 9 presents those

CARTOGRAM 9.—*Minor geographic divisions in which the rate of increase in the number of establishments was greater than the rate of increase for the United States, 1900.*



minor geographic divisions showing a per cent of increase in number of establishments exceeding the per cent of increase for the United States. From this cartogram it appears that in all of the states bordering on the Atlantic and Pacific oceans, except Delaware, Maryland, and Virginia, and in all of the states bordering on the Great Lakes, except Minnesota, the per cent of increase in number of establishments is less than that for the United States. The states showing these relatively low percentages of increase contain most of the large cities, and are the ones in which consolidation of establishments is most likely to occur.

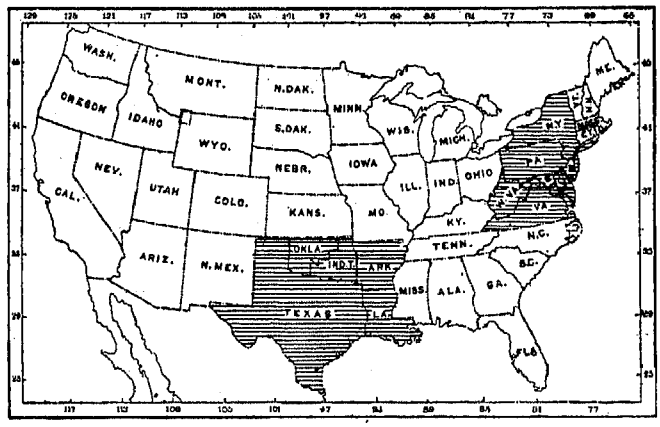
Capital.—The distribution of capital by minor geographic divisions is shown, in Table 51 and by reference to cartogram 10, to vary in a marked degree from the distribution of the number of establishments.

TABLE 51.—*Capital, by minor geographic divisions, with per cent which capital in each forms of total, 1890 and 1900.*

DIVISION.	CAPITAL.		PER CENT WHICH CAPITAL IN EACH DIVISION FORMS OF TOTAL CAPITAL.		Per cent of increase, 1890 to 1900.
	1900	1890	1900	1890	
United States	$192,443,708	$126,269,885	100.0	100.0	52.4
New England	16,800,780	11,827,874	8.7	9.4	42.0
Southern North Atlantic	83,648,876	48,159,589	43.5	38.1	73.7
Northern South Atlantic	7,159,175	3,358,169	3.7	2.7	113.2
Southern South Atlantic	3,332,721	2,580,365	1.7	2.0	29.2
Eastern North Central	36,885,321	26,041,005	19.2	20.6	41.6
Western North Central	22,957,056	17,301,266	11.9	13.7	32.7
Eastern South Central	6,332,991	5,070,293	3.3	4.0	24.9
Western South Central	4,764,265	3,056,304	2.5	2.4	55.9
Rocky Mountain	3,055,318	2,129,333	1.6	1.7	43.5
Basin and Plateau	958,226	710,986	0.5	0.6	34.8
Pacific	6,548,979	6,084,201	3.4	4.8	8.5

In 8 out of the 11 divisions the per cent which the capital invested formed of the total capital was less in

CARTOGRAM 10.—*Minor geographic divisions in which the rate of increase in capital was more rapid than the rate of increase for the United States, 1900.*



1900 than in 1890. The only marked advance was made in the Southern North Atlantic group—New York, Pennsylvania, and New Jersey—which increased its lead at the expense of nearly all of the other divisions. In other words, during the decade just ended, the centralization of this industry, as measured by capital invested therein, has made most rapid progress in the Southern North Atlantic group, and this in spite of the fact that in each division the absolute increase in capital was large. The very high per cent of increase for the United States was of course due, to some extent, to the enormous advance shown in the group

mentioned. The per cent of increase for the remainder of the United States was only 39.3 per cent.

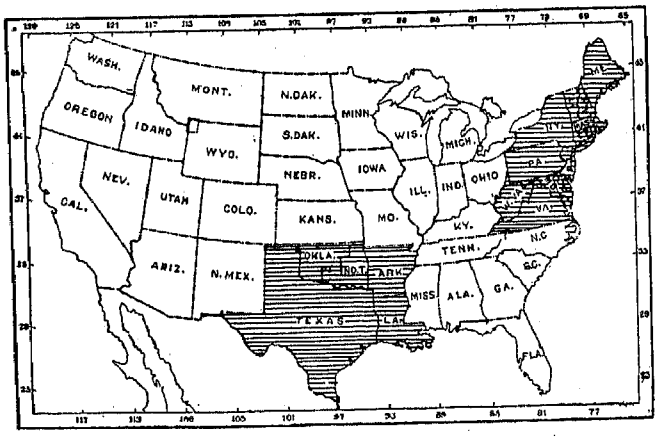
Value of newspaper and periodical products.—In Table 52 is presented, by geographic divisions the combined value of advertising, and subscriptions and sales. These figures show greater uniformity in relative importance than any other figures for this industry. The advance is greatest in New England, and there it is but 1.5 per cent; in 3 divisions it is fractional; 1 presents the same proportion as in 1890; and 6 show declines, all of which are insignificant. In every division except the Southern South Atlantic there was an increase in the value of such products.

TABLE 52.—*Value of products, by minor geographic divisions, with per cent which value of products for each forms of total, 1890 and 1900.*

DIVISION.	VALUE OF PRODUCTS.		PER CENT WHICH VALUE OF PRODUCTS IN EACH DIVISION FORMS OF TOTAL.		Per cent of increase, 1890 to 1900.
	1900	1890	1900	1890	
United States	$175,789,610	$143,586,547	100.0	100.0	24.0
New England	18,543,042	13,039,163	10.6	9.1	42.2
Southern North Atlantic	70,244,534	56,457,695	40.0	39.3	24.4
Northern South Atlantic	5,612,432	4,253,464	3.2	3.0	31.9
Southern South Atlantic	2,867,574	2,893,545	1.6	2.0	[1] 0.9
Eastern North Central	36,663,239	30,298,789	20.9	21.1	21.0
Western North Central	20,386,232	17,297,463	11.6	12.0	17.9
Eastern South Central	4,634,427	4,288,391	2.6	3.0	8.1
Western South Central	5,059,191	4,019,041	2.9	2.8	25.9
Rocky Mountain	3,248,759	2,650,786	1.8	1.8	22.6
Basin and Plateau	719,288	691,498	0.4	0.5	4.0
Pacific	7,805,897	7,696,717	4.4	5.4	1.4

[1] Decrease.

CARTOGRAM 11.—*Minor geographic divisions in which the rate of increase in value of product was more rapid than the rate of increase for the United States, 1900.*



In cartogram 11 are indicated the minor geographic divisions showing a per cent of increase in value of products greater than the per cent for the United States.

It will be observed, from cartograms 9, 10, and 11, that the Western South Central group has exceeded the percentage for the United States in all three particulars—number of establishments, capital, and value of products—doubtless because of the influence of Texas.

Consideration of the proportions which each minor geographic division contributed to the totals for number of establishments, capital, and value of products, shows that 8 divisions ranked higher in number of establishments than in capital or value of products; that 1, the Southern North Atlantic, ranked highest in capital; and 1, New England, ranked highest in value of products. It is shown by Table 53 that the North Atlantic division, comprising New England, New York, New Jersey, and Pennsylvania, although having only 21.6 per cent of all establishments, possessed 52.2 per cent of all the capital, and produced 50.6 per cent of the total value of products; that 6 divisions possessed substantially the same proportion of each item, and that 3 possessed a decidedly greater proportion of the total number of establishments than of capital or value of products.

TABLE 53.—*Per cent of number of establishments, capital, and value of products in each minor geographic division, 1900.*

DIVISION.	Number of establishments.	Capital.	Value of products.
United States	100.0	100.0	100.0
New England	5.2	8.7	10.6
Southern North Atlantic	16.4	43.5	40.0
Northern South Atlantic	3.5	3.7	3.2
Southern South Atlantic	3.8	1.7	1.6
Eastern North Central	25.0	19.2	20.9
Western North Central	24.2	11.9	11.6
Eastern South Central	5.1	3.3	2.6
Western South Central	7.6	2.5	2.9
Rocky Mountain	2.8	1.6	1.8
Basin and Plateau	0.8	0.5	0.4
Pacific	5.6	3.4	4.4

The detailed statistics for newspapers and periodicals are given in Table 58, which appears at the end of this report

BOOK AND JOB PRINTING.

Table 54 presents the number of establishments, capital, value of products, and wage statistics for this branch of the industry in 1890 and 1900, for cities containing 20,000 inhabitants and over.

TABLE 54.—SUMMARY OF BOOK AND JOB PRINTING FOR CITIES HAVING A POPULATION OF 20,000 OR OVER, 1900.

CITIES.	Population.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products.
				Number.	Salaries.	Average number.	Total wages.			
New York, N. Y.	3,437,202	996	$19,107,954	1,552	$1,689,166	12,857	$7,730,447	$4,404,740	$7,206,921	$26,484,933
Chicago, Ill.	1,698,575	594	12,540,430	1,816	1,750,818	9,581	4,674,796	2,947,234	4,955,114	18,536,364
Philadelphia, Pa.	1,293,697	401	11,539,833	844	775,094	5,327	2,508,317	1,626,292	2,948,999	10,066,740
St. Louis, Mo.	575,238	173	3,560,128	524	481,141	2,329	1,129,757	648,828	2,016,560	4,420,147
Boston, Mass.	560,892	280	5,870,499	708	582,807	3,077	1,663,282	1,723,336	1,752,274	8,183,215
Baltimore, Md.	508,957	142	1,285,980	148	133,600	1,178	505,903	196,111	690,446	2,037,037
Cleveland, Ohio	381,768	69	1,107,419	150	141,306	981	496,819	117,084	700,052	1,787,106
Buffalo, N. Y.	352,387	87	1,517,903	101	92,661	1,071	522,369	137,789	475,302	1,455,933
San Francisco, Cal.	342,782	105	1,370,577	104	109,514	1,183	667,566	137,002	656,344	2,022,649
Cincinnati, Ohio	325,902	115	1,630,554	127	127,762	1,617	784,122	177,234	866,618	2,513,458
Pittsburg, Pa	321,616	67	100,015	90	75,076	886	434,481	116,728	513,223	1,396,292
New Orleans, La.	287,104	51	507,670	61	57,218	452	188,062	48,889	150,577	573,987
Detroit, Mich.	285,704	91	927,283	426	165,476	831	394,301	128,950	383,633	1,417,275
Milwaukee, Wis.	285,315	58	746,478	59	57,924	562	225,622	65,785	242,234	750,896
Washington, D. C.	278,718	76	3,139,046	164	211,277	4,101	3,236,730	113,580	1,867,668	5,107,905
Newark, N. J.	246,070	54	624,712	104	89,403	493	203,380	37,570	185,153	674,321
Jersey City, N. J.	206,433	18	454,023	27	29,004	442	175,166	22,195	206,977	488,795
Louisville, Ky.	204,731	45	631,577	60	60,257	601	235,535	59,249	319,998	854,547
Minneapolis Minn.	202,718	73	474,357	63	57,296	548	253,200	68,706	209,474	770,339
Providence, R. I.	175,597	47	421,297	48	53,539	446	201,182	52,091	250,706	667,328
Indianapolis, Ind	169,164	47	911,693	159	119,842	746	351,393	472,194	385,885	1,536,652
Kansas City, Mo.	163,752	63	720,010	166	114,805	804	419,784	102,835	333,089	1,187,253
St. Paul, Minn	163,065	47	577,999	195	127,902	395	188,808	163,324	289,164	923,909
Rochester, N. Y.	162,608	52	495,819	47	23,828	362	130,402	80,006	137,846	524,296
Denver, Colo.	133,859	52	604,486	56	59,274	390	251,561	92,676	183,266	808,895
Toledo, Ohio	131,822	24	248,690	36	23,257	208	96,746	80,551	100,109	337,239
Allegheny, Pa.	129,896	16	79,566	7	4,728	87	40,394	10,800	42,482	129,289
Columbus, Ohio	125,560	22	172,060	29	22,082	206	97,045	17,874	91,188	282,915
Worcester, Mass.	118,421	31	195,851	7	18,018	148	84,552	35,514	84,629	271,625
Syracuse, N. Y.	108,374	29	346,280	24	17,672	212	94,890	26,816	136,567	336,384
New Haven, Conn	108,027	35	513,982	47	31,474	285	127,832	132,459	184,999	583,889
Paterson, N. J	105,171	12	45,796	.....	.....	29	11,756	6,821	11,147	43,465
Fall River, Mass.	104,863	9	50,938	2	1,018	37	18,669	5,110	22,815	66,584
St. Joseph, Mo.	102,979	9	169,150	20	14,420	240	121,529	12,874	96,359	302,060
Omaha, Nebr.	102,555	38	459,714	59	55,737	395	196,739	65,326	228,717	668,567
Los Angeles, Cal	102,479	47	182,626	18	18,158	230	114,143	30,807	106,470	391,370
Memphis, Tenn.	102,320	17	225,750	15	28,529	215	92,370	16,589	118,849	354,647
Scranton, Pa	102,026	13	74,898	3	1,280	50	22,715	5,715	21,464	66,717
Lowell, Mass	94,969	16	64,982	8	2,811	53	28,592	7,873	29,435	85,790
Albany, N. Y.	94,151	29	1,253,446	77	68,202	685	347,876	181,168	332,316	1,244,810
Cambridge, Mass	91,886	17	961,932	84	54,371	873	468,527	97,649	455,284	1,242,492
Portland, Oreg	90,426	32	285,972	25	26,515	140	76,753	25,945	105,600	315,506
Atlanta, Ga.	89,872	17	365,085	31	28,160	409	150,562	26,613	143,149	405,964
Grand Rapids, Mich.	87,565	22	[1]199,437	20	21,530	244	88,739	26,651	84,609	278,431
Dayton, Ohio	85,333	18	277,477	59	39,399	186	85,500	55,415	173,335	431,840
Richmond, Va.	85,050	18	1,048,768	64	55,223	291	142,035	95,913	147,009	538,082
Nashville, Tenn	80,865	18	595,143	55	57,616	371	186,294	34,893	224,391	613,489
Seattle, Wash.	80,671	22	164,738	23	20,149	161	98,230	23,231	81,969	285,688
Hartford, Conn.	79,850	38	1,028,315	49	55,293	442	236,111	151,533	252,420	876,854
Reading, Pa	78,961	17	121,607	.....	.....	63	27,485	7,062	35,020	99,447
Wilmington, Del	76,508	12	134,875	12	8,644	85	39,589	7,475	27,905	106,245
Camden, N. J.	75,935	14	68,357	5	2,886	37	13,696	3,544	19,195	58,252
Trenton, N. J.	73,307	10	155,838	6	4,016	75	38,401	7,127	31,422	109,744
Bridgeport, Conn.	70,996	11	72,672	10	8,180	56	24,902	6,318	25,036	87,282
Lynn, Mass.	68,513	14	104,141	8	6,050	83	41,751	7,381	44,829	143,452
Oakland, Cal	66,960	16	47,295	5	3,800	43	17,839	5,200	19,454	69,009
Lawrence, Mass	62,559	6	20,470	1	750	14	5,625	1,673	8,719	22,199
New Bedford, Mass.	62,442	8	29,613	4	1,928	26	11,658	2,279	15,456	46,550
Des Moines, Iowa	62,139	22	318,060	40	36,164	357	155,160	27,516	170,413	463,934
Springfield, Mass	62,059	22	565,986	121	120,686	189	108,890	214,166	132,963	750,710
Somerville, Mass	61,643	5	7,200	.....	.....	3	2,514	820	2,882	12,765
Troy, N. Y.	60,651	14	123,073	10	6,630	84	39,045	10,612	26,556	127,467
Hoboken, N. J.	59,364	10	26,740	.....	.....	20	11,669	2,249	13,341	44,799
Evansville, Ind.	59,007	7	81,627	10	7,721	94	34,666	7,064	44,147	109,815
Manchester, N. H.	56,987	13	29,125	.....	.....	30	14,100	2,951	11,489	38,689
Utica, N. Y.	56,383	16	123,000	16	8,958	116	49,458	14,295	59,608	179,169
Peoria, Ill	56,100	12	143,340	14	12,016	169	72,566	9,244	88,758	226,576
Charleston, S. C.	55,807	7	182,417	22	15,990	121	49,542	11,145	72,390	203,082
Savannah, Ga	54,244	5	72,320	8	8,696	75	32,961	6,896	34,800	91,480
Salt Lake City, Utah	53,531	10	117,273	16	14,082	96	44,689	13,082	52,795	144,644
San Antonio, Tex.	53,321	11	123,757	11	13,390	191	107,548	8,665	90,116	290,900
Duluth, Minn.	52,969	10	82,262	9	7,317	93	49,193	10,376	31,057	138,614
Erie, Pa	52,733	10	106,512	2	624	71	33,652	3,644	28,180	108,904
Elizabeth, N. J.	52,130	5	291,350	15	17,885	195	98,150	18,096	92,844	312,766
Wilkesbarre, Pa	51,721	11	147,857	8	5,604	80	40,594	6,031	31,554	103,182
Kansas City, Kans.	51,418	5	12,400	.....	.....	12	5,443	1,171	6,170	18,300
Harrisburg, Pa	50,167	14	219,921	9	8,009	198	89,891	24,047	57,336	210,155
Portland, Me.	50,145	22	188,880	20	14,884	159	78,727	19,711	79,218	244,789
Yonkers, N. Y.	47,931	6	10,060	.....	.....	9	4,452	1,493	3,487	14,500
Norfolk, Va.	46,624	15	75,618	7	4,010	78	32,884	11,698	33,242	108,331
Waterbury, Conn	45,859	7	58,077	13	7,834	37	20,655	6,681	23,551	65,202
Holyoke, Mass.	45,712	12	139,844	29	27,642	158	62,716	31,553	80,087	287,646
Fort Wayne, Ind.	45,115	4	80,432	8	8,492	59	23,435	3,762	54,550	88,880
Youngstown, Ohio	44,885	4	44,685	5	4,700	16	8,180	3,996	6,761	44,160
Houston, Tex.	44,633	16	158,783	14	9,860	103	53,781	15,143	48,815	157,059

[1] By clerical error this figure is given as $1,062,657 in Vol. VIII, Manufactures, Part II, p. 430.

TABLE 54.—SUMMARY OF BOOK AND JOB PRINTING FOR CITIES HAVING A POPULATION OF 20,000 OR OVER, 1900—Continued.

CITIES.	Population.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products.
				Number.	Salaries.	Average number.	Total wages.			
Covington, Ky	42,938	6	$16,325			13	$5,527	$1,682	$7,178	$19,145
Akron, Ohio	42,728	18	2,195,040	111	$98,611	903	481,763	375,444	535,907	1,821,296
Dallas, Tex	42,638	20	207,207	21	16,080	145	78,226	27,870	74,247	284,178
Saginaw, Mich	42,345	11	106,717	2	1,100	57	23,527	6,237	27,096	81,078
Lancaster, Pa	41,459	9	149,110	3	3,500	71	31,265	5,914	17,546	73,075
Lincoln, Nebr	40,169	10	94,270	10	7,610	109	42,935	11,197	58,883	143,920
Brockton, Mass	40,063	9	100,140	8	6,750	78	44,707	13,427	71,243	180,390
Binghamton, N. Y	39,647	11	32,400	1	1,000	18	5,656	2,030	9,195	28,582
Augusta, Ga	39,441	6	82,500	2	2,560	212	25,427	3,595	19,186	70,132
Pawtucket, R. I	39,231	8	151,100	18	13,500	89	35,354	7,303	74,810	154,550
Wheeling, W. Va	38,878	6	21,721	1	960	22	7,280	1,669	10,958	24,767
Mobile, Ala	38,469	9	54,205			66	24,948	4,941	20,949	71,780
Birmingham, Ala	38,415	5	87,643	14	14,544	99	52,685	6,094	63,410	148,699
Little Rock, Ark	38,307	5	80,510	11	10,332	59	35,810	6,945	47,280	129,000
Springfield, Ohio	38,253	8	87,140	6	6,250	106	44,591	4,606	61,571	130,289
Galveston, Tex	37,789	7	48,725	7	6,810	36	16,510	3,954	8,189	44,225
Tacoma, Wash	37,714	12	56,053	3	3,380	48	22,916	5,185	17,886	73,487
Haverhill, Mass	37,175	12	44,625	4	2,680	49	26,251	3,644	14,457	71,550
Spokane, Wash	36,848	11	86,961	9	10,630	72	49,122	8,956	28,989	128,541
Terre Haute, Ind	36,673	9	54,960	19	7,900	85	32,301	7,601	34,138	114,660
Dubuque, Iowa	36,297	5	44,883	5	3,280	46	21,906	3,606	22,127	70,395
Quincy, Ill	36,252	12	103,004	11	10,876	122	41,958	6,598	51,631	135,461
South Bend, Ind	35,999	7	30,800	2	1,561	39	15,878	3,423	19,315	55,561
Salem, Mass	35,956	7	23,300	3	900	32	12,057	3,966	13,707	41,330
Johnstown, Pa	35,936	5	14,500			16	3,327	1,123	7,117	19,497
Elmira, N. Y	35,672	11	44,635	2	660	27	8,344	2,335	19,652	43,876
Allentown, Pa	35,416	8	66,048	3	1,118	30	11,303	5,116	15,195	44,885
Davenport, Iowa	35,254	11	101,828	12	12,503	87	39,376	11,654	40,688	133,573
Springfield, Ill	34,159	9	124,625	14	11,030	118	50,647	10,646	34,076	129,602
Chelsea, Mass	34,072	6	17,545			21	8,022	2,011	5,678	23,296
Chester, Pa	33,988	4	14,250			5	1,800	746	3,548	15,900
York, Pa	33,708	11	39,040			14	6,195	1,370	8,949	27,675
Malden, Mass	33,664	7	21,845			23	9,966	3,191	8,447	28,957
Topeka, Kans	33,608	13	372,594	24	23,140	204	109,550	30,578	152,178	369,181
Newton, Mass	33,587	3	8,940			17	8,300	525	3,844	18,100
Sioux City, Iowa	33,111	9	179,421	12	12,420	78	28,143	15,119	40,532	118,232
Knoxville, Tenn	32,637	6	79,690	7	7,450	108	37,493	5,459	32,535	110,301
Schenectady, N. Y	31,682	6	31,150	1	150	6	3,518	2,483	3,706	13,250
Fitchburg, Mass	31,531	6	13,275			11	6,770	1,254	5,893	19,338
Rockford, Ill	31,051	7	53,533	5	4,835	66	25,246	3,956	26,942	72,356
Canton, Ohio	30,667	7	31,875			23	10,329	1,544	7,111	26,382
Butte, Mont	30,470	3	5,625	1	1,500	2	1,096	627	1,651	6,800
Montgomery, Ala	30,346	6	39,401	2	2,400	56	14,287	3,258	16,066	48,929
Auburn, N. Y	30,345	6	23,350	1	800	21	6,338	1,361	8,099	25,325
Chattanooga, Tenn	30,154	10	51,060	19	13,250	100	37,310	5,645	48,064	129,425
Joliet, Ill	29,353	5	14,438	3	1,680	14	4,092	1,550	5,903	16,466
Sacramento, Cal	29,282	5	52,062	3	3,000	27	22,247	5,083	12,721	54,391
Racine, Wis	29,102	3	16,200	1	672	21	8,500	1,071	9,115	22,550
La Crosse, Wis	28,895	4	10,550	1	400	8	2,600	964	4,768	12,250
Williamsport, Pa	28,757	6	29,955	2	1,330	27	12,186	2,048	19,160	44,277
Jacksonville, Fla	28,429	9	96,392	6	5,050	86	36,962	5,618	25,850	95,342
Newcastle, Pa	28,339	3	18,950	1	150	8	3,150	887	5,172	17,929
Oshkosh, Wis	28,284	6	30,067			31	12,003	2,837	12,289	33,325
Woonsocket, R. I	28,204	4	36,850	2	1,050	25	12,180	1,864	13,024	33,880
Pueblo, Colo	28,157	4	24,000	3	3,520	21	11,354	2,241	13,359	42,100
Bay City, Mich	27,628	6	37,950	5	3,484	26	12,155	3,712	10,858	42,917
Fort Worth, Tex	26,688	7	60,793	11	10,339	50	23,993	9,380	29,087	85,224
Lexington, Ky	26,369	10	41,550	7	2,168	54	18,531	4,523	23,469	63,300
New Britain, Conn	25,998	3	18,734	2	1,214	13	5,759	1,277	7,044	19,817
Council Bluffs, Iowa	25,802	4	10,950			11	4,854	1,226	4,240	15,560
Cedar Rapids, Iowa	25,650	5	42,614	3	3,028	54	21,898	4,417	23,568	71,803
Jackson, Mich	25,180	3	14,286			15	7,997	1,091	5,677	21,935
Wichita, Kans	24,671	10	68,817	7	5,915	54	25,537	4,958	39,846	96,237
Kingston, N. Y	24,535	4	9,200			7	2,554	436	1,788	9,400
Kalamazoo, Mich	24,404	10	208,239	26	14,114	158	55,738	15,125	75,055	194,448
Meriden, Conn	24,296	5	69,559	8	6,364	38	20,243	1,871	14,114	51,955
North Adams, Mass	24,200	4	24,460	1	600	24	12,182	1,865	5,590	25,868
Aurora, Ill	24,147	4	22,150			31	11,200	1,428	13,199	38,200
Poughkeepsie, N. Y	24,029	7	61,360	2	2,100	60	25,496	3,809	16,057	75,449
Hamilton, Ohio	23,914	3	11,535			15	4,806	1,074	7,475	20,950
Cohoes, N. Y	23,910	3	35,985			29	12,480	1,322	8,797	35,242
Nashua, N. H	23,898	4	8,100			9	3,525	863	3,743	13,000
Lewiston, Me	23,761	7	26,227			18	8,574	1,722	6,657	22,960
Zanesville, Ohio	23,538	6	9,700			10	3,106	1,040	2,821	19,940
Waltham, Mass	23,481	6	14,625			10	5,162	1,400	9,195	25,421
Bloomington, Ill	23,286	7	90,400	18	15,516	122	44,880	5,744	61,946	147,383
Macon, Ga	23,272	6	32,225	4	2,400	35	11,523	3,967	14,535	43,350
Springfield, Mo	23,267	8	27,150			17	6,846	5,030	10,063	41,600
Burlington, Iowa	23,201	5	63,362	20	14,694	60	16,791	4,645	22,248	71,100
West Hoboken, N. J	23,094	3	4,415			2	1,710	935	1,909	7,534

TABLE 54.—SUMMARY OF BOOK AND JOB PRINTING FOR CITIES HAVING A POPULATION OF 20,000 OR OVER, 1900—Continued.

CITIES.	Population.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products.
				Number.	Salaries.	Average number.	Total wages.			
Jamestown, N. Y	22,892	8	$25,080			15	$6,166	$1,796	$10,100	$30,648
Clinton, Iowa	22,698	3	25,300	3	$4,475	15	4,968	1,022	7,327	21,820
Elgin, Ill	22,433	3	98,546	6	4,000	39	15,829	22,742	30,536	87,100
Austin, Tex	22,258	5	82,200			94	60,275	6,006	29,354	115,880
Oswego, N. Y	22,199	5	98,188	8	2,782	36	16,750	3,286	16,693	46,117
Bangor, Me	21,850	9	46,875	1	364	39	15,283	3,215	20,612	59,208
Petersburg, Va	21,810	4	85,590	2	1,200	27	6,160	1,761	17,352	43,486
Pittsfield, Mass	21,766	4	7,964			6	1,926	1,443	1,297	8,620
Lima, Ohio	21,723	3	8,200			4	1,186	1,153	4,535	12,450
Watertown, N. Y	21,696	3	88,704	7	6,229	54	15,616	2,491	28,192	55,370
San Jose, Cal	21,500	15	98,895	4	5,020	50	22,482	8,073	20,869	77,500
Roanoke, Va	21,495	3	94,694	9	6,608	74	32,439	7,428	40,958	96,064
Columbia, S. C	21,108	6	17,190	5	3,100	61	20,550	1,808	9,178	44,580
Wilmington, N. C	20,976	6	15,970			17	4,004	1,335	6,663	20,150
Muncie, Ind	20,942	6	18,315	5	2,200	32	12,236	2,887	19,148	48,567
Amsterdam, N. Y	20,929	3	7,300			9	3,068	609	2,662	12,400
Decatur, Ill	20,754	5	19,075	6	2,209	16	6,696	2,303	9,244	27,310
Leavenworth, Kans	20,735	4	62,675	5	4,800	38	19,250	7,314	23,776	70,500
Waco, Tex	20,686	10	42,665			47	23,855	4,887	17,354	59,208
New Albany, Ind	20,628	4	2,275			3	535	482	1,987	5,645
Anderson, Ind	20,178	5	8,800	8	1,600	7	3,100	1,815	10,472	28,300
New Brunswick, N. J	20,006	5	26,100			18	8,550	1,707	9,031	25,778
All other cities[1]		31	131,431	7	4,328	119	60,599	10,051	50,623	175,992

[1] Includes Bayonne, N. J., 2; Easton, Pa., 2; East St. Louis, Ill., 2; Everett, Mass., 1; Gloucester, Mass., 2; Joplin, Mo., 2; McKeesport, Pa., 2; Muskegon, Mich., 2; Newburg, N. Y., 2; Newport, Ky., 2; Norristown, Pa., 1; Orange, N. J., 2; Passaic, N. J., 1; Quincy, Mass., 2; Sheboygan, Wis., 1; South Omaha, Nebr., 1; Superior, Wis., 2; Taunton, Mass., 2.

In 1900, cities of 20,000 inhabitants and over contained 79.0 per cent of the separate job printing establishments of the country, with 95.8 per cent of the capital invested in such establishments, and 97.7 per cent of the value of products.

Table 55 compares the totals for cities of 20,000 and over with those for all other localities.

TABLE 55.—*Number of establishments, capital, and total and average value of products shown for cities of 20,000 or more inhabitants, and for other localities, 1890 and 1900.*

LOCALITY.	Year.	Number of establishments.	Capital.	Value of products.	Average value of products per establishment.
Cities of 20,000 or over	1900	5,466	$92,850,506	$118,943,242	$21,761
	1890	3,491	64,053,816	90,034,844	25,791
Other localities	1900	1,454	4,045,672	2,855,854	1,964
	1890	607	3,092,629	3,505,987	5,776

Between 1890 and 1900 the number of establishments in cities increased 56.6 per cent, but the value of products increased only 32.1 per cent, showing a decrease in the average value of products per establishment.

While the per cent of increase, between 1890 and 1900, in number of establishments outside of the cities was very large, in the value of products a decrease was shown, resulting in a much lower value of products per establishment in 1900 than in 1890. To some extent this change may be due to a more careful enumeration in 1900, by which were included certain small establishments that escaped notice in 1890.

Table 54 shows wide variations in number of establishments, capital, and value of products, in relation both to one another and to population. Large job printing establishments are often attracted to a given city by special causes quite distinct from population, as in the case of a state capital, in which a large amount of official printing is required. Of this class Albany, N. Y., Richmond, Va., and Hartford, Conn., are examples.

II. PROGRESS IN THE PRINTING AND PUBLISHING INDUSTRY.

When judged by modern ideas of progress, the art of printing was nearly stationary for four hundred years. Printing has been the most generous contributor to human progress, the handmaiden of all the arts and industries, and perhaps the most powerful factor in making the Nineteenth century the leader of all centuries in genius and invention; but it has been reserved for the last two decades to record the most substantial advances in the many and exacting details connected with the satisfactory production of a printed page. The invention of the 10-cylinder press, by Robert Hoe, in 1853, was declared by the lords of the privy council of England to be "one of the greatest steps ever made in printing." But in the far more difficult field of machine composition, inventors made no appreciable progress during the greater portion of the Nineteenth century; as late as 1880 the extended report of the Tenth Census upon this industry, after presenting evidence of the activity and progress of the period, declared: "While all these improvements have

been following each other in the printing and delivery of newspapers, the ingenuity of man has not yet invented a substitute for the setting of type by hand, the method of composition remaining precisely the same as it was when printing was first invented."[1]

The first step toward the solution of this problem was taken in 1886, by Ottmar Mergenthaler, who invented the linotype machine, which shortly afterwards came into general use, and has been followed by several ingenious and successful inventions similar in purpose. Although only beginning to be felt, the effect of these inventions is already significant, and in them doubtless may be found the cause of many of the abrupt changes which are shown on contrasting the figures given for 1890 and 1900 in the tables for newspapers and periodicals. These remarkable inventions can not fail to affect more and more the future progress of the industry.

Types have no existence in the product of the linotype machine; the unit is the line, which is known as a "slug." By pressing keys the operator assembles brass matrices, and upon the completion of a line these are pressed forward against a bar of molten type metal, casting the line, or slug, in condition for printing. By continuation of this process the matrices return automatically to their receptacles.

Other inventors also attacked the problem of mechanical composition, and there have been placed upon the market the Lanston monotype, a combination of a keyboard by which a strip of paper is punched, and a machine casting individual types from matrices indicated by the passage of compressed air through the holes in the punched paper strip; the Goodson graphotype, also a combination of two machines, operated by electricity, and casting individual types; and the Scudder monoline, a Canadian machine somewhat like the linotype, except that the matrices are located upon a disk. The monoline machine has not been placed upon the American market.

Mechanical composition and distribution of foundry type are accomplished successfully by the Dow, Simplex, Empire, and other machines.

The question of wages has been somewhat affected by the introduction of these radical departures in composition. In 1850 a compositor in New York city received $1.50 per day, or $9 per week. Ordinary job compositors now receive $18, and operators upon machines receive considerably more. It is the opinion of many large employers of labor in this industry, that the invention of labor-saving machines has merely served to increase the demand for labor in new channels, so that the number of wage-earners employed has actually increased rather than diminished. The introduction of machine composition has been of decided benefit to the employee, offering a new field of employment at high wages. This fact is illustrated by the experience of the Typographical Union of New York city, in 1900, when called upon hastily to supply 150 men for a special piece of work in connection with city printing. Every effort was made to secure them, but in that great center of population and labor it was impossible to obtain, at short notice, more than 100 men fitted for the work.

During the decade type founding made marked progress in several of its branches. The Benton punch cutter and the Barth type-casting machine enabled the founder to dispense with much of the laborious and expensive detail connected with his calling, and to reduce materially the cost of type to the printer. To some extent the use of these machines offset the inroads which the use of machine composition made into the business of the type founder, and permitted him to increase greatly the output of special faces and artistic display type.

In the measurement of type bodies a revolution was effected. A uniform series of sizes, known as the "point system," was introduced about 1890, supplanting everywhere the earlier method, by which each foundry used a different size of "body." This radical change permitted the use of the type of one foundry with that of any other, and meant as much to the printer as the change from local to national currency meant to the nation.

In stereotyping, a device known as the autoplate was invented in 1900, by means of which the time required for casting plates was considerably reduced, and in electrotyping the value and efficiency of the foundry were enormously increased by the use of a strong current of electricity to hasten the deposit of copper, so that the time required by the process may now be controlled by the electrotyper to suit his customer.

The greatest advances in press building since 1880 have been made in perfecting presses. These machines are now constructed of such enormous size and with such great capacity that it is possible to obtain, at short notice, a newspaper press which will produce 100,000 impressions per hour, printed in 12 colors. The greatest advance in printing presses, however, was the construction of perfecting presses capable of producing the finest type and cut work as rapidly as though printing newspapers. Such machines, which were an impossibility in 1880, and an experiment in 1890, are now in general use, and are necessary to the production of the large number of inexpensive magazines and newspaper special supplements, profusely illustrated, which have become an important feature of current literature.

The great advance in the direction of printing in colors from plates, by means of which the printer has invaded the business of the lithographer, created a demand which the press maker met with a machine capable of printing the three primary colors and producing several more by combination at one impression, so that a complete picture in many colors may be the product of one impression.

In the field of illustration the decade has witnessed advances second only to the invention and commercial

[1] Tenth Census: The Newspaper and Periodical Press, by S. N. D. North, page 102.

success of composing machines. The art of steel engraving, carried to great perfection about the middle of the century, has become practically a lost art, and by 1900 wood engraving was neglected and unprofitable, being replaced by the "line cut" and the "half tone."

These two classes of illustration are obtained by a combination of photography and etching. In producing the line cut the drawing is photographed and the negative printed upon a zinc plate. The lines of the photograph are then protected and acid is permitted to eat away the exposed portions, producing a relief. The mechanical details of the half tone resemble to some extent those of the line cut, but the process is much more delicate, and the element of individual skill plays a more important part. The relief upon the plate is secured by small dots obtained by photographing the drawing through two glass plates which have been closely ruled. The negative is then printed upon a copper plate, which is subsequently etched.

The effect of the extraordinary activity in invention and improvement, sketched above as characteristic of this great industry since 1880, has been twofold: To the printer himself it has been injurious rather than helpful; to the public it has been of incalculable advantage—a potent factor in elevating the standards of good taste.

It has already been pointed out that by the introduction of labor-saving devices in this industry, the wage-earner has doubtless benefited both in employment and in higher wages. As a matter of fact, the employing printer and not the wage-earner, suffered from new inventions and improvements in machinery. The type founder and the press maker secure protection from the ills of competition by consolidation, but no such relief is afforded to the printer. Indeed, from the nature of his calling, no effective combination could be organized. Extraordinary activity in mechanical invention and improvement, added to increasing competition, forced the printer to sacrifice to the interests of his business a large share of his narrow margin of profit. It is unlikely that there is any other industry in which there is so small a financial return for so much labor and uncertainty. Printers have seldom grown rich from their calling; their recompense has been generally in the character of their product. So far as wealth from his occupation is concerned, the printer of to-day, like his predecessor of centuries ago, lives entirely in the future.

Of far greater consequence, however, is the consideration of the quality of the product. There has been a remarkable advance, since 1880, in artistic composition and in artistic results in all classes of printing. The styles of printing employed during the last two or three decades may be divided into three general periods. The first period was that in which a great number of type faces were employed in all display work and title pages, apparently with the idea that several kinds of shaded and display type were necessary for effective presentation. This style of composition was accompanied by elaborate ornamentation, such as rule work, scroll work, impossible cranes, birds, frogs, and conventional designs. Such work was not artistic in any sense, and could be regarded as interesting and commendable only from the standpoint of ingenuity.

The second period was marked by the imitation of alleged ancient designs and type faces. In the Seventeenth century printing was placed under very great restrictions in England. In consequence of this, a large number of small printing shops sprang up in obscure places, being generally known as "holes." These shops often used secondhand and worn-out dresses of type, and, operating secretly, produced pamphlets and small books of a very poor grade. Where ornamentation or special letters were necessary, the printer himself cut them, generally in crude and barbarous fashion. Thus there was a distinct decline in the printing of that period, due to the product of this multitude of interdicted shops. Certain artists of the present day, coming across this class of work, endeavored to imitate what was not really a subject for imitation, for it did not represent the best work of the period. Advertisers seized upon these oddities with avidity, and for a time there was a considerable movement toward such extreme results; but this fashion appears to be already on the wane. It obtained little foothold on the title pages or in the ornamentation of standard books.[1]

The third period was one of better taste, the simplest types being used in the preparation of titles and display. At no period in the history of the industry has more beautiful work been produced in the combination of types and paper than during the decade which has just ended. Indeed, in the progress of this industry paper is a factor which should not be overlooked.

In 1862 the kind of news paper ordinarily used was made of cotton rags. It was imperfect, poor in color, and manufactured in the crudest manner. The price was 24 cents per pound. In 1900 stock of the same quality could not have been marketed for 2 cents per pound. The extensive use of wood pulp, and the great variety of qualities, weights, and surfaces made possible by increased skill and by improved paper-making machinery, are factors which must not be neglected in any careful survey of the advance of printing.

The volume of advertising circulars and pamphlet literature was never before so large or of such mechanical excellence as during the last decade. The educational effect upon the public at large of presenting in the most attractive and artistic form the ordinary details concerning commercial wares, can not be overestimated.

The underlying cause of this advance, however, is the fact that the untiring search for improvement

[1] Theodore L. DeVinne, to the writer.

has not been confined to the printing industry; other lines of commercial activity, scoring their triumphs, turned to the printer for exploitation by combinations of types, cuts, and paper so original and artistic as to compel attention and merit preservation. To this demand the printer was quick to respond. He became in many cases a designer, and firms were organized, with and without plants, to make a specialty of designing artistic combinations of types and material. This class of designing printers was practically a product of the last decade.

Leaping beyond the narrow limits of the modest and ugly circulars, leaflets, and handbills of two generations ago, the business community thus educated itself, through the activity of the period, to demand, for advertising purposes, the most beautiful products of the press.

In the realm of bookmaking no striking changes were recorded, but the advance in good taste and in artistic beauty of product was a marked characteristic of this branch of the industry. Fashions in bindings changed annually, but a widening range of materials and patterns, more daring use of designs and inks, and the invention and general use of automatic binding machinery supplemented improvements in printing, permitting lower prices for books and promoting phenomenal sales. It is a significant coincidence that the decade which witnessed extraordinary advance in all details of mechanical production in this industry, should be characterized also by the most noteworthy advance in the good taste and appreciation of the general public.

In connection with daily newspapers the beneficial results of the use of composing machines and of improvements in plate making, in presses, and in methods of illustration, are so obvious that they need not be discussed in detail. Many of the advances in mechanical construction, which already have been sketched, profoundly affected this class of publications.

The growth of the Sunday edition of the daily newspaper is worthy of notice. In 1900, 7 morning daily newspapers in New York published Sunday editions, aggregating nearly 400 pages. These enormous publications were composed of sections of 8, 12, or 16 pages devoted to news, literature, advertising, and comic illustrations in colors. The last-mentioned feature—made possible by the advance in color printing on perfecting presses—though carried to extremes, showed no sign of reaction.

There was no radical change in the gathering of news or in the management and scope of daily papers. One characteristic of the decade, however, was the great increase in the quantity of news published. Partly because of the ambitious and progressive spirit of the period, and partly because of the lavish expenditures of capital made by reorganized or newly established publications in order to break into the patronage of prosperous competitors and secure a foothold, the dailies of the great cities became the purveyors of the news of the world to an extent never before attempted. In many cases—especially in New York city, where the daily newspapers are of national repute—it was freely admitted that this expenditure was carried beyond the bounds of business prudence.

In 1886 the *New York World* reported the battle of Majuba Hill in six lines, but so rapid was the extension of news gathering that, fourteen years later, events in the same quarter of the globe were reported to the great American dailies by cable as fully as though close at hand. The destruction of St. Pierre, Martinique, in 1902, by an eruption of Mont Pelee, may be mentioned as an illustration of this tendency. Cablegrams concerning that great disaster reached American newspapers by way of Brazil, the Azores, and Great Britain, costing the recipients from $2 to $4 per word, with fees for precedence.

To some extent this outlay for increased news service has been met by organizing groups of newspapers in different cities to receive and publish duplicates of expensive cables or dispatches, but in few cases has this arrangement lifted more than half the burden. During the greater part of the decade the most stirring current events occurred on the other side of the globe; the war between China and Japan, the fighting in the Philippines, the war in South Africa, and the campaign of the Allies in the Far East required in turn costly presentation, while the operations of the Spanish War off Cuba, followed with wonderful efficiency by the American newspapers, involved immense expenditure. Many of the larger dailies maintained special yacht service between the scene of the conflict and Jamaica or Key West.

Upon the public the effect of such extensive news gathering was very marked; there was a decided increase in human interest; the world became a great neighborhood.

In the revenues of newspapers, however, there was no corresponding increase to offset the drain of increased expenditures for news.

The recent public sale of the Philadelphia Record, which may be regarded as representative of large and prosperous publications, adds confirmation to the foregoing statements. An accurate analysis of the business of the Record for most of the decade under consideration shows the following:

TABLE 56.—SUMMARY OF RECEIPTS AND EXPENDITURES OF THE PHILADELPHIA RECORD, WITH INCOME PER COLUMN FROM ADVERTISING: 1893 TO 1900.[1]

YEAR.	RECEIPTS.			EXPENDITURES.				PER CENT OF TOTAL EXPENDITURES.			Income per column from advertising.
	Total.	Advertising.	Subscriptions, sales, and miscellaneous.	Total.	News-gathering and wages.	Paper.	All other.	News-gathering and wages.	Paper.	All other.	
1893	$815,474	$487,360	$328,114	$617,542	$302,907	$227,489	$87,146	49.1	36.8	14.1	$59
1894	797,285	477,225	320,060	571,344	265,366	231,547	74,431	46.4	40.5	13.0	62
1895	848,478	552,587	295,892	598,369	281,303	239,266	77,800	47.0	40.0	13.0	60
1896	964,904	630,751	334,153	661,429	305,948	275,520	79,961	46.3	41.7	12.1	60
1897	885,934	594,337	291,597	668,328	332,325	266,195	69,808	49.7	39.8	10.4	59
1898	980,742	645,426	335,316	757,908	389,878	292,287	75,743	51.4	38.6	10.0	58
1899	1,073,917	722,205	351,712	769,019	411,931	291,693	65,395	53.6	37.9	8.5	57
1900	1,209,445	855,810	353,635	921,561	490,352	352,137	79,072	53.2	38.2	8.6	55

[1] Prospectus of the sale of the Philadelphia Record, Exhibit I.

It will be observed from this summary that the proportion of expenditure for news gathering rose from 46.4 per cent in 1894 to 53.2 per cent in 1900, a difference of 6.8 per cent, and the earning power of a column of advertising fell from $62 to $55, a difference of $7 per column, or more than 10 per cent.

In connection with increase in expenditures it should be noted that toward the close of the decade there appeared a perceptible hardening in the price of paper. Urgency of demand had made such inroads into the supply of lumber available for wood pulp, that it was clear that unless more liberal laws were enacted the price of paper was likely to rise rather than become lower.

Because of competition, many newspapers cut the price of their issue to 1 cent per copy, and in spite of increasing circulation, there was thus an actual decrease in revenue from sales.

In the meantime, advertising, the other source of newspaper income, showed no marked increase. The department store, though a liberal advertiser, did not compensate for the multitude of smaller retailers whom it supplanted. Taking advantage of the concentration effected in advertising, as elsewhere, the department store advertising agent offered contracts for as much as a thousand columns at a time, and these huge figures extorted from the publisher the lowest possible price.

By 1900 it had become customary for large advertisers to form combinations; it is said that the patronage of fewer than twenty advertisers forms more than half the total quantity of advertising appearing in the daily newspapers of New York city. The only new source of income in the field of advertising was found in newcomers—principally tobaccos, whiskies, cereals, and books. Of these interests the publisher, formerly the most conservative advertiser, became the most daring. The professional advertising agent might be termed another cause of loss to the daily paper, to the amount of the commissions exacted. Between the opposing perplexities of competition and combinations of the advertisers there has been a decline in the advertising earning power of leading newspapers.

After passing 300,000 circulation, the value of advertising becomes a race between the receipts from that source and the cost of white paper. The advertising in one of the New York evening papers with circulation much exceeding 300,000 was recently declared to entail a cost of 21 cents per line for white paper. Evidently the publisher who secures a circulation of huge proportions confronts the necessity of securing from his advertising patrons a return of the cost of the paper space which they occupy, with a margin of profit. For reasons already noted, the profit is in many cases uncertain, and, as the decade drew to a close, for certain newspapers in the great cities a new problem arose.

The population had become so vast, and means of communication with surrounding territory so easy, that systematic search for circulation had been rewarded by enormous sales, the penalty for which was reduction or complete wiping out of profit on advertising. The circulation ball, once in motion, is not easy to stop, and the serious nature of this problem appeared when the cost of white paper occupied threatened to exceed the return from the advertiser. At the close of the decade such a possibility confronted several American daily newspapers. Overcirculation necessitated also an increase in capital invested in plant, with the added burden of interest which it represented. It may be said, therefore, that at the close of the decade from 1890 to 1900 the daily newspaper was more of a public institution than ever before, because it sacrificed an increased share of its revenue for the public benefit, obtaining no compensating financial return from either purchaser or advertiser. This was a condition very much to the advantage of the public, but one which tended to periods of reduced dividends in those establishments appearing to be most prosperous. Daily publications suffered from the rage for enlarged business and narrow profits so characteristic of all industries during the decade, but the relief which other callings found in combinations was not open to the publishers of daily newspapers, because the inequalities of circulation forever make combinations of newspapers impossible. Prosperity for the daily newspaper clearly lies in a middle course, if conditions permit, with respect to both news and circulation.

The changes which occurred in weekly publications

during the last decade were not such as to merit more than passing consideration.

In weekly publications of general circulation devoted primarily to news, a distinct decline set in, doubtless as a result of circumstances which have been referred to in connection with the tables. Many such publications were discontinued; for example, the *New York Times* and the *New York Sun* abandoned the weekly editions long published by those papers, and the widely-known *New York Weekly Tribune* was saved from the same fate only by being made an agricultural paper. It should be mentioned, also, as indicating the tendency of the period, that the semiweekly *Tribune* was made a triweekly.

Notable additions to the class of important weeklies, devoted to literary subjects or illustrated matter, and possessing large national circulation, were the *Saturday Evening Post*, of Philadelphia, and *Collier's Weekly*, of New York. Other publications, devoted to the subjects mentioned, and national in scope, maintained a prosperous circulation.

In the field of monthly magazines the most notable change which occurred during the decade was the creation of the 10-cent magazine. The leading publications in this class were *Munsey's Magazine*, established as a 25-cent publication in October, 1891, and reduced to 10 cents in October, 1893; and *McClure's Magazine*, established as a 15-cent magazine in June, 1893, and reduced to 10 cents in July, 1895. The *Cosmopolitan*, which had long existed as a 25-cent publication, varied its price to 12½ cents and 15 cents, reducing to 10 cents in 1895.

The immediate effect of the reduction in price of *Munsey's Magazine* to 10 cents was to increase the circulation to such an extent that it was difficult to supply the orders, and the production of the first edition at the reduced rate was stopped in order to begin work upon the next issue. In the case of *McClure's Magazine*, reduction to 10 cents caused the circulation to double, and before the end of the first year it had reached about 150,000.

When the reduction of price to 10 cents was made, it was generally regarded as a foolhardy proceeding. The opposition of the news companies made it necessary to handle independently the distribution of *Munsey's Magazine*. It was not realized by many well-informed publishers that the time was ripe for such a change. Improvements in mechanical production had progressed so far that it was at length possible for a daring manager to produce an excellent magazine at a trifling cost per copy. Moreover, the public, accustomed to cuts in prices in other directions, were in a frame of mind to welcome such a change. It should be remarked that advances in machine composition and in making illustrations, while of much importance, represented but a part of the initial cost, and were, moreover, a fixed figure, regardless of the size of the edition. These items, therefore, were not of much consequence in producing a great number of copies. The principal factors were the improvements in presses and in machines for stitching and covering, which greatly reduced the cost per copy.

Publications of this class may be regarded as a variation of the old-established and more expensive magazine. They at once supplied an evident want, and have attained to an enormous aggregate circulation. Possessing different characteristics, they reached a different class of readers, circulating not only in the United States, but in Canada as well.

Munsey's Magazine is noted for the large number of illustrations employed, and for the use of material that deals with people and timely topics, avoiding descriptions. This magazine averages 160 pages of reading matter and 80 pages of advertising, or a total of about 240 pages and cover.

The leading characteristic of *McClure's Magazine*, in addition to articles by well-known writers, is the presentation of subjects of current interest, completely worked out in all their details as soon as the topic has actually been completed. In character of material used, the *Cosmopolitan* follows a little more closely the policy of the older magazines. In all magazines of this class, except the *Argosy*, illustrations are freely used. There is unquestionably an evolution of daily newspapers, through their Sunday publications, toward the field occupied by the inexpensive magazine, which, before the completion of another decade, may have some decisive result. Meantime the importance of the inexpensive magazine, and its educating force in the community, must be given due weight. The combined circulation of the monthlies published by F. A. Munsey, the *Ladies' Home Journal*, *McClure's Magazine*, and the *Cosmopolitan*, in 1900, was 2,483,000 copies per issue.

TYPE FOUNDING.

There has been no material change during the past two decades in the manner of designing types, but the process of executing the design is different from that formerly employed.

For the laborious and delicate task of punch cutting, a machine known as the Benton punch cutter came into general use about 1885. This consists of a light framework a little over 5 feet high, occupying a floor space of 22 by 28 inches. About three feet from the floor a table is set in the machine. The preparation of a model for the Benton punch cutter begins with a pencil sketch, on paper, of letters 12 inches high. The drawing is reproduced by a pantograph, in the form of a model letter 3 inches high, with raised outline. An electrotype of this letter is then prepared, and is fixed firmly upon the platform or table of the machine, beneath a tracing needle or index. To the head plate of this index are attached the four rods holding the cut-

ting mechanism, which is at the top of the machine, and consists of a rapidly revolving borer, fixed in a stationary position and in a movable framework, in which is set the bar of steel or other metal which is to be cut. The leverage of the machine is capable of various adjustments, so that from the same model letter any body of type, from 2-point to 72-point, can be cut with equal facility and exactness.

The operator moves the index over the model letter on the platform, bearing down upon the lower parts and pressing against the sides of parts in high relief. The direction given to the index, at the will of the operator, upon the outlines of the model letter, is faithfully repeated by the tools cutting the punch. The cutting tools, of which two or three kinds are used in succession, are made with the utmost care. Being very highly tempered and being operated at very high speed, by steam power, they cut into the steel along the lines indicated by the movement of the guide over the model letter. The punches which are produced by this machine are finished in all points, requiring no hand work. Besides being produced more rapidly than those made by hand, these punches are more accurate, the counters are deeper, and the bevels are truer and always of uniform slope. This machine may be arranged to reproduce model letters in either direct or reverse order.

Where the punch is to be employed in making matrices by the driving process, as is necessary for small characters, hard steel is used. The matrices for the larger characters are made from soft metal by the electrolysis process.

The automatic type-casting machine was invented by Mr. Henry Barth, of Cincinnati, and patented in 1886. The machine is now in general use in type foundries, both in the United States and in England, and has been largely instrumental in reducing the price of type. It delivers completely cast type, perfect in all respects and ready for use. In the office of the *London Times* a new dress of type is cast daily by an automatic type-casting machine, which, though seemingly deliberate in its operation, casts 1,000 types a minute. The old dress of the *Times* goes daily into the melting pot, and a new one takes its place. In that office this system is preferred to the use of the linotype or other composing machine.

The first practical attempt at uniformity in type bodies was made in France, by the type founder Fournier, in 1737. His system, which was quite complicated, did not come into general use, but after his death it was improved by Didot, a type founder of Paris. The systems of Fournier and Didot are still followed to some extent by French type founders.

In America the first practical attempt to establish correct proportions between different types was made by George Bruce, a New York type founder, in 1822, but his method was not adopted by other American founders. After the Chicago fire a firm of type founders in that city—Marder, Luse & Co.—planned a system of bodies based on 6 picas to the inch. Later they took as their standard the pica made by the MacKellar, Smiths & Jordan Company, as the one which the majority of American founders and printers would prefer, and regraded the other sizes according to the methods of Fournier. In 1878 they placed on sale type made on what they called the American system of interchangeable type bodies.

At a meeting of the American Type Founders' Association, in 1886, a committee was appointed to examine into and report upon the new system. There was some objection to the pica as a standard, but the majority of founders finally agreed to accept it as the basis of the point system. The twelfth part of a pica, called a point, was taken as a unit, and all bodies of type were placed on multiples of this point and called by numerical names: pica became 12-point; long primer, 10-point; brevier, 8-point; nonpareil, 6-point, etc.

The American system follows the system of Fournier and Didot, except in the unit of measure employed. The following statement shows the names of the principal bodies or sizes of type in use in England and in America, with the names of these sizes under the point system:

Names of type bodies.[1]

AMERICAN.		English.
New name.	Old name.	
60-point	Five-line pica	Five-line pica.
48-point	Canon, or four-line	Canon, or four-line.
44-point	Meridian	Two-line double pica.
40-point	Double paragon	
36-point	Double great primer	Two-line great primer.
32-point	Four-line brevier	
30-point	Five-line nonpareil	
28-point	Double english	Two-line english.
24-point	Double pica	Two-line pica.
22-point	Double small pica	Double pica.
20-point	Paragon	Paragon.
18-point	Great primer	Great primer.
16-point	Columbian	Two-line brevier.
14-point	English	English.
12-point	Pica	Pica.
11-point	Small pica	Small pica.
10-point	Long primer	Long primer.
9-point	Bourgeois	Bourgeois.
8-point	Brevier	Brevier.
7-point	Minion	Minion.
6½-point	Minionette	Emerald.
6-point	Nonpareil	Nonpareil.
5½-point	Agate	Ruby.
5-point	Pearl	Pearl.
4½-point	Diamond	Diamond.
4-point	Brilliant	Brilliant.
3½-point		
3-point	Excelsior	Minikin.

[1] From Theodore L. De Vinne's Practice of Typography; Plain Printing Types, page 54.

In the autumn of 1892 the American Type Founders' Company was established. The majority of the type foundries of the United States became branches of this organization, which now practically controls this branch of the industry.

COMPOSING AND TYPESETTING MACHINES.

The Mergenthaler Linotype.—The linotype machine, invented by Ottmar Mergenthaler, of Baltimore, Md., became commercially successful during the early part

of the decade. This machine is less than 5 feet square, and weighs about 2,000 pounds. It consists of a bank of keys connected with a magazine containing about 1,500 brass matrices—small plates about an inch high and half an inch wide, the thickness varying with the type character. On one edge is the die from which is cast the letter, and at the upper end are a series of nicks or teeth for distributing purposes, every character possessing a different combination. Each magazine contains a number of matrices for each letter, and all the usual characters required by a complete font of type, together with spaces, quads, etc., of varying thicknesses. In addition there are also flat, elongated, wedge-shaped spaces which are inserted between words and employed for justifying each line as it is cast. The magazine containing the matrices is an inclined receptacle 2 feet 6 inches high, the top being about 6 feet from the floor. Within this magazine are channels in which the matrices for the different letters are stored, and through which they pass. The machine is so adjusted that as the keyboard is manipulated the matrices are selected in the order in which they are to appear in the slug or casting. When a key is depressed, the matrix to which it corresponds emerges from its channel, is caught upon an inclined traveling belt, and is then carried to the assembler, or stick. As each word is completed, a stroke of the space key inserts the wedge-shaped space used between each two words. When the line is completed the operator can correct errors by extracting matrices or substituting others for those which are in the line. The wedge-shaped spaces are now pushed up through the line, securing instantaneous and complete justification. The completed line is then transferred automatically to the front of a mold extending through a mold wheel at the left. Behind the mold is a melting pot, heated by gas or gasoline, and containing molten metal. Within the pot is a pump plunger leading to a perforated mouth arranged to close the rear of the mold. When the matrix line is in position the automatic operation of the plunger forces the metal into the mold and against the line of matrix letters, where it instantly solidifies in the form of a slug. The mold wheel then makes a partial revolution, bringing the mold in front of a blade which pushes the slug into a receiving galley, ready for the proof press.

In order to insure accuracy in height and thickness of the slugs, knives are arranged to act upon them during their progress to the galley. The slugs thus prepared are type-high, and when arranged in order look exactly like a type-high, metal-backed stereotyped plate cut into slices one line deep.

Having served their purpose in front of the mold, the matrices are returned to the magazine to be utilized in new combinations. The distribution is accomplished automatically. The line is lifted from the mold by a long arm, and shifted laterally until the teeth at the tops of the matrices engage the teeth of a bar which is lowered to receive them. This bar then rises, lifting the matrices to the distributor at the top of the machine, but leaving the wedge-shaped spaces behind to be shifted to their magazine, which is to the left of the matrix magazine, and about on a line with its foot. The matrices, having been lifted to the top of their magazine, are pushed along a distributor bar by continually-moving longitudinal screws beneath. The distributor bar, which is made in a single piece, is fixed horizontally over the upper end of the magazine, and is supplied with longitudinal ribs or teeth adapted to engage the teeth of the matrices and to hold the latter in suspension as they are carried along the bar. The teeth of the bar are cut away to produce a different number or arrangement over each of the channels. Each matrix remains engaged and travels over the mouths of the channels until it arrives at the point where its teeth bear such relation to those of the bar that it is permitted to disengage itself and fall into its own channel. It is thus clear that the operation of the machine permits the composition of one line, the casting of a second, and the distribution of a third to be carried on simultaneously. The casting operation can also be arranged to work independently of the rest of the machine. It is said that this machine is capable of a speed greater than that at which the most skillful expert can operate the keys. The average product of a good operator is 4,000 ems per hour. Many operators, however, can produce from 5,000 to 6,000 per hour, and a speed of 13,000 is on record. There are three styles of mold—the first from 30 ems to 19 ems pica, the second for any measure between 24 and 13 ems pica, and the third for measures from 14 ems to 5 ems pica, inclusive. Each magazine contains matrices for any face of type, and the usual range of type faces is now from ruby to pica, or 12-point, though some matrices have been made for 14-point. Various faces of letters, and the alphabets of different languages, can be supplied with this machine. There are also combinations such as casting a 6-point face on a 7-point body, or a 7-point face on an 8-point body, in order to secure the effect of leading. The machines are equipped to permit an exchange of matrices or molds, and they can now be adapted to produce any practical face or any desired body, provided the line does not exceed 5 inches in width.

The Linotype company makes all the matrices required for its machines, employing the Benton punch cutter extensively in the preparation of the characters. Until 1899 it was impossible to employ in this machine more than one face of type at a time—the use of italics, for example, was impossible with body letters; but in the year mentioned one of the officers of the linotype company invented a two-letter matrix. The principal letter is a body character, and is placed above the other, which is italic, small capital, or bold face. To utilize the two-letter device, a special finger key is provided, which moves a small slide into or out of the assembler.

When the slide is drawn forward, the matrices entering the assembler assume the customary height and are delivered to the mold in position to produce the upper or body characters. If italics or small capitals are desired, it is necessary only to draw out the lower end of the finger key, causing the slide to move inward, so that the matrices added to the line will be arrested and sustained at a higher level than the others, causing their lower or secondary characters to be presented in casting position. By the operation of the finger key the line may be made to consist wholly of body face, italics, or small capitals, or of any combination of these faces required. The field of operation of the linotype machine has been much extended by the introduction of the two-letter device. It is stated that about 8,000 machines are in use in the United States, perhaps half that number in Great Britain, and a large number in Germany, France, and other parts of Europe. About one thousand new machines are put in operation each year. They are now in general use in the large newspaper offices in the United States. In addition to greatly cheapening the cost of composition, they possess the added advantage of supplying what is in effect a new font of type with every issue, the slugs being returned to the melting pot after each use. Another advantage is the ease with which the slugs can be handled. As they represent lines instead of individual letters, they can be manipulated with great rapidity.

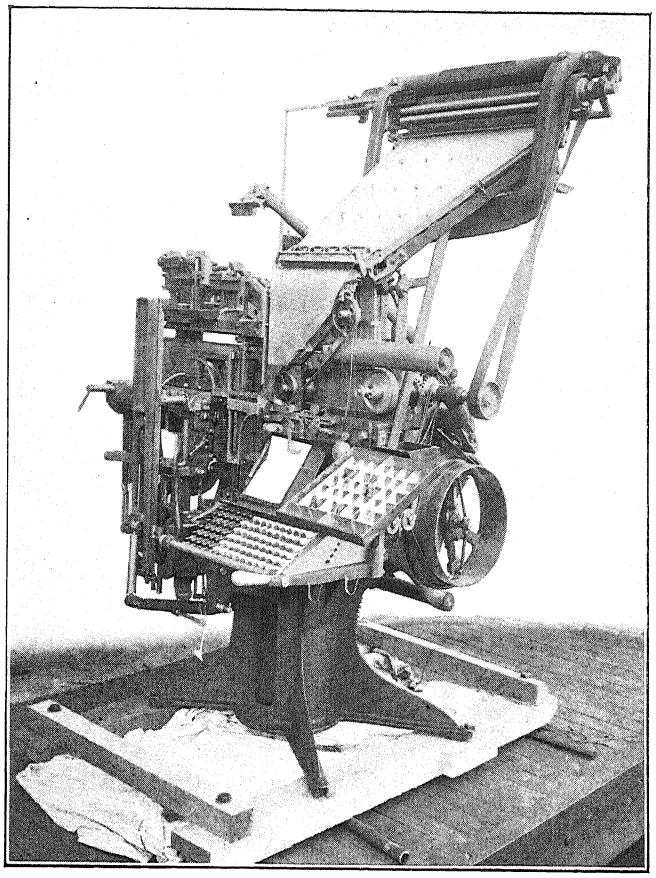
The Scudder Monoline.—The Scudder monoline machine manufactures a solid line of type, or type bar. It is automatic in all of its functions, and is operated by one man, by the manipulation of a keyboard. The different parts of the working mechanism are attached to a solid, three-legged cast frame, and are in full view and within easy reach of the operator. The machine is 3 feet 6 inches high, 4 feet long, and 3 feet 6 inches wide, occupying about as much floor space as a printer's three-quarter case frame.

The principle governing the operations of the monoline is much the same as for the linotype, the main difference being in the construction of the matrix bars; those for the linotype carry a single intaglio, while the monoline uses matrix bars, each having 12 characters indented on the front edge. These matrix bars, of which there are 500, are stored one behind another in a magazine about the size of an ordinary photographic camera. As the keys are struck on the keyboard the matrices and spacers descend into the assembling box, traveling a distance of about four inches, and the bars are dropped more or less, according to the position of the letter to be brought in line to be cast. When the line has been completed to approximately its full length, the operator strikes a lever at the right of the keyboard and begins the composition of the second line, while at the same time the machine automatically justifies the first line, carries it to the casting pot, delivers it upon the galley, and returns the matrices and spacers to their respective receptacles in the magazine. The machine will not cast a line which has not been properly justified. After being once brought into use, a matrix bar or spacer is not employed again until all others of the same kind stored in the magazine have been used in turn.

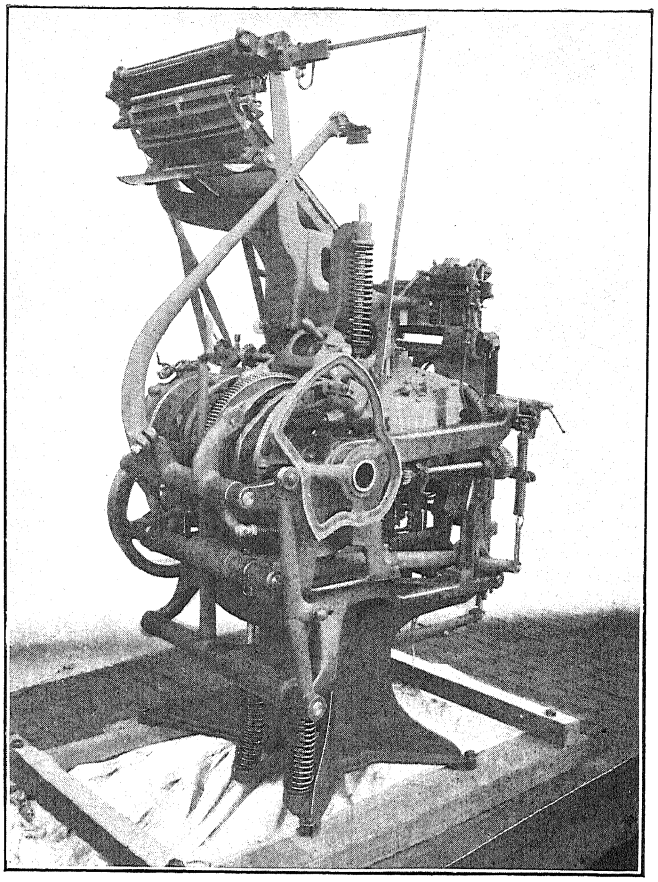
The Lanston Monotype Machine.—The Lanston monotype machine was invented by Tolbert Lanston, in 1886, but was not placed upon the market until the latter part of the last decade. The principle upon which it is constructed differs radically from that of the linotype. The monotype produces single types cast in the order of their use, and set in automatically justified lines. It consists of two machines—a perforating device operated by a keyboard, and a casting machine. The keyboard differs from that of the typewriter only in the much greater number of characters, of which there are 225, comprising a complete font, including italics and small capitals. The keys are arranged in 15 columns of 15 rows each, with 2 extra rows at the top to secure justification. For each series of characters in the font a different color is used, so as to distinguish italic from roman, etc. The keyboard is between 3 and 4 feet from the floor and is supported by an iron bar upon a base 1 foot square. At the top of the machine is a roll of paper which unwinds from one spool and winds on another as the keys are struck, and also a paper scale for registering the body size of the type.

Before beginning his task, the keyboard operator sets an index of the number of ems required per line. Each stroke of a key perforates the paper ribbon in such a combination as to control the matrix of the proper letter in the casting machine, and causes the registering scale to charge to the line an amount equal to the body width of the type just selected. In this way a line of matter is progressively perforated and charged until, as the end is approached, the line scale shows that the next word or syllable can not go into that line, while another portion of the registering scale indicates the amount of unfilled space in the line just perforated if it should be cast with its spaces of normal body size. Still another portion of the scale has been keeping account of the number of spaces used between words of the line which may be varied in the process of justification. The machine thus mechanically notes for the operator the amount of space to be added and the number of space types among which the variation from the normal body width may be apportioned. At the completion of each line the operator, by merely noticing the figures shown by the pointer on the justifying scale, knows at once what additional holes to perforate in the record in order to secure perfect justification. When he has touched the justifying keys the registering scale recedes to zero, advancing again as the new line progresses. These operations are all automatic.

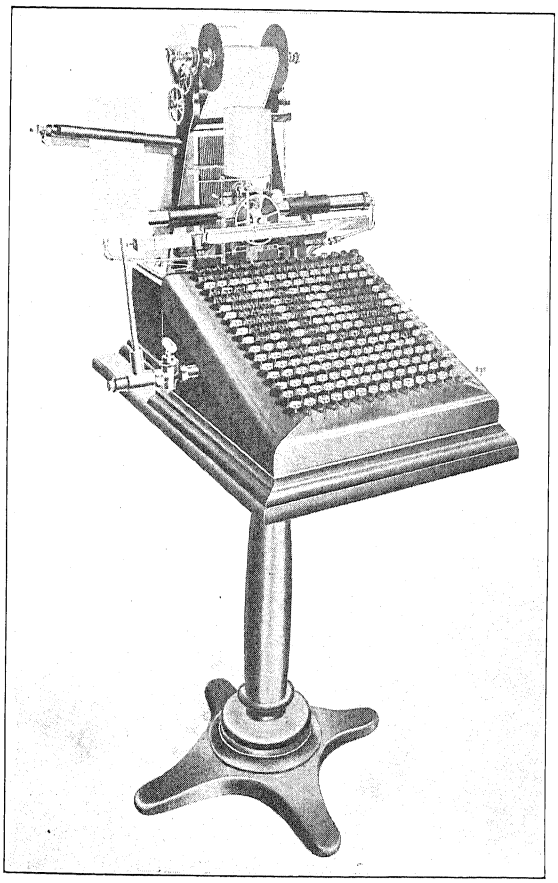
From the perforator the spool passes to the casting



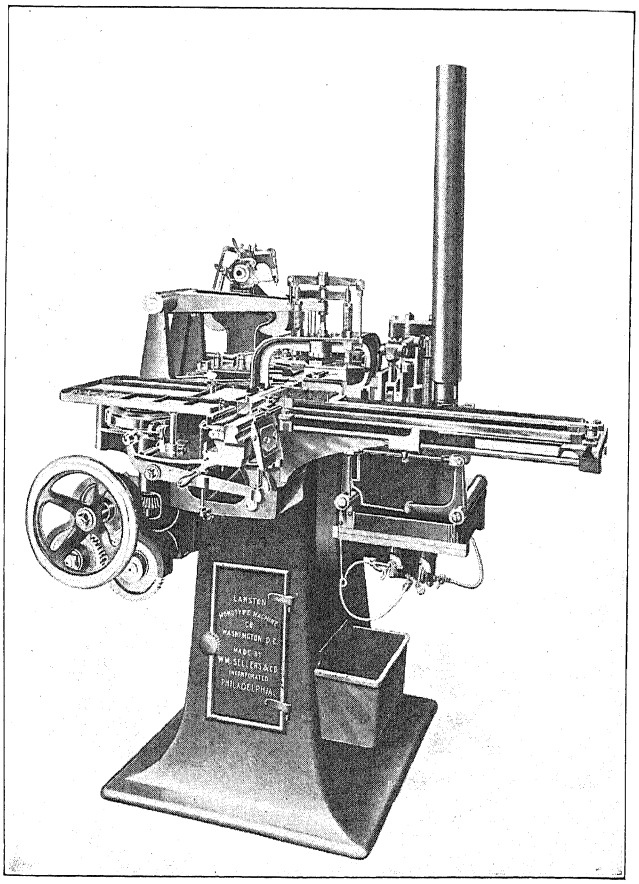
MERGENTHALER LINOTYPE—FRONT VIEW.



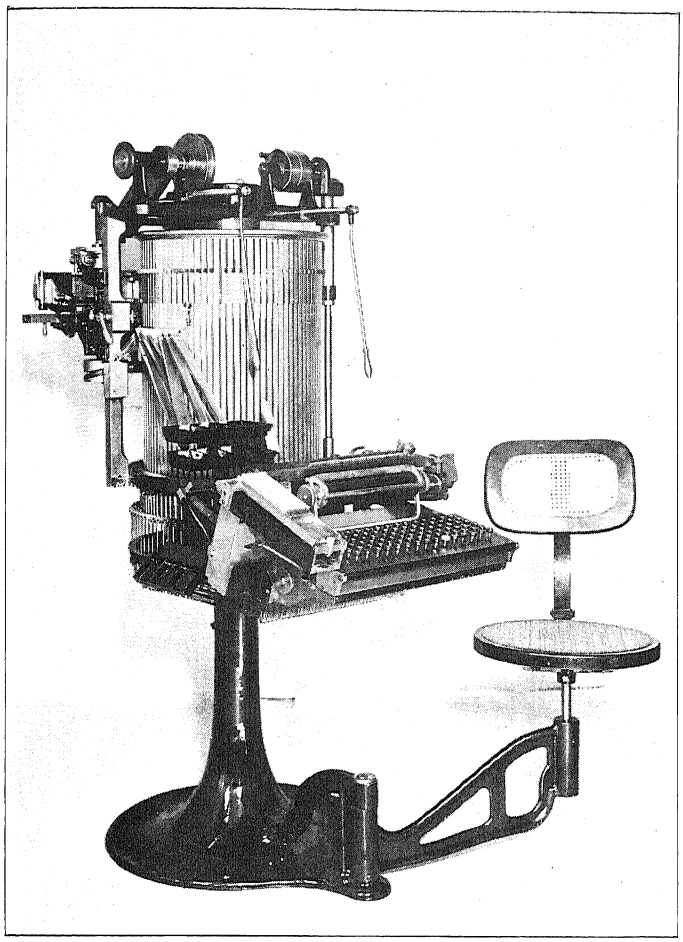
MERGENTHALER LINOTYPE—SIDE AND REAR VIEW.



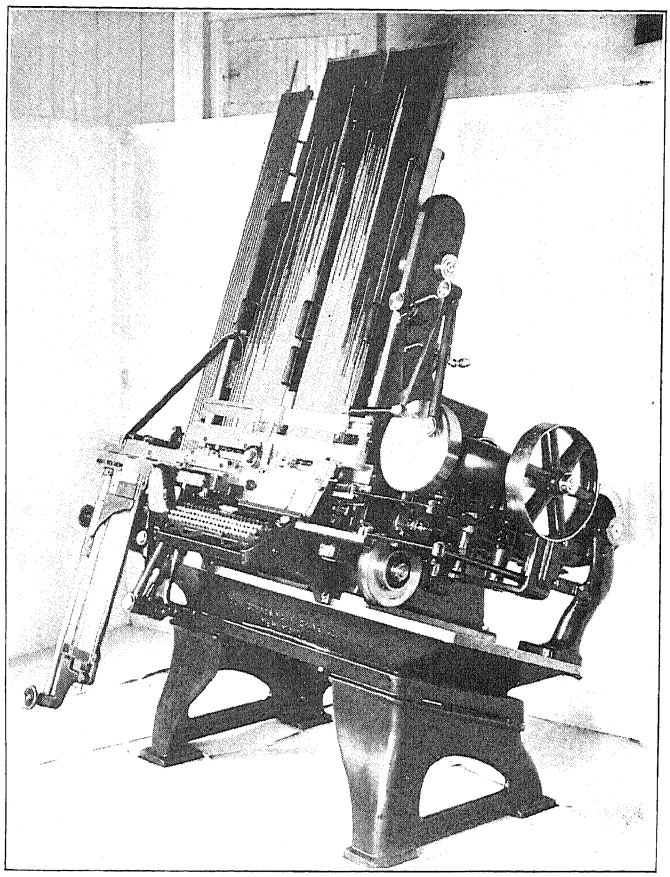
LANSTON MONOTYPE—KEYBOARD.



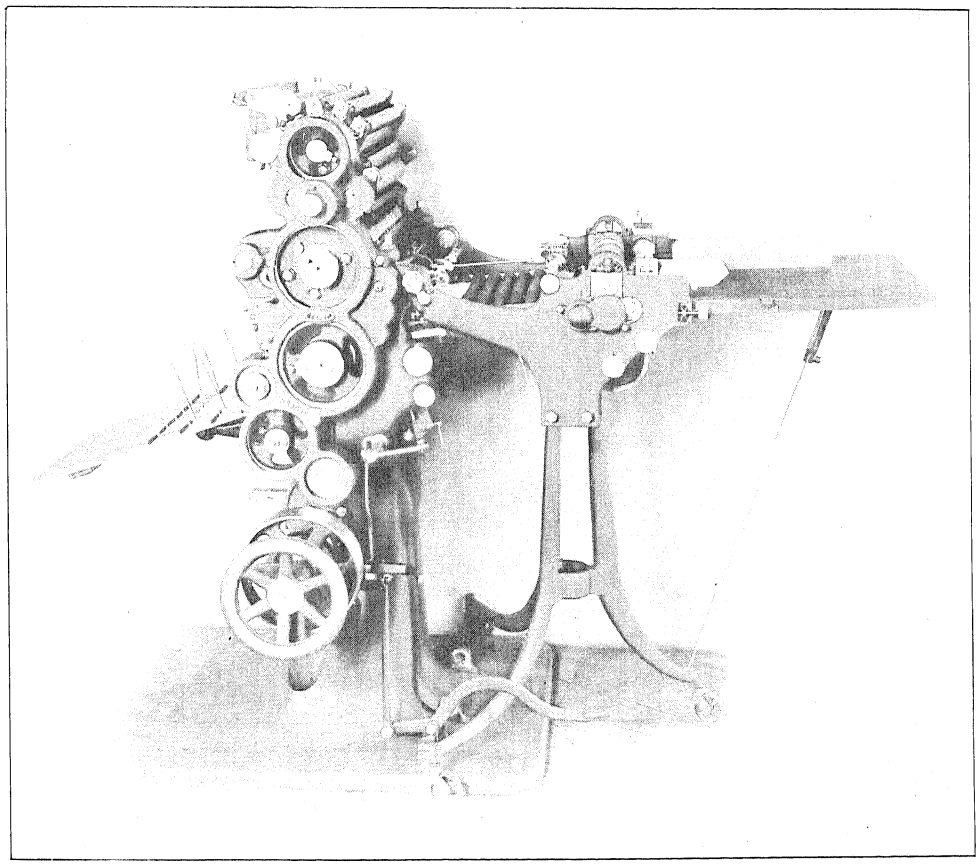
LANSTON MONOTYPE—CASTING MACHINE.



SIMPLEX ONE-MAN TYPESETTING MACHINE.



DOW COMPOSING MACHINE.



HARRIS ROTARY JOB PRESS.

and setting machine, an intricate piece of mechanism about 4 feet high and slightly less in width, weighing about 1,200 pounds. On being placed in the casting machine the ribbon is unwound in reverse order, the operation of casting and setting proceeding in like manner. The control of the casting machine by the perforations in the ribbon is effected by the pressure of air passing through the holes as the ribbon moves over a rounded plate. Within this plate are 32 air tubes, and, as different perforations appear, different connections are made through these tubes with the working parts of the casting machine, a pressure of 8 pounds being maintained. The 225 matrices are contained in a die case measuring about 3 inches square. The matrix case shifts its position according to the combination of perforations passing over the air tubes. The perforations for justification regulate the casting of space types between words, causing the mold to be opened in the degree indicated by the justifying holes, in order that the space types may be cast of the proper size. Thus, from the record ribbon made at the keyboard, the casting machines cast type and insert mathematically correct spaces at constant speed, which may be kept up up to the limit of cooling metal. It is the work of only a few moments to remove one matrix case and substitute another. Moreover, the molds in which the bodies of the types are cast, also, may be exchanged at short notice. At one side of the casting machine is a melting pot, in which an automatic plunger forces the hot metal into a nozzle leading directly to the mold upon which the matrix rests. The metal is forced against the matrix, which is filled first, and then instantly occupies the body of the mold under pressure, insuring a good cast. When chilled the types are ejected through the mold into the carrier, which carries them to the line in the galley. As each line is completed, it is advanced automatically to make room for the next. The correction of matter set on the Lanston machine is the same as in hand composition; it is not necessary to recast a line, as in the slug machines. In the operation of the Lanston machine it is customary first to cast a font of type to be used in making alterations by hand.

It should be observed that the keyboard and casting machine have no connection whatever, and that each part can be operated independently. A keyboard operator can set matter as rapidly as he can read the copy and strike the keys, a speed of 5,000 ems per hour being regarded as a moderate average. The type-casting machine casts and produces, according to the body size, from 75 to 125 ems per minute, or from 4,000 to 5,000 per hour. It can be adjusted to cast type on bodies ranging from 5½-point to 12-point, with various faces.

The advantages claimed for this machine are perfect justification, the convenience of being able to operate the two parts separately, the employment of matter set from single types, and therefore easily and quickly corrected, and the ability to produce a font of type at every operation. Although they have not been long in practical operation, many of these machines are in commercial use.

The Goodson Graphotype.—The Goodson graphotype machine was first placed upon the market in 1899, by J. H. Goodson, and depends upon electricity for its successful operation. It is composed of two parts: a small table about the size of a typewriter desk, containing an ordinary typewriter, a perforating machine, and a small dial similar to a clock; and a caster and setter. The typewriter is in all respects unaffected as far as facility in writing is concerned. The operator is required, in addition to the execution of ordinary typewriting, to notice, when the end of the line is reached, the dial which controls the spacing, and to touch the key indicated by the dial, thus automatically spacing and justifying the line.

Each time a key is touched, not only is the proper letter written on paper, but an electrical communication is made with the perforator, which perforates a narrow paper ribbon in series of round holes so arranged that when the ribbon is placed in the casting and setting machine a similar electrical connection is made through this perforation, by indicating the letter or space to be cast and set. The advantage of a visible, typewritten sheet is obvious. It is accessible to the operator for reference, and it may be read by the proof reader instead of the first proof, as the type and the typewritten page are identical so far as the orthography is concerned. The ribbon, together with the corrected typewritten sheets, may be put away indefinitely for reprint or for possible use in the future, without expense for retaining metal. The same perforated ribbon and corrected first proof can be used in the casting machine to set from 5½ to 12 point type, the size or style of type required being determined at the caster, not the perforator.

The caster and setter resembles a sewing machine, being but little larger. It is operated automatically, and controlled by the perforated ribbon already mentioned. It casts and sets type continuously at a speed of 5,500 ems per hour, and has reached a speed of 8,000 ems per hour. The metal pot is more than a foot from the mold, making it possible to cool the types rapidly, thus overcoming a difficulty which has heretofore limited the efficiency of casting machines. It is possible, therefore, to maintain the maximum speed mentioned. The molten metal is conveyed to the mold by means of an electrically heated tube insuring uniform temperature for type casting. The mold is also water-jacketed, to counteract the heat which the small jet of metal gives out in casting type. By this means the mold is kept at a temperature at which the type is immediately chilled throughout an indefinite run, insuring a perfect and well-cut face. The type itself is in all respects

equal to foundry type, and can be distributed into the case and reset with the same facility. The size or style of type and the measure can be changed as rapidly as this could be done by hand. It is claimed that the advantages of this machine for setting tabular matter are very great—that it can be set at the same speed as straight matter, the rules being put in by hand.

The Dow Composing Machine.—The Dow system of composition, patented November 28, 1899, requires the use of two machines—a composing machine, which sets individual foundry types and delivers them automatically justified on the galley; and a distributing machine.

The composing machine is a little over 6 feet high, weighs 2,000 pounds, and occupies about 17 feet of floor space. It is operated by means of a keyboard similar to that of a typewriter, but with 90 characters. The keys descend only three thirty-seconds of an inch, and are used simply to release certain parts, the driving power of the machine accomplishing the rest of the work. For greater ease in handling, the main type magazine is divided into two parts. In the type channels, which are 4 feet in length, the types lie with their faces in sight, resting on their sides in order that a large number may be placed in one channel. For further increase of capacity, additional channels are devoted to letters in frequent use.

At each touch of the keyboard a single type is pushed from the magazine and advanced to a type raceway in front of and parallel with the magazine. This raceway, which is in a continuous horizontal line, widens at one end, so that as the type enters and is pushed along by a rapidly reciprocating type driver it is stopped at the center by the narrowing of the raceway. From this position it is conveyed, by a blade operating in harmony with the type drivers, into an upright channel or "stick," each type forcing down the preceding one. To set a line of quads the operator simply keeps his finger on the quad key, and the quads are set in the stick at the rate of 10 per second until the line is filled. As the types enter the stick their faces are presented directly in view of the operator, who can read and correct them at will. A bell gives warning when a line is approaching completion, and a gauge at the side of the channel in which the line of type is formed, shows how much the line is short or how far the operator has overrun the standard measure he is setting. When the line is full the operator touches the line key, and then, without further attention on his part, and without delaying the composition of the next succeeding line, the stick of type turns halfway round and the line of characters is thrust by a blade to a point on the raceway called the "bridge," where the process of justification begins.

During the process of composition plain, type-high, rectangular bits of brass are used temporarily to separate the words; at the bridge each word is removed from the forward end of the line and carried to the galley, where the temporary space is extracted and returned to the setting case, the proper justifying space being substituted. The justification is accomplished by means of an automatic calculating device placed at the back of the machine. This calculator registers the shortage in the line and the number of spaces among which this must be divided, divides the shortage as equally as possible among the number of spaces indicated, and sets in motion another mechanism which ejects the required spaces and places them between the words as they pass in succession along the raceway to the galley.

Safety devices are provided to protect the machine from accident or carelessness. Should anything get into the raceway at the foot of the channels, the sliding shoe on the type driver unlatches from the driving mechanism, so that the reciprocating parts go on working, clear of stoppage. If by any chance the stick becomes choked, so that it can not turn at the proper time, the ejector blade is stopped, thus preventing injury to the stick. All movements of the machine are positive, there being no dependence whatever on gravity, centrifugal force, magnetism, air pressure, or the like, and the operative force used is only one-half horsepower.

When one of the sorts is exhausted, if it be one of the duplicated channels the next channel is brought into action by means of one of a series of levers over the keyboard; if the type sort be entirely exhausted it is replenished from the distributor. When the magazine requires refilling, it is let down by a hand crank, lifted out by the handles, and taken to the distributor.

The Dow distributor is entirely separate from the composing machine, but its mechanism is of the same positive character. The operation by which it distributes the various types in their respective channels is automatic, and allows a normal speed sufficient to supply three composing machines with type. For purposes of distribution the body of each type character has a special identifying nick. The distributor, which lies flat, consists of a central disk joined to a set of channels radiating like a fan. Upon the periphery of the disk are supported 36 type carriers, and as these are rotated past the galley channel on one side, each receives a single type, which is carried round until it is opposite the proper channel, when it is pushed out of the carrier into the channel, the distributor continuing its rotation.

The Simplex One-man Type Setter.—The simplex machine is a combination of the Cox typesetting machine and the Thorne machine. It performs the two operations of composition and distribution, either simultaneously or one at a time, as the operator chooses. It occupies less space than a printer's stand, weighs 800 pounds, and requires less than one-fourth horse-

power to drive it. The body of the machine is formed of two cylinders about 1½ feet in diameter, one directly above the other. The lower, which is about 2 feet high, is stationary, but the upper, whose height is about 9 inches, rotates in the common axis. In each cylinder, extending vertically their full length, there are 90 parallel channels, slightly wider than the body of the type which the machine is made to set; those of the lower form a magazine into which type is distributed from the channels of the upper cylinder, to be stored for resetting.

Each key on the keyboard is connected by levers and wires with a small plunger at the bottom of its particular channel. When the key is depressed the plunger is moved forward and ejects one type on to the flat surface of a rapidly moving disk encircling the bottom of the cylinder. The type is conveyed quickly to the right-hand side of the machine, collisions of type on the way being prevented by the scimitar-shaped guards between each two channels, which prevent the types from interfering with one another and guide them as they start on their run on the disk. A switch deflects the type from the disk to a flat traveling belt which runs parallel with the disk at this point, and which conveys the type to the "separator"—two rolls with just enough space between to permit the passage of a single type, so that if the operator has played two types which are traveling side by side they are separated before proceeding farther. The types are now guided, one by one, to the packer, where they run on a cam, are lifted, and are then carried forward to proper position. Types succeed each other in the packer with 3-em space between the words, until a continuous line is formed extending across the back of the keyboard, with the face in view. At this point the operator, who is on a seat attached to the body of the machine, swings himself to a place at the left, where the justifying mechanism is situated, separates from the long line about enough matter to fill a line of the width of the column being set, and justifies and corrects it by hand; he then touches a thumb lever beside the galley, releasing a pawl which engages with a ratchet on a rotating wheel under the keyboard. In one revolution of this wheel, the rule which stands behind the type line is drawn down below it, while a line pusher comes up in front of the line and carries it into the galley which rests on a support behind the rule. For "leading" matter automatically there is a receptacle—which the operator can easily keep supplied with leads—out of which, by the action of a small lever, a lead can be delivered behind each line as the line pusher carries it into the galley; if more than one lead is desired, the thumb lever is held out until the needed number of leads has been supplied.

The distributing mechanism is at the rear of the upper cylinder. The galley of dead type to be distributed is placed sidewise (the lines of type being vertical) on a bracket, upon a solid upright fastened to the body of the machine. In each channel of the distributing cylinder there is a weight which rests on top of the column of type. When an empty channel, in its revolution, reaches the loading point, its weight, being low, trips a trigger attached to the releasing mechanism and the vertical lifter and plunger cam shaft is started, making a complete revolution. The lifter arm carries up the weight, thus leaving the channel clear while the "plunger" is moved forward and a line is pushed from the galley into the channel. After one line has been extracted from the galley, a spring moves the column forward so that the next line is in position to be loaded into the distributing cylinder. As the shaft continues its revolution, the lifter arm is dropped and the weight is lowered upon the line of type where it rests, aiding the force of gravity in making each type drop into its proper channel in the magazine cylinder. For this system of distribution each type character in a font is given a combination of nicks, and the channels are so grooved that they are closed to all type not fitted, by the combination of nicks, to pass.

All the channels in the upper cylinder are filled in turn. The cylinder revolves with a step-by-step motion, each of its channels being brought in turn over each channel in the stationary magazine cylinder below and held rigidly a moment to permit the dropping of each type as it comes to its proper channel.

In the practical operation of this machine it is not necessary to keep the distributor working without interruption, since it supplies type faster than the operator can set it up. With every channel in the upper cylinder empty, the replenishing can be done in three-quarters of a minute.

The sorts in the different channels distribute in about the proportion required by the operator, but provision is made for removing quickly any sorts which distribute faster than is required, and for replenishing the supply of sorts which do not distribute rapidly enough.

STEREOTYPING AND ELECTROTYPING.

The process of duplicating type surfaces by stereotyping has remained practically unchanged since its application to the requirements of newspapers in 1861. This process has been a necessary adjunct to the perfecting press, which prints from curved stereotype or electrotype plates. Advances in this form of press construction created a necessity for the rapid casting of stereotypes, and for many recent models, the duplication of pages. This demand led to considerable improvement in the direction of rapidity of production and ease of handling in stereotype plate casting.

The most notable improvements in the stereotyping process during the last two decades have been a matrix-rolling machine, constructed for making a specially

prepared matrix, which is ready for the casting box when it leaves the press; improved drying tables; automatic casting boxes; combined sawers and trimmers; combined planers and shavers; improved machines for routing and beveling; and an improved half-tone beveling machine.

The autoplate, an invention of Henry A. Wise Wood, is a mechanical device for stereotyping. It is a solidly constructed mechanism, 4 feet high, 7 feet long, and 3 feet wide. The matrix is placed, face up, in a concave receiver, which slides forward into the casting box when the machine is set in motion. The bottom of the box rises and lifts the matrix close to a fluted cylinder, while at the same time a pump begins to draw molten metal from a caldron and force it into the casting chamber, under an elastic pressure, which follows the shrinkage of the plate with fresh metal. Sprays of water are used to cool rapidly the casting box and the cylinder. When the plate is completed the casting box falls, stripping off the matrix, and the plate is brought by the cylinder to the top of the machine, where a metal arm seizes it and carries it along toward the back, trimming and finishing it automatically on the way. Then the plate moves out upon a long arm, where a workman gives it the final preparation for the press.

The great advantage of the use of the autoplate over other methods of stereotyping is that much less time is required. At highest speed, hand work will produce but one plate per minute; the autoplate will produce three or four in the same time, and the quality of its work is pronounced superior to that of hand work. Another consideration of advantage to the printer is that fewer workmen are required to attend to the working of the autoplate than are necessary for hand work.

Stereotyping is still in general use in newspaper offices, because of speed. With respect to fineness and finish, electrotyping is far in advance of stereotyping, and is now used almost exclusively for book, magazine, and job printing.

In electrotyping the principal improvements are these: An important invention to stimulate the action of electro-deposition by the use of a dynamo; a black-leading machine which utilizes a blast of air; a combined metal kettle, wax-heating table, and case-filling table; a power wax-shaving machine; a hydraulic molding press; and improved saw and routing machines, including curved routing machines for use on both electrotype and stereotype plates. Process engraving, or the half tone, has developed new possibilities for the electrotyping process. The Muller patent half-softening hammers and punchers, and the Richards improved ruling machine, are inventions used in this work.

PRESSES.

Prior to 1870 printing presses were largely of two types: the platen or job press, in which the impression was made by direct pressure; and the cylinder press, consisting of a flat bed which held the type form in a horizontal position, and oscillated beneath a large revolving drum or cylinder carrying upon a segment of its surface the sheet to be printed.

Attempts had been made to construct a press which would permit the type to be placed upon a cylinder, utilizing the rotary principle that has been brought to a high degree of perfection in the modern web press. In 1846–47 Hoe & Co. produced a machine of this class. The type was locked on the surface of the cylinder, the curvature being assisted by V-shaped column rules. The sheets were fed separately to impression cylinders, and delivered by a sheet flier. This form of press was soon found incapable of meeting the demands of the larger newspapers.

The discovery, about this time, of the possibility of casting stereotype plates on a curve, from papier-maché matrices, was the key that opened the way to the ingenious and complicated printing presses of the period.

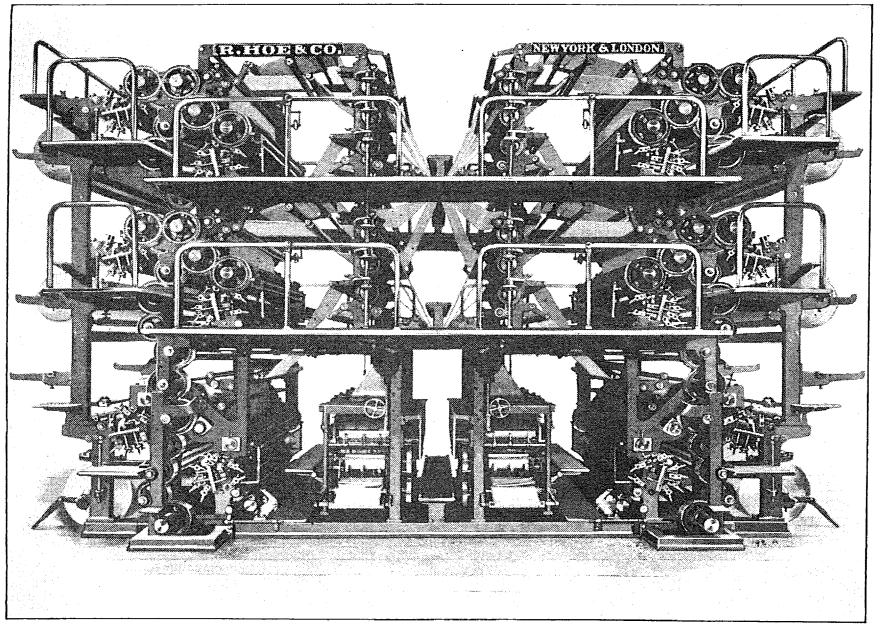
Job Presses.—The improvements in job presses consist largely in details relating to the various classes of work for which they are intended. In the general construction of this class of presses few radical changes have been made, and standard patterns long in use need not be described here. The most radical departure within the last few years has been the employment of the rotary principle, as exemplified in the Harris automatic press. In this press the printing surface is a curved electrotype plate, though separate types can be fitted into a type box adjusted to the printing cylinder. The press prints upon separate sheets which can be fed either by hand or by an automatic arrangement; the automatic feeder carries several thousand sheets of paper, which are fed from the bottom by an ingenious device permitting the renewal of the pile without stopping the press. The speed of this press is from 5,000 to 14,000 impressions per hour, according to the class of work.

The Kidder Press Company manufactures job presses which feed automatically from a roll.

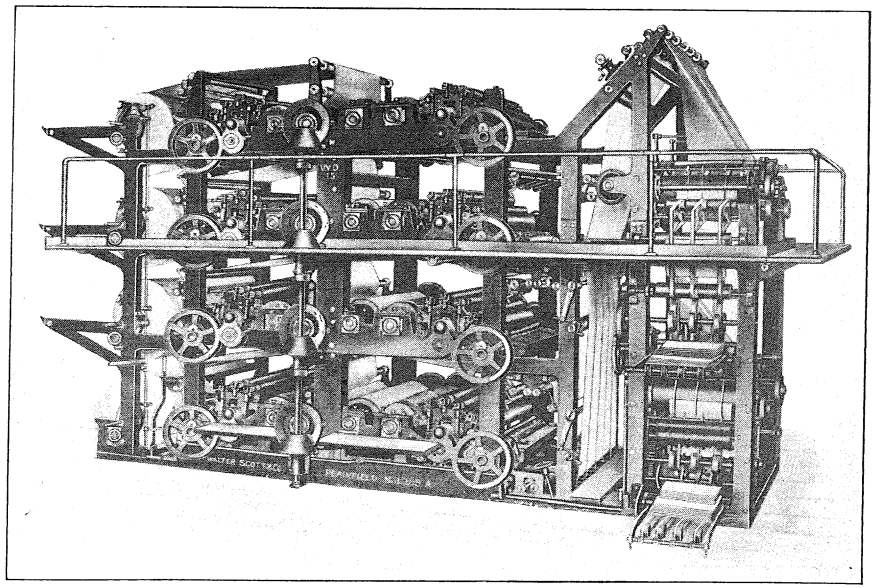
Cylinder Presses.—Until the close of the last decade the cylinder press was the main reliance of publishers for larger work, such as books, posters, and all large forms. It was in general use also for papers of small circulation and for all high-class work. Improvement in perfecting presses has to some extent caused the displacement of the cylinder press, but it is still generally used.

There are four kinds of cylinder presses in use—the drum cylinder, the double cylinder, the stop cylinder, and the two-revolution cylinder. Of these, the last named is now regarded with the greatest favor.

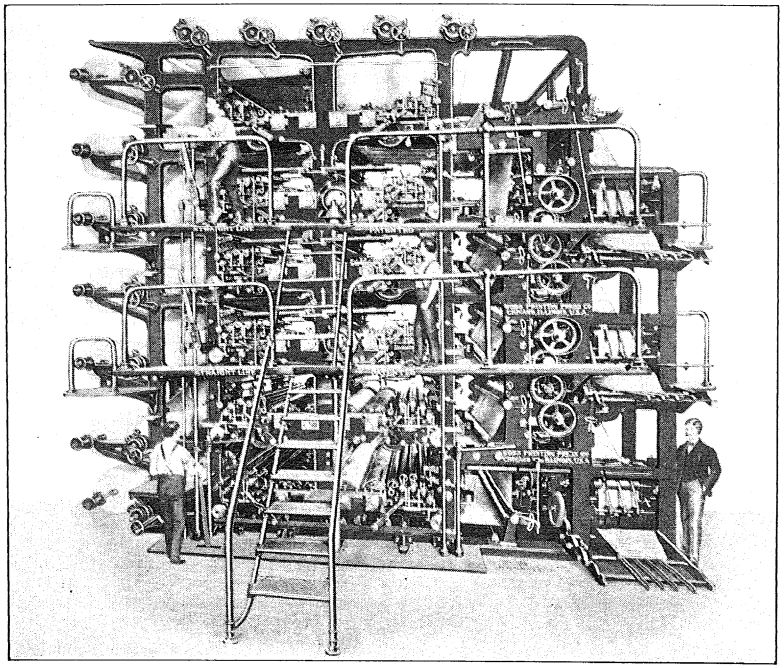
The past twenty years have witnessed numerous improvements in the three styles of presses last mentioned. From the old, cumbersome drum cylinder, still in operation in many country newspaper offices, with a speed



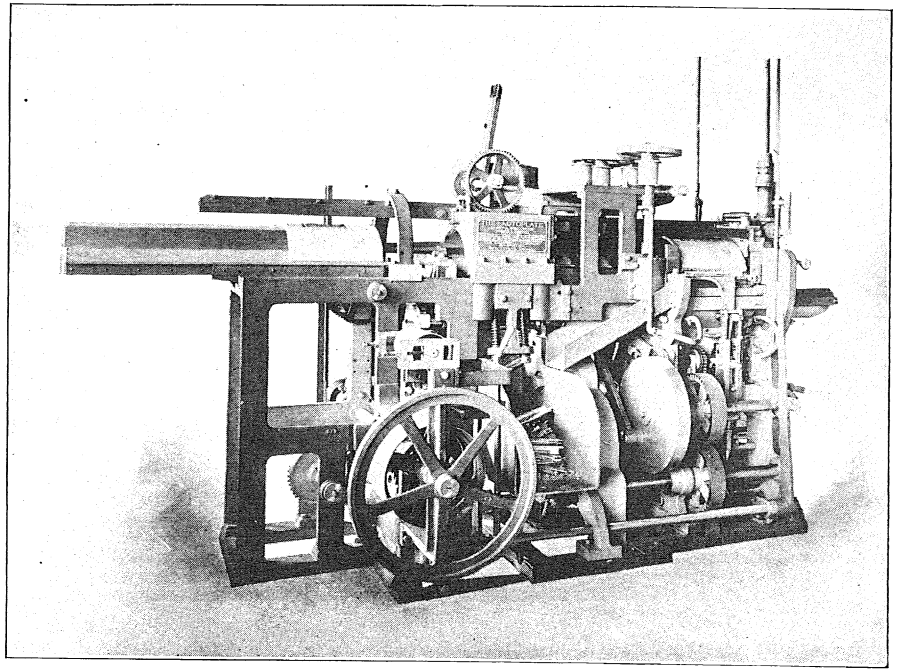
HOE ROTARY NEWSPAPER PERFECTING PRESS.



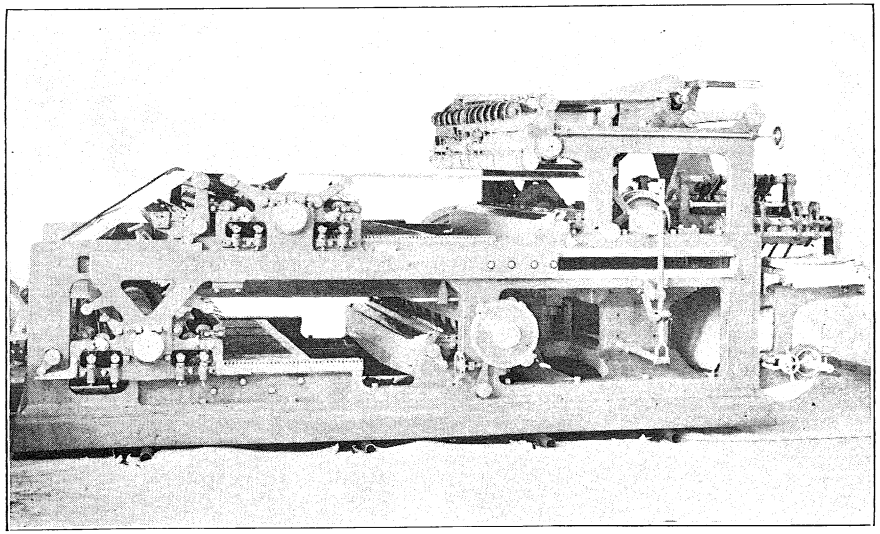
SCOTT OCTUPLE PERFECTING PRESS.



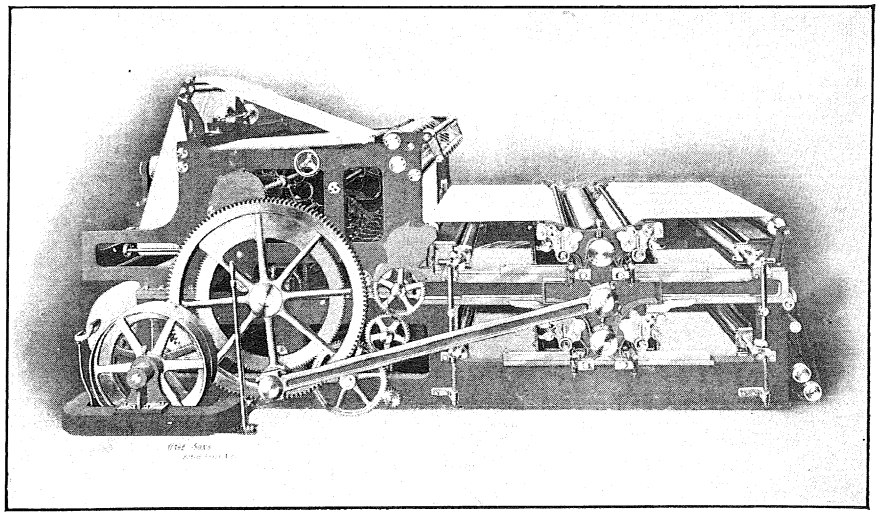
GOSS STRAIGHTLINE PERFECTING PRESS.



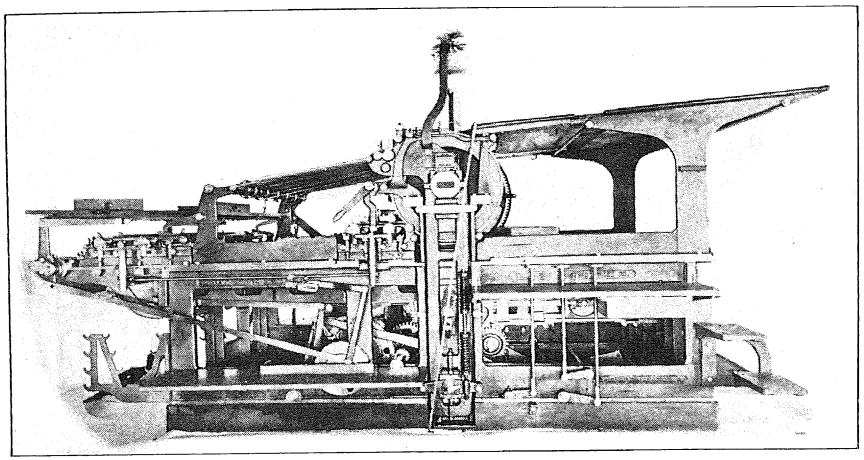
THE WOOD "AUTOPLATE."



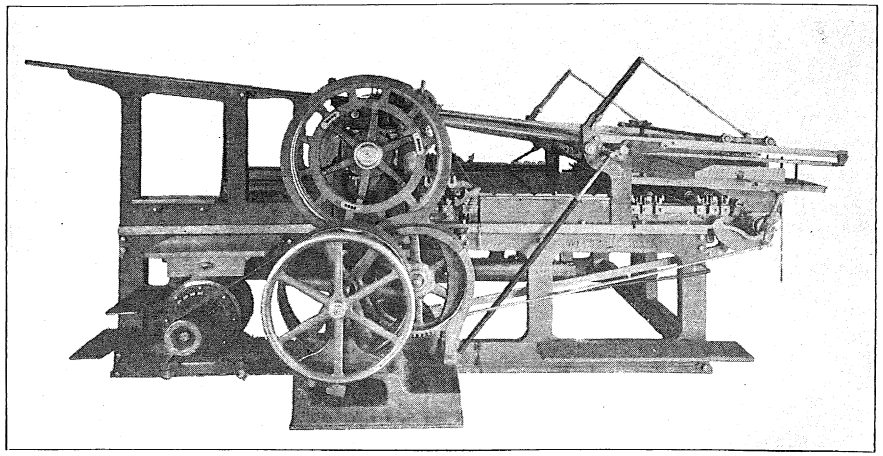
CAMPBELL "MULTIPRESS" FOR PRINTING FLAT FORMS WITHOUT STEREOTYPING.



COX DUPLEX PERFECTING PRESS FOR PRINTING FLAT FORMS WITHOUT STEREOTYPING.



HUBER HIGH-SPEED 2-REVOLUTION BOOK AND JOB PRESS.



MIEHLE BOOK AND JOB PRESS WITH MOTOR ATTACHMENT.

of 1,200 to 1,500 per hour, to the modern, rapid two-revolution press, with all its delicate adjustments and labor-saving devices, is a very great advance.

From the old-fashioned drum-cylinder press was evolved the double cylinder, a duplication of the cylinder, by which the capacity of the press was doubled. The cylinders were fed alternately. The stop-cylinder press was so named because the cylinder stops at a certain point in its revolution, thus permitting greater accuracy in feeding. Owing to the exactness with which the sheet was printed—technically called "register"—this press was used where fine grades of work, such as half-tone or color work, were required. It attained great popularity, but has been supplanted by the two-revolution press, because the latter possesses much greater speed and nearly equal accuracy. In this press the cylinder is smaller, and revolves twice at each impression, once in contact with the type and again in a slightly elevated position while the sheet is being released and the form returned to its former position.

In 1885 Robert Miehle made a number of improvements in the two-revolution press, which increased its capacity and brought it into more general use. Since then this type of press has been subject to continuous improvement. The Century two-revolution press is one of the most perfect machines of this class. The constant aim of improvements in this field has been to increase speed and accuracy, and to give the utmost facility in adjustment and operation. Among recent improvements in the two-revolution press are the substitution, for cam gears, of a crank movement of the bed; an adaptation of the stop-cylinder principle; and perfected methods of ink distribution.

Perfecting Presses.—In the web perfecting press occurred the most noteworthy development of the past two or three decades. While modern presses of this class possess remarkable capacity, they are the result of improvement, rather than a radical departure from the earlier form of rotary presses. Various mechanical problems, resulting from high speed, were met and solved; among these were the questions of combining the printed sheets, cutting, folding, and preventing the offsetting of ink. Although attempts were made before 1870, in this country as well as in England and France, to build presses embodying this principle, the machine constructed, in 1871, by Hoe & Co., of New York, may be said to be the first successful perfecting press. This press printed 15,000 papers per hour from one set of plates. In 1876 this firm brought out the rotary folder. The development of folding mechanisms has naturally kept pace with that of the press proper, until at the present time papers consisting of any even number of pages from 4 to 32 are turned out, cut, pasted, folded, and counted, in lots of 25 or 50, at rates of speed varying from 12,000 to 150,000 per hour.

The term "web perfecting" exactly describes the process employed; a roll, or "web," of paper passes into the press and is printed, or "perfected," on both sides before being cut and folded. The early form of rotary press was the "single." Then the length of the cylinder was doubled, thus doubling the capacity of the press—that is, printing a paper of the same size at twice the speed, or a paper double the size at the same speed, as the "single rotary." Then came the double-supplement press, with a set of single cylinders at one side, permitting the printing of 10-page and 12-page papers. The next step was to double the supplementary press, forming the quadruple press—a style in common use to-day—with a capacity of from 48,000 4-page papers to 12,000 24-page papers per hour. Instead of being arranged side by side, the presses were often constructed with the supplementary press on top, making a "double decker." The quadruple press was then converted into a sextuple press by the addition of a supplementary double press placed at one side. It was a simple matter to convert this into an octuple, a type of press now in use on such papers as the *New York Journal* and the *Chicago Tribune*. The octuple is sometimes constructed by piling four double presses one above another. One style of press, designed for the *New York Journal*, consists of two sextuples working side by side. This is a three-decker machine, equivalent to six double presses. In these presses each double-cylinder machine is fed from a separate roll of paper. The folding and cutting mechanism can be adjusted to assemble the pages in any desired combination within the limits of the press.

The illustrated colored supplements of the large city journals have been made possible by the adaptation of these presses to color printing, permitting the use of one, two, or three colors besides black. This principle has been carried still further in a rotary multicolor and half-tone machine, which prints in as many as eleven colors, and has a capacity 48,000 full-sized 8-page papers per hour.

Two general classes of the web press are made. In one, what is called the "angle bar" is utilized to turn the sheets in order to assemble them from the different webs. The other is designated the "straight line," the sheet being run through the press without being diverted from a straight course, and was invented by Joseph L. Firm, of Jersey City, N. J., who associated himself with the Goss Company, of Chicago, in 1890. By means of this invention greater accuracy in register was obtained, with less danger of tearing the running sheet in rapid work.

The Scott Company has produced an "all-size" rotary web press, by which pages of different sizes can be printed, the adjustment being graduated to quarter inches.

Another type of perfecting press is shown in the flat-bed "multipress" of the Campbell Company, and the Cox duplex press, in which the type beds are stationary, the cylinders rolling back and forth upon them. These are adapted to small country dailies.

Many variations in the perfecting press are made to order to satisfy individual requirements. Some of these even place colored covers upon their products and stitch or staple them. The colored supplements of newspapers are often printed in colors on one side and black on the other, and half-tones often occur on the same page in different colors. Music is printed on heavier paper and folded in with the supplement. All this is accomplished without marring the product. A space is often reserved also for a type column of late news, to avoid stereotyping another set of plates.

The presses of the Goss Company are fitted with an ingenious arrangement to prevent offsetting. Rollers made of molasses and glue pass over the freshly printed paper, absorbing the excess of ink, which is then transferred to a polished metal cylinder, from which it is removed by a cylindrical cotton wiper.

Toward the latter part of the last decade the product of the perfecting press was greatly improved, so that it became a competitor for the finer grades of magazine work, for which it is being utilized more and more.

Lithographic Presses.—Few changes of consequence were recorded in this branch of the industry during the decade. Aluminum plates have been employed with considerable success as a substitute for stones, but the notable feature in their employment is that they permit the use of the rotary principle. Special presses, constructed with great care to meet the exacting requirements of lithographic work, are manufactured for this process, and have attained some success.

PATENT BLANKETS AND MECHANICAL OVERLAYS.

There were many attempts to substitute mechanical processes for the laborious task of "making ready" by hand. Among the inventions of this class were the Savary, Dittman, De Vinne-Bierstadt, and Humphrey and Upham methods, all of which must be regarded, so far as general use is concerned, as still more or less in the experimental stage.

The Savary device is a blanket composed of a collection of very short wires. This blanket is mounted on a cylinder, and by equalizing the pressure serves to correct irregularities in the height of type and cuts. Another invention substituted a blanket of woven wire for that of pointed wires.

The Dittman process utilizes the expansion which occurs in wheat flour when dusted onto a fully inked impression.

The De Vinne-Bierstadt process utilizes the action of light upon gelatin in combination with other substances. A print taken on a thin sheet of transparent celluloid is dusted with plumbago to thicken the lines, and exposed in a photographer's printing frame over a film of gelatin. This film is afterwards swelled in those parts not made insoluble by the action of light, and from it a plaster of paris mold is made. From the latter a flexible reverse in gutta-percha is formed, and the gutta-percha, backed, becomes the overlay, being thickest in the darkest parts of the illustration.

The Humphrey and Upham process is of use only for duplicating overlays. This duplication is made by rubber or gutta-percha impressions of a reversed overlay.

ILLUSTRATING AND ENGRAVING.

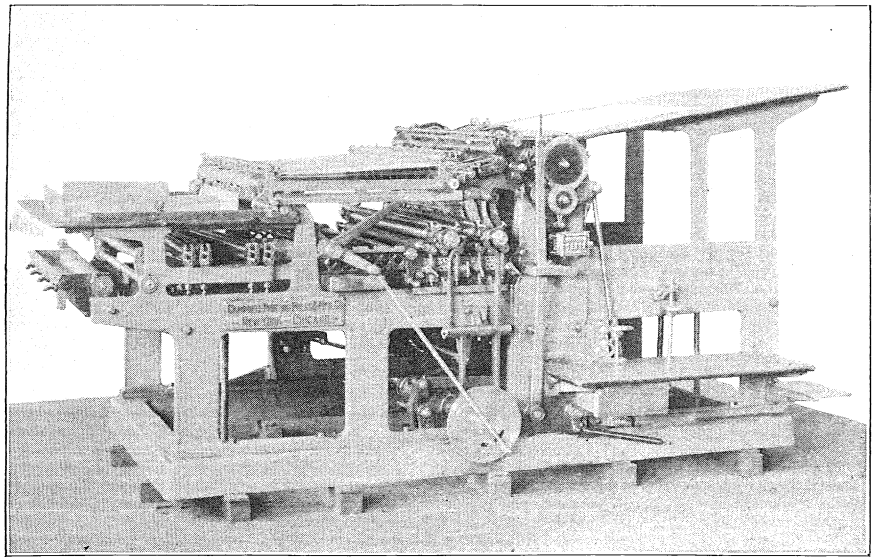
The introduction of photoengraving, about the year 1875, marked a new era in the history of illustrating and engraving.

Wood and steel engraving were unable to fulfill the increasing demand of the public for large quantities of good, inexpensive pictorial work. Proper production of this work by hand was impossible, save by an artist of no mean ability. Accordingly, if illustration was cheap, it was poor; if good, it was expensive.

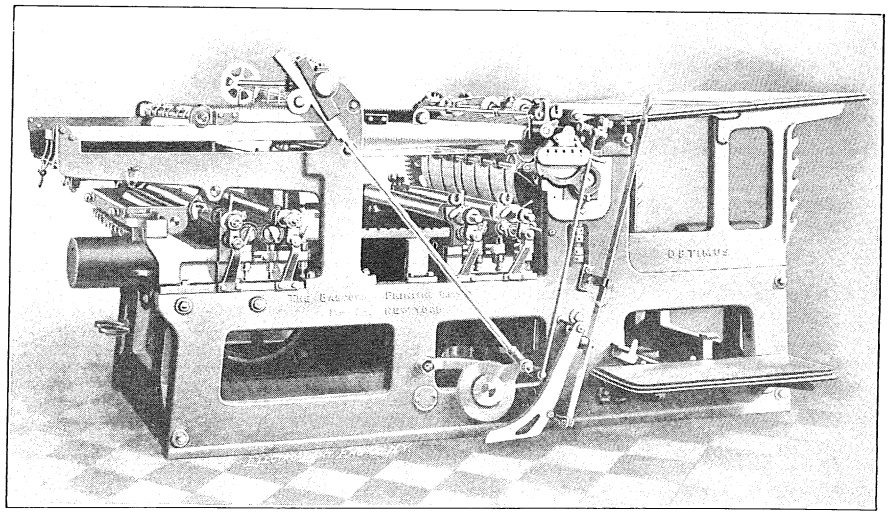
Half-tone Engraving and Zinc Etching.—The half-tone process is a method of making cuts suitable for use upon ordinary printing presses. The first step is the taking of a photograph on a wet sensitive plate, in front of which, in the camera, a fine screen is placed. These screens are an essential feature of the process, as they permit the accurate reproduction of the half tones in the object. They are made by mechanically cutting or scratching lines on two glass plates; these lines are then filled with some opaque substance, and the two plates are placed together, face to face, with the lines of one plate crossing those of the other. They are made in varying degrees of fineness, the lines ranging from 40 to 400 to the inch. The coarser screens are placed farther from the sensitive plate than the finer ones. The finer screens cut off about nine-tenths of the light; therefore, the negative is often exposed for eight or ten minutes.

After the negative is developed the film is stripped from the plate, reversed, and placed on another, called a turning glass, thus becoming a positive. This is placed in contact with a copper plate coated with a sensitized solution, and exposed to the light for about two minutes. After being developed, this plate is enameled and "burned in" over a flame. It is then etched with a solution of perchloride of iron. In this process the portions of the coated copper plate which have been exposed to the light in the printing process—in other words, the lines that were formed by the screen in the original negative—are etched away, producing a printing surface composed of dots which vary in size according to the lights and shadows of the object. Further processes pertain mainly to finishing and mounting. A certain amount of expert hand work is required for the finishing of the half-tone plate and its final preparation for the press. In this field many artists who were formerly engravers have found work.

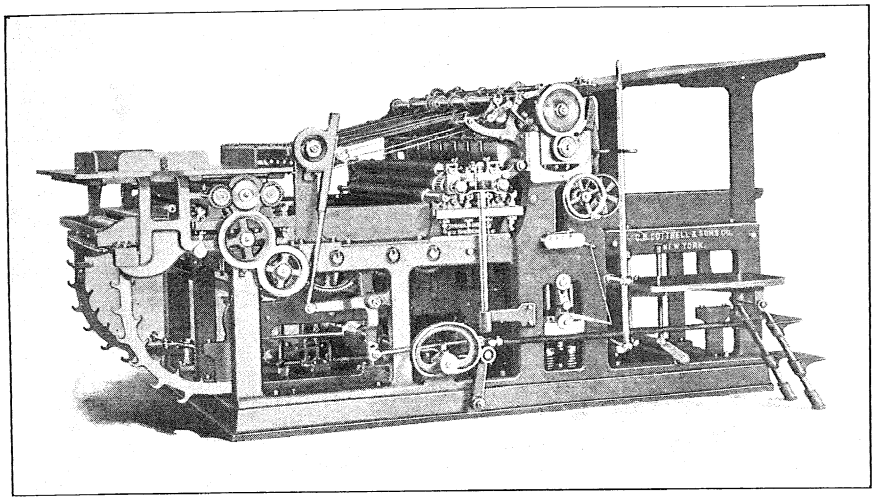
Half tones are of three classes, considered according to the treatment of their background—the silhouette, the square-etched, and the vignette. The silhouette is an effect of sharply defined edges; the square-etched is



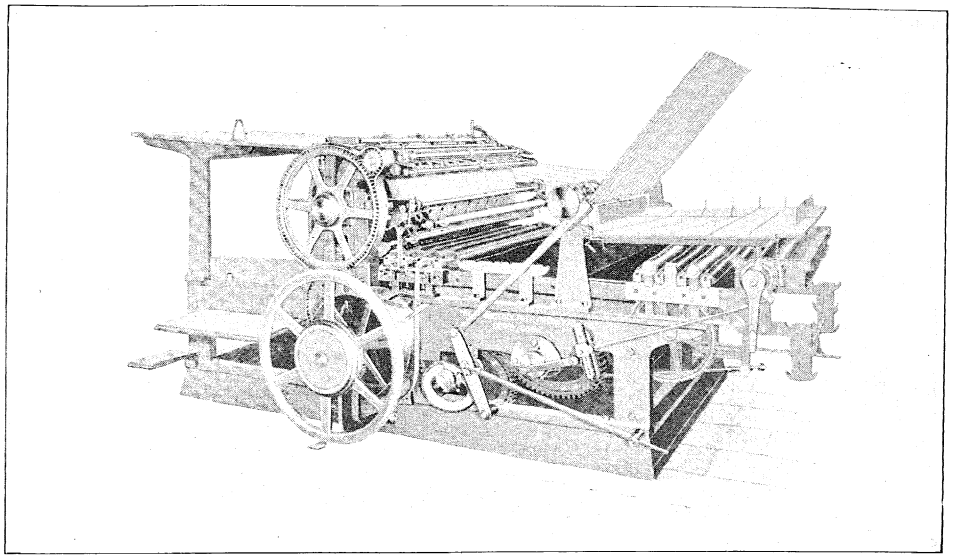
CAMPBELL "CENTURY" 2-REVOLUTION BOOK AND JOB PRESS.



BABCOCK "OPTIMUS" BOOK AND JOB PRESS.



COTTRELL 2-REVOLUTION BOOK AND JOB PRESS.



WHITLOCK BOOK AND JOB PRESS.

an exact reproduction as to background, of the original picture; and the vignette is a production of softened, gradually-fading background, without definite termination.

Zinc etching is practically the same process, except that the copy must be a pen-and-ink or line drawing, and no screen is used. In the etching process, in place of perchloride of iron, muriatic acid is employed. This gives a plate which is cut deeper, but is less durable than the copper half-tone plate.

Three-color Process.—The attempt to print in colors from half-tone plates by means of photographic processes was partially solved by Frederick Ives, of Philadelphia, in 1888. Since that date the process has been improved with gratifying results. The principle upon which it is based is that by a combination of the three primary colors—red, yellow, and blue—almost any shade of color can be produced. Photographic plates that are specially sensitive to color are used. As in the half-tone process, a glass screen is placed in the camera. Three photographic negatives, each of which is to produce a separate printing plate, are made of the object. In each case a colored glass screen, excluding certain color rays of light, is used in front of the lens. In the production of the plate which is to print the blue ink, a red color screen is employed; to produce the plate for yellow ink, a blue-violet screen is used; and to produce the plate which is to print red ink, a green screen is used.

In printing from these plates great exactness, technically called "register," is required, in order that the colors may be laid on in proper place as the three impressions are consecutively made.

One serious problem which confronted the inventor was the difficulty experienced in so arranging the line screens that the diagonal lines would not form geometric patterns in the finished picture. This was solved by the discovery that by varying in certain ways the directions of the lines used for the three negatives, the pattern effect could be avoided.

Lithographic Color Printing.—A widespread but unsuccessful attempt was made, about 1880, to substitute zinc for stone in lithographic work. After this failure, zinc was generally abandoned as a factor in the lithographic problem, but one firm has continued to make experiments along this line with considerable success.

In 1898 the great superiority of aluminum over lithographic stone was demonstrated. Aluminum is far lighter, requires less space for storage, is cheaper, is almost noncorrosive, can be used in sheets upon rotary presses, can be used for longer runs without reproduction of the design, and after some manipulation possesses all the desirable qualities of stone.

The methods of manipulation are two. By the first, the surface of a sheet of fine-rolled aluminum is ground off, producing a porous surface. The second method is the formation of an aluminum surface by electrodeposition.

To prevent the ink from spreading over the limits of the design, phosphoric acid is used; this is removed from the plate by the application of nitric acid.

About four-fifths of present-day lithographic work is done on stone, but the number of printing machines constructed to use aluminum is rapidly increasing.

BOOKBINDING.

Recent advances in the bookbinding department of the printing and publishing business have been numerous, but not revolutionary.

Automatic feeding devices for folding machines, as well as for printing presses, are a product of the last decade. Of these there are many variations, but as the problem which they solve is comparatively simple they need not be described in detail. Three-fourths of the folding machines of the present day are supplied with automatic feeders. Folding machines have been greatly improved also by parallel-fold arrangements and by automatic pointing.

Many improvements have been made in wire-stitching machines. One of these machines will stitch anything from two sheets to a book 2 inches thick, and with several of them either round or flat wire may be used. There has been introduced recently a noteworthy combination folding and wire-stitching machine, which by a continuous and automatic operation takes the sheets from the feeders, and folds, gathers, collates, covers, and wire-stitches copies of magazines and pamphlets, delivering them ready for distribution.

Paper-cutting machines have been improved by the introduction of automatic clamps, indicators, and gauges.

The invention of a steam rounding and backing machine, increasing a capacity of from 500 to 1,000 books per day to a capacity of from 5,000 to 6,000 in the same time, should be noted. The latest case-making machine feeds itself from a roll of cloth which it automatically cuts into pieces of proper size for use. The cloth is first covered with glue by contact with a cylinder revolving in a pot of glue. It is then cut by the machine and nicked in corner sections; boards are supplied from a holder and a back lining from a roll, both receptacles forming parts of the machine. This process completed, the nearly finished product drops a little, the cloth is folded over the boards and back lining, and the binding, after passing through a case smoother, is delivered in a finished state. This automatic process is very satisfactory. Another interesting invention in this line is a machine for covering paper books and magazines, which has been known to cover 22,000 books in a day.

Among late inventions are a casting-in machine, for putting the body of a book into its cover, and a gathering machine.

During the next ten years the principal advance in bookbinding doubtless will be in those branches of the industry which are concerned with casting-in, gathering, smashing, folding, and sewing.

NEWS-GATHERING ORGANIZATIONS.

The only changes in news gathering since 1880 have been those of detail.

In 1880 the leading news-gathering association was the body then known as the Associated Press, which was furnishing news to 30 per cent of the dailies of the United States. This organization, composed of New York papers, gathered news for its own members on the cooperative plan, but exchanged news with other associations on terms that made the exchange practically a sale, a large cash bonus being asked from associations receiving their news.

These methods caused much dissatisfaction among the tributary associations. The claim was made that the parent organization, having absolute control of the news gathered, was selling it at a price covering the entire cost of collection, giving the news to its members practically for nothing.

The principal complaints came from the Western Associated Press, which in 1882 was paying a bonus amounting to $3,000 per month. The outcome of this controversy was an amalgamation of the Associated Press and the Western Associated Press into one organization, under the former title.

The next great conflict was that between the new Associated Press and the organization afterwards known as the United Press, which was founded in 1882. In 1884 the Associated Press and the United Press made a secret agreement for an exchange of services, by which a practical union of the two organizations was effected. It was claimed that the exchange was most unequal, the United Press getting the benefit of the wide field covered by the stronger organization, and giving poor and inadequate service in return. In 1891 the arrangement was discontinued; but in 1892 the eastern branch of the Associated Press—the original New York organization—transferred its affairs to the United Press, while the western branch—the former Western Associated Press—continued in business, with headquarters in Chicago, as the Associated Press. The new Associated Press, like the United Press and other proprietary bodies, followed the plan of selling its news to papers whose proprietors were not stockholders or members of the organization.

At the time of its organization the western association had contract relations with the eastern one. In 1893 the contract expired; the western association refused to renew it, and there followed a bitter war between the two associations, which was very disturbing and expensive to the newspapers of the country, some being compelled to receive news from both associations to insure a complete service. Strong efforts were made to bring about an agreement between the two organizations, but all failed because of fundamental differences in their plan of organization. In 1897 the United Press made an assignment, with large liabilities and no assets.

The victory of the Associated Press was not, however, the end of newspaper difficulties. This organization could not, under its regulations, admit to membership all the newspapers which were left without service by the failure of the United Press. Moreover, the associations which were organized to supply the needs of the papers not provided with a news service were declared to be antagonistic, and members of the Associated Press were forbidden to make contracts with them.

The *Chicago Inter-Ocean*, having received news from a bureau thus proscribed, and being threatened with suspension of the Associated Press service, applied for an injunction to restrain such action.

The circuit court and appellate court successively dismissed the bill, but the supreme court of the state (184 Illinois Reports, 438–455) reversed the previous decision on the ground that the corporation had a virtual monopoly of a commodity of vast importance to the public, had used its franchise in such a manner as to injure the public interests, and could not be allowed to deprive the public of the services of a newspaper.

This decision did not, however, break up the monopoly held by the Associated Press, but merely caused removal of that organization to New York state, where it was reincorporated on May 22, 1900, with practically all of its former 600 members and subscribers.

Under its new charter the Associated Press is simply a mutual and cooperative organization of newspaper proprietors. A distinction existing in the old organization between voting stockholders and ordinary members was abrogated in the new charter, and all newspaper owners who receive the news service of the Associated Press are now members of the organization on equal terms.

The certificate of membership designates in detail the name of the newspaper entitled to receive the news of the Associated Press, the language in which it is printed, its place of publication, whether it is a morning or an evening newspaper, and whether the member is to receive a day or a night report. A certificate of membership in the Associated Press is not transferable except in special cases.

Each and every member of the Associated Press is entitled to receive a service of news for the purpose of publication in the newspaper specified in his certificate of membership, and for that purpose only. Special regulations forbid, in detail, publishing news in any other newspaper than that specified, furnishing it in advance of publication to any person not a member, or anticipating the publication of documents of public concern confided to the corporation for use on a stipulated date, however the document may have been secured.

The Associated Press, as now organized, has four divisions—Eastern, Central, Southern, and Western—with headquarters at New York, Chicago, Washington, and San Francisco, respectively.

Domestic news is collected from all parts of these four divisions at the division offices, and exchanged between the several divisions, items being enlarged or condensed according to the territory in which they are to be circulated.

For gathering foreign news the Associated Press has contract relations with various news agencies, with which it exchanges news. Of these the most important are the Reuter agency, covering Great Britain and her colonies; the Agence Havas, covering France, Belgium, Switzerland, Portugal, and some parts of South America; and the Wolf agency, of Berlin, covering Germany, Hungary, Austria, and to some extent northern Europe and Russia. In the New York office of the Associated Press the Reuter agency has a representative who looks over the dispatches and sends abroad whatever American news may be of interest to Europeans. For Canadian news the Associated Press has exchange arrangements with the Canadian Pacific Railway, by which that company gathers all the news on its line and delivers it at Bangor, Buffalo, Detroit, and Seattle, receiving at those points the news of the United States, for use in Canada. Other agencies supplying news to the Associated Press are the Steffanie, covering Italy; the Nordischer Telegram Bureau, covering Russia; the Norsky Telegram Bureau, covering Norway; the Svenska Telegram Bureau, covering Sweden; and the Agence de Constantinople, covering Turkey.

While, as has been noted, each newspaper connected with the Associated Press contributes its quota of news to the general fund, the organization has regular correspondents of its own at places where it has no member. It also sends out its own reporters, when the occasion is of sufficient importance, to cover specific events, and employs special men to cover special classes of news—as, for instance, the Wall street market reports, and the arrival and departure of steamers at principal ports. It also has emergency men whose names are kept on file, and who can be called on at any time to gather news for the organization. At important points are stationed representatives whose duty it is to put the news into shape and file it for circulation throughout the country.

Besides the full reports delivered to large papers, the Associated Press distributes what are called "pony" reports—condensations of the full reports, sold at a cheaper rate. It also sells news to an organization known as the American Press Association, for distribution to papers not members of the Associated Press, with the proviso that the news thus sold is not to be printed for twelve hours after it has been sent over the wires to newspapers receiving the regular service of the Associated Press.

The Associated Press now has about 700 members, more than half of which are afternoon dailies, and serves, under the arrangement with the American Press Association described above, about 2,500 daily and weekly papers in addition. Most of the papers served are in the United States, but there are 50 or more in Canada, Mexico, Cuba, and Porto Rico. In its regular news service the Associated Press now uses 9,345 miles of leased wire by day and 20,467 miles by night.

The annual revenues derived from assessments levied on the newspapers served exceed $1,900,000, and the number of words daily received and transmitted at each of the more important offices is now over 50,000, or the equivalent of 35 columns of an average newspaper.

Among other news-gathering associations now in the field are the Publishers' Press, and the Scripps-McRae Press Association, which work together, the former operating principally in the eastern part of the country, the latter in the western.

The Publishers' Press was started April 8, 1897, the day after the failure of the United Press, to fill the gap left by that association. Unlike the Associated Press, it is not a cooperative organization, but a stock company whose business it is to buy news and sell it again; nor is it, like the Associated Press, under limitations as to the number of papers it may serve in one place. Again, unlike the Associated Press, the Publishers' Press does not receive news from the papers it serves, but has its own correspondents at the various centers where news can be collected. The foreign news of the Publishers' Press is gathered through a main office in London and branch offices in Paris, Berlin, Rome, and other European news centers.

The Publishers' Press controls several thousand miles of wire in the United States—one, which carries news to a Seattle paper, being 3,260 miles long.

Another news-gathering organization, which may be regarded as simply the news-gathering department of the *New York Sun*, is the Laffan News Bureau. This organization has regular correspondents at all news centers, foreign as well as domestic, maintaining, besides, "sleeping correspondents" who are paid in accordance with the news they send in; serves 30 or 40 newspapers in different parts of the country; and maintains, like the other bureaus, a system of leased wires.

Besides the regular press bureaus, some leading newspapers engage in the business of selling news. Among these are the *New York Herald*, the *Chicago Record*, and the Hearst papers. Such arrangements as these can hardly be said, however, to compete with the news service of the Associated Press, which is far in the lead of the news-gathering organizations of the United States.

Newspaper Syndicates.—An extension of the scope of the newspaper, during the last twenty years, to include subjects of more lasting interest, led to the creation and extension of the so-called "syndicate," which furnishes papers with miscellaneous reading matter, as the news-gathering association furnishes them with news. The syndicate was introduced about 1884, for the purchase

and sale of stories, but has since extended its field to all sorts of reading matter. While the news-gathering associations are largely cooperative, the syndicate is purely a proprietary affair, buying articles from authors and selling them outright to the different newspapers on their list of customers.

Some syndicate matter is sent out in matrix form, but most of it is supplied in the shape of galley proof, to be set up in the office of the newspaper purchasing it, in the general style of the paper.

Most of the syndicate material is prepared especially for the Sunday supplement or magazine part of a newspaper, but the syndicates will furnish almost any class of articles found in daily papers. In making sales, the syndicate has a fixed price for articles, and although it disposes of the same stories or other matter to a number of papers, only one in each city or field of publication may receive a given story or article.

The syndicate is enabled, by its sales of the same article to many customers, to purchase matter quite out of the reach of the individual newspaper, and to sell it on terms that each can afford. The scheme is found to be so advantageous that to-day practically all the newspapers of the country, except some in a few of the largest cities, use syndicate matter to a considerable extent.

Besides the firms engaged primarily in the syndicate business, certain leading metropolitan newspapers dispose of their own matter to papers published elsewhere.

In the last decade no important changes have taken place in the syndicate field. The material now supplied may be rather better in quality than that supplied at first, but the business arrangements and the extent of syndicate operations have remained about the same for several years.

THE COOPERATIVE PLAN OF PRINTING PAPERS.

There has been little development, for several decades, of the "patent insides" system described in the special report of the Tenth Census on the Newspaper and Periodical Press. The general advance in printing has led to some progress in methods, and the number of papers served has increased with the growth of the newspaper industry in general, but growth in this line has been relatively slow.

The following table shows, by states and territories arranged geographically, the number of newspapers printed on the cooperative plan:

TABLE 57.—*Newspapers printed on the cooperative plan, by states and territories: 1900.*

STATE OR TERRITORY.	Number of newspapers.
United States	7,749
North Atlantic division	728
New England	177
Maine	18
New Hampshire	30
Vermont	10
Massachusetts	90
Rhode Island	16
Connecticut	18

TABLE 57.—*Newspapers printed on the cooperative plan, by states and territories: 1900*—Continued.

STATE OR TERRITORY.	Number of newspapers.
North Atlantic division—Continued.	
Southern North Atlantic	551
New York	196
New Jersey	79
Pennsylvania	376
South Atlantic division	611
Northern South Atlantic	185
Delaware	4
Maryland	49
District of Columbia	6
Virginia	62
West Virginia	64
Southern South Atlantic	326
North Carolina	81
South Carolina	51
Georgia	135
Florida	59
North Central division	4,725
Eastern North Central	2,110
Ohio	337
Indiana	358
Illinois	703
Michigan	355
Wisconsin	347
Western North Central	2,615
Minnesota	409
Iowa	619
Missouri	376
North Dakota	122
South Dakota	224
Nebraska	462
Kansas	403
South Central division	1,179
Eastern South Central	476
Kentucky	59
Tennessee	114
Alabama	134
Mississippi	169
Western South Central	703
Louisiana	94
Arkansas	143
Indian Territory	62
Oklahoma	153
Texas	251
Western division	606
Rocky Mountain	285
Montana	82
Idaho	40
Wyoming	20
Colorado	177
New Mexico	16
Basin and Plateau	43
Arizona	4
Utah	35
Nevada	4
Pacific	278
Washington	95
Oregon	65
California	118

It will be seen from this statement that over 60 per cent of the papers printed on the cooperative plan are found in the North Central division. The number in Illinois alone (the highest number for any single state) nearly equals the number shown for the entire North Atlantic division, and Iowa (next in rank) surpasses both the Western and South Atlantic divisions.

Many of the newspapers of this class are the only ones in their respective towns—this being the case with 60 per cent of those sent out by one concern. At the present time most of the newspapers printed in this way are weeklies, and these form about half of the total number of weeklies in the United States. Many semiweeklies and triweeklies, also, are issued in this way, and some dailies adopt the method. These dailies are

printed at a distributing center, sent out by express in the morning, and finished at the local office in the afternoon.

Some concerns endeavor to avoid the sameness of appearance in "patent insides" by issuing the material in the form of stereotyped plates ready for printing, instead of in printed sheets. They first send out proof sheets, showing what articles they have on hand, and from these the local editor selects what he chooses. On receiving the plates he cuts them up as he likes, for arrangement in his page, even cutting off the headings and supplying headlines of his own, to secure greater individuality.

The American Press Association, of New York, organized about 1880, controls much of the business in plate matter, and has already been referred to as the association supplied by the Associated Press with telegraphic news for use twelve hours after the regular service. The news received by this association in the morning is set up in plate form, and distributed to some 2,500 dailies for use the same afternoon. This organization serves a large number of newspapers, including many dailies, with electrotype or stereotype plates of miscellaneous matter, and also sells type uniform with that used in making the plates, so that the papers supplied may be made to appear the same throughout.

There appears to be a growing tendency toward the use of plate matter in preference to the half-printed sheets. Country journals are beginning to demand telegraphic news, and this the plate-matter concerns can supply fresher than the "patent insides."

Newspaper Combinations.—By the close of the last decade there was noted a slight tendency toward consolidation, under one ownership or management, of newspapers published in different places. This plan has thus far been adopted only among certain large metropolitan dailies. Examples of common ownership of this general character are shown in the *Galveston News* and the *Dallas News*, essentially the same paper in both cities; the *New York Herald*, the *Evening Telegram* (New York), and the European edition of the *Herald*; the *New York Times* and the *Philadelphia Times;* the *Washington Times* and the *New York Daily News;* and the group of papers owned and published by William R. Hearst—the *San Francisco Examiner*, the *Journal and American* (formerly the *New York Journal*), the *Evening Journal* (New York), and the *Chicago American*. In small places the newspapers are in such close contact with the people they serve that it is a distinct advantage for the proprietor to be personally known to his subscribers, and to be identified exclusively with his locality. In small places not only the reading public but the advertisers seem to prefer newspapers owned and published in the place of circulation. Furthermore, it is only in large cities that the opportunities for economy through combination are great enough to warrant the attempt, practically the same results being secured more easily in country districts by making use of the syndicate and the "patent insides."

TABLE 58.—NEWSPAPERS AND PERIODICALS.

		United States.	Alabama.	Arizona.	Arkansas.	California.	Colorado.
1	Number of establishments	15,305	156	32	217	512	212
	Character of organization:						
2	Individual	9,686	109	22	154	328	118
3	Firm and limited partnership	3,016	29	3	44	91	34
4	Incorporated company	2,420	16	7	19	86	60
5	Miscellaneous	183	2	.....	.....	7	.....
	Capital:						
6	Total	$192,443,708	$621,852	$186,573	$648,883	$4,440,602	$1,751,437
7	Land	$13,361,249	$13,945	$7,050	$13,510	$161,215	$51,155
8	Buildings	$19,497,604	$37,580	$12,475	$29,343	$239,835	$93,070
9	Machinery, tools, and implements	$77,362,342	$362,741	$118,602	$395,698	$2,464,724	$1,009,797
10	Cash and sundries	$82,222,513	$207,586	$48,446	$210,337	$1,574,828	$597,415
11	Proprietors and firm members	15,976	178	28	248	538	186
	Salaried officials, clerks, etc.:						
12	Total number	27,579	80	15	59	857	280
13	Total salaries	$27,015,791	$79,809	$17,727	$44,905	$840,650	$262,974
	Officers of corporations—						
14	Number	2,626	22	4	9	58	37
15	Salaries	$4,990,705	$41,220	$6,350	$10,600	$94,664	$56,180
	General superintendents, managers, clerks, etc.—						
16	Total number	24,953	58	11	50	799	249
17	Total salaries	$22,025,086	$38,589	$11,377	$34,305	$745,986	$206,844
	Men—						
18	Number	19,814	54	9	46	702	225
19	Salaries	$19,892,882	$37,140	$9,477	$33,145	$701,520	$195,378
	Women—						
20	Number	5,139	4	2	4	97	24
21	Salaries	$2,132,204	$1,449	$1,900	$1,160	$44,466	$11,466
	Wage-earners, including pieceworkers, and total wages:						
22	Greatest number employed at any one time during the year	107,123	641	160	748	3,173	1,508
23	Least number employed at any one time during the year	89,074	518	128	560	2,518	1,196
24	Average number	94,604	548	139	600	2,683	1,303
25	Wages	$50,333,051	$241,525	$78,640	$215,410	$1,804,619	$770,382
	Men, 16 years and over—						
26	Average number	73,653	459	109	384	2,158	1,168
27	Wages	$44,961,533	$229,549	$65,807	$179,932	$1,650,777	$730,362
	Women, 16 years and over—						
28	Average number	14,815	21	17	69	344	95
29	Wages	$4,628,221	$5,368	$6,685	$17,855	$128,979	$33,884
	Children, under 16 years—						
30	Average number	6,136	68	13	147	181	40
31	Wages	$743,297	$6,608	$1,148	$17,623	$24,863	$6,136
	Average number of wage-earners, including pieceworkers, employed during each month:						
	Men, 16 years and over—						
32	January	74,702	459	114	400	2,191	1,164
33	February	74,148	458	114	399	2,171	1,159
34	March	74,559	474	111	394	2,181	1,153
35	April	74,287	472	109	387	2,170	1,158
36	May	74,103	467	109	378	2,199	1,165
37	June	72,566	446	108	360	2,124	1,162
38	July	71,167	436	104	353	2,102	1,127
39	August	71,106	427	102	347	2,091	1,134
40	September	72,445	442	100	370	2,128	1,166
41	October	74,110	464	110	404	2,160	1,195
42	November	74,905	481	116	408	2,174	1,216
43	December	75,738	478	116	405	2,210	1,223
	Women, 16 years and over—						
44	January	15,218	20	18	72	353	89
45	February	15,250	19	17	72	351	88
46	March	15,375	20	17	69	344	93
47	April	15,196	21	16	71	348	94
48	May	14,944	21	17	72	344	105
49	June	14,471	20	17	68	335	93
50	July	13,827	20	17	63	331	94
51	August	14,019	21	16	67	327	94
52	September	14,296	22	16	70	338	97
53	October	14,865	28	18	69	349	97
54	November	15,068	22	18	67	352	99
55	December	15,251	23	18	67	354	98
	Children, under 16 years—						
56	January	6,264	69	13	157	187	43
57	February	6,256	67	13	156	185	42
58	March	6,272	68	13	156	188	41
59	April	6,281	66	13	156	189	39
60	May	6,245	63	13	161	185	42
61	June	6,042	59	13	142	178	38
62	July	5,934	59	13	132	170	38
63	August	5,888	61	13	133	168	36
64	September	5,978	63	13	135	174	40
65	October	6,112	59	13	142	179	36
66	November	6,141	56	9	146	178	39
67	December	6,219	61	13	149	187	41
	Compositors (included in wage-earners)—						
68	Men, 16 years and over	39,599	276	57	256	1,176	505
69	Women, 16 years and over	7,608	20	11	34	241	53
70	Children, under 16 years	2,104	10	.....	118	16	4
	Compositors operating type-casting or typesetting machines—						
71	Men	4,946	37	9	5	199	88
72	Women	857	1	.....	3	70	2
73	Type-casting and typesetting machines used, number	3,988	32	6	1	150	68
	Miscellaneous expenses:						
74	Total	$38,544,642	$84,881	$17,968	$79,261	$637,302	$323,599
75	Rent of works	$4,134,995	$16,498	$5,878	$19,725	$147,847	$58,555
76	Taxes	$961,248	$4,313	$1,814	$3,974	$26,246	$10,475
77	Newspaper and periodical postage	$4,260,681	$9,847	$1,199	$5,991	$80,624	$45,149
78	Rent of offices, interest, insurance, and all sundry expenses not hitherto included.	$18,121,131	$41,390	$9,082	$43,211	$255,452	$151,565
79	Contract work	$11,066,587	$12,833	.....	$6,360	$127,133	$62,855

BY STATES AND TERRITORIES: 1900.

Connecticut.	Delaware.	District of Columbia.	Florida.	Georgia.	Idaho.	Illinois.	Indiana.	Indian Territory.	Iowa.	Kansas.	
116	26	60	86	233	66	1,259	638	58	910	595	1
57	12	21	58	135	47	764	432	36	593	436	2
15	2	14	17	48	14	232	123	15	243	130	3
44	12	21	11	48	5	249	71	7	72	23	4
.....	.....	4	.....	2	.....	14	12	.....	2	6	5
$2,289,658	$275,298	$2,233,897	$400,221	$1,852,813	$280,804	$12,259,569	$4,792,139	$115,003	$4,703,049	$1,920,636	6
$199,600	$20,650	$290,300	$11,110	$113,635	$22,865	$893,231	$207,450	$3,920	$239,560	$63,700	7
$309,243	$30,550	$576,812	$28,250	$165,112	$25,375	$1,524,023	$558,068	$7,355	$405,976	$222,375	8
$1,098,895	$153,705	$843,029	$252,588	$1,249,133	$154,123	$4,847,495	$2,670,216	$78,325	$2,451,255	$1,131,989	9
$681,920	$70,398	$523,756	$108,328	$824,983	$78,441	$4,994,820	$1,356,405	$25,403	$1,606,258	$502,572	10
85	15	51	99	234	78	1,289	680	69	1,083	701	11
238	45	301	55	196	17	2,894	665	5	523	169	12
$235,655	$29,656	$289,566	$49,096	$177,325	$11,600	$2,420,322	$615,036	$1,900	$398,965	$107,369	13
63	5	32	4	32	6	285	110	4	69	24	14
$88,892	$7,100	$94,040	$7,100	$49,123	$8,300	$488,489	$176,298	$1,300	$88,872	$23,329	15
175	40	269	51	164	11	2,609	555	1	454	145	16
$151,763	$22,556	$195,526	$41,996	$128,202	$8,300	$1,931,833	$438,738	$600	$310,093	$84,040	17
147	37	198	43	145	11	1,841	431	1	370	120	18
$136,261	$20,996	$172,285	$39,691	$120,980	$8,300	$1,639,983	$384,987	$600	$275,957	$76,310	19
28	8	71	8	19	.....	768	124	.....	84	25	20
$15,502	$1,560	$28,241	$2,305	$7,272	.....	$291,850	$53,751	.....	$34,136	$7,730	21
1,268	248	678	384	1,149	246	8,449	4,708	190	4,046	2,194	22
1,123	204	550	294	996	173	6,999	3,888	121	3,264	1,700	23
1,151	220	600	305	1,050	187	7,478	4,084	138	3,393	1,766	24
$703,587	$86,208	$393,220	$184,866	$450,878	$92,819	$3,704,341	$1,784,059	$48,389	$1,311,179	$623,783	25
958	174	477	256	774	150	6,071	2,793	116	2,324	1,144	26
$640,227	$78,560	$363,088	$126,043	$406,365	$85,696	$3,317,615	$1,490,847	$44,419	$1,107,349	$502,408	27
162	25	105	16	110	19	972	988	14	596	364	28
$60,393	$5,816	$27,229	$5,084	$27,190	$5,574	$333,076	$256,180	$3,221	$148,477	$89,439	29
31	21	18	38	166	18	435	303	8	473	258	30
$2,967	$1,832	$2,908	$3,239	$17,328	$1,549	$53,650	$37,032	$749	$55,353	$31,936	31
967	178	493	278	774	147	6,101	2,900	118	2,378	1,152	32
963	178	492	272	780	144	6,072	2,888	119	2,354	1,125	33
962	177	486	264	787	145	6,119	2,910	110	2,354	1,157	34
961	180	492	258	808	151	6,108	2,888	113	2,322	1,170	35
953	179	489	254	800	151	6,036	2,878	116	2,303	1,159	36
949	184	461	237	753	146	5,966	2,671	106	2,263	1,117	37
949	171	458	233	745	140	5,842	2,626	107	2,215	1,110	38
950	165	461	235	752	143	5,843	2,631	112	2,225	1,106	39
965	166	479	236	763	148	5,990	2,694	117	2,281	1,133	40
959	171	471	267	771	155	6,170	2,725	124	2,364	1,152	41
955	174	482	266	775	159	6,289	2,740	124	2,407	1,166	42
968	175	485	271	782	167	6,313	2,959	132	2,419	1,176	43
163	23	116	16	109	20	963	995	14	611	370	44
167	23	114	14	109	20	966	992	14	616	356	45
162	22	113	16	118	18	988	1,000	14	618	357	46
168	24	120	17	116	18	962	985	14	606	373	47
167	25	95	16	117	18	977	984	14	607	361	48
157	29	94	18	105	19	953	965	14	580	357	49
152	25	87	15	106	19	926	956	12	568	345	50
158	26	91	15	109	19	921	953	12	567	344	51
159	25	103	15	107	19	965	983	14	573	362	52
165	25	105	17	108	23	996	997	13	590	375	53
162	25	113	17	107	20	1,038	1,014	14	607	379	54
160	26	114	15	107	20	1,014	1,030	14	611	393	55
32	22	18	37	172	18	440	308	9	484	277	56
32	22	18	33	172	18	439	310	9	488	261	57
32	23	18	34	175	18	446	307	8	483	261	58
31	22	18	33	178	18	442	306	9	485	270	59
31	23	18	33	176	18	438	306	9	482	270	60
31	22	18	33	170	18	433	298	8	456	253	61
31	21	18	31	158	18	422	294	8	456	260	62
31	20	18	30	156	18	424	291	8	455	248	63
31	19	18	30	157	18	424	296	7	464	251	64
31	21	18	32	161	18	432	301	8	473	259	65
29	18	13	36	161	13	436	308	9	472	243	66
31	20	18	37	162	18	442	314	8	476	239	67
471	113	229	161	405	119	3,002	1,393	92	1,605	790	68
93	20	13	11	29	16	554	400	14	446	299	69
5	.....	.....	3	26	3	151	140	1	11	214	70
112	13	60	22	69	5	108	146	.....	121	37	71
31	2	2	.....	.....	.....	245	14	.....	16	2	72
110	11	.....	10	39	2	267	115	.....	94	24	73
$294,604	$17,201	$411,596	$81,775	$243,417	$19,254	$3,668,045	$577,187	$10,467	$444,690	$195,520	74
$33,094	$3,870	$23,526	$11,018	$23,483	$5,057	$397,302	$97,512	$5,028	$101,133	$50,552	75
$12,216	$768	$3,751	$2,053	$13,364	$2,198	$68,972	$27,720	$774	$22,154	$12,714	76
$16,057	$1,704	$32,999	$6,341	$33,485	$1,662	$545,022	$93,973	$695	$87,116	$30,420	77
$194,473	$10,859	$284,558	$11,197	$129,184	$9,037	$1,534,394	$229,995	$3,950	$199,315	$83,089	78
$88,764	.....	$66,767	$1,166	$38,901	$1,300	$1,122,355	$157,987	$20	$34,972	$18,745	79

TABLE 58.—NEWSPAPERS AND PERIODICALS,

		United States.	Alabama.	Arizona.	Arkansas.	California.	Colorado.
	Materials used:						
80	Aggregate cost	$50,214,904	$158,677	$46,393	$171,979	$1,420,243	$507,899
	Paper—						
81	Total pounds	1,233,142,248	2,950,889	548,651	2,455,256	35,113,672	12,083,992
82	Total cost	$37,823,856	$116,715	$29,567	$124,501	$1,140,424	$405,822
83	News, pounds	956,335,921	2,508,884	351,851	1,476,893	31,725,454	10,855,076
84	Cost	$22,197,060	$74,187	$12,921	$52,388	$895,324	$296,551
85	Periodical, pounds	121,901,749	39,824	600	112,486	840,898	238,226
86	Cost	$5,504,578	$2,010	$30	$7,808	$46,560	$12,605
87	Book and periodical, pounds	80,394,514	26,731	46,000	194,001	459,316	74,455
88	Cost	$3,851,912	$1,715	$4,530	$9,437	$33,059	$4,881
89	Job printing, pounds	74,510,064	375,450	150,200	671,876	2,088,009	916,235
90	Cost	$6,270,306	$38,803	$12,086	$54,868	$166,481	$91,785
91	Ink, pounds	13,436,459	43,688	9,099	29,426	384,797	111,079
92	Cost	$1,374,237	$5,478	$2,597	$6,102	$37,232	$13,252
93	Fuel	$1,276,337	$4,321	$1,444	$5,800	$32,332	$14,934
94	Rent of power and heat	$895,206	$5,314	$995	$2,727	$44,688	$10,630
95	Office supplies	$2,001,699	$7,016	$2,017	$7,085	$53,324	$12,814
96	All other materials	$6,008,035	$7,595	$3,036	$14,768	$79,961	$31,892
97	Freight	$835,534	$12,238	$6,737	$10,996	$32,282	$18,555
	Products:						
98	Total value	$222,983,569	$841,036	$236,975	$839,787	$6,858,192	$2,525,488
99	Newspaper products	$175,789,610	$704,767	$170,083	$632,869	$5,801,721	$2,105,892
100	Advertising	$95,861,127	$410,090	$110,143	$268,424	$3,437,976	$1,289,888
101	Subscriptions and sales	$79,928,483	$294,677	$59,940	$264,445	$2,363,745	$816,004
102	Book and job printing products	$44,859,226	$131,534	$64,040	$301,889	$970,770	$390,884
103	Book and pamphlet publications	$18,407,528	$8,679	$6,750	$9,187	$109,108	$34,006
104	Sheet music and books of music	$544,802	$150	----------	$3,050	$4,000	----------
105	Job printing	$22,793,322	$116,805	$51,264	$220,850	$774,329	$325,780
106	Bookbinding	$2,067,450	$3,175	$4,850	$12,765	$71,758	$23,556
107	Blank books	$554,557	$1,275	$1,176	$55,735	$4,275	$3,115
108	Electrotyping, engraving, etc	$491,567	$1,450	----------	$302	$7,300	$4,427
109	All other products	$2,334,733	$4,785	$2,852	$5,029	$85,701	$28,662
	Aggregate circulation per issue:						
110	Daily	15,102,156	48,645	11,456	38,140	475,596	157,016
111	Including Sunday	8,645,536	30,450	7,856	34,340	367,280	125,477
112	Except Sunday	6,456,620	18,195	3,600	3,800	108,316	31,539
113	Triweekly	228,610	700	----------	1,000	480	500
114	Semiweekly	2,332,368	4,340	----------	11,285	23,342	2,000
115	Weekly	39,852,052	155,244	22,392	187,578	618,146	285,425
116	Monthly	39,519,897	6,800	206	18,900	194,792	72,947
117	Quarterly	11,217,422	----------	----------	5,000	112,500	1,250
118	All other classes	5,546,329	14,350	----------	1,000	23,800	2,075
	Number of publications:						
119	Total	18,226	175	43	236	622	248
	By period of issue—						
120	Daily	2,226	19	10	20	117	42
121	Including Sunday	567	11	4	10	34	17
122	Morning	359	7	3	4	30	11
123	Evening	208	4	1	6	4	6
124	Except Sunday	1,659	8	6	10	83	25
125	Morning	236	1	1	----------	17	2
126	Evening	1,423	7	5	10	66	23
127	Triweekly	62	1	----------	1	1	1
128	Semiweekly	637	2	----------	4	22	3
129	Weekly	12,979	143	32	199	397	179
130	Monthly	1,817	4	1	8	71	19
131	Quarterly	237	----------	----------	1	6	1
132	All other classes	268	6	----------	3	8	3
	By character—						
133	News, politics, and family reading	14,867	160	41	214	467	199
134	Religion	952	7	----------	6	40	4
135	Agriculture, horticulture, dairying, and stock raising	307	2	1	1	17	9
136	Commerce, finance, insurance, and railroads	190	4	----------	----------	12	3
137	Trade journals	520	----------	----------	----------	21	7
138	General literature, including magazines	239	----------	----------	1	10	----------
139	Sunday newspapers	72	----------	----------	3	2	1
140	Medicine and surgery	111	1	----------	1	4	1
141	Law	62	----------	----------	----------	4	2
142	Science and mechanics	66	----------	----------	----------	3	2
143	Fraternal organizations	200	----------	----------	6	13	6
144	Education and history	120	----------	----------	2	6	2
145	Society, art, music, and fashion	88	----------	----------	1	2	1
146	College and school periodicals	139	----------	1	----------	2	1
147	Miscellaneous	293	1	----------	1	19	10
	By language—						
148	Bohemian	28	----------	----------	----------	----------	----------
149	Bohemian and English	1	----------	----------	----------	----------	----------
150	Chinese	5	----------	----------	----------	5	----------
151	Dutch	12	----------	----------	----------	----------	----------
152	English	17,194	174	42	236	572	238
153	Finnish	7	----------	----------	----------	----------	----------
154	French	27	----------	----------	----------	3	----------
155	French and English	4	----------	----------	----------	----------	----------
156	Gaelic and English	3	----------	----------	----------	----------	----------
157	German	613	1	----------	----------	18	3
158	German and English	20	----------	----------	----------	----------	----------
159	German and Hebrew	3	----------	----------	----------	----------	----------
160	Hebrew	13	----------	----------	----------	----------	----------
161	Hungarian	2	----------	----------	----------	----------	----------
162	Indian and English	3	----------	----------	----------	----------	----------
163	Italian	35	----------	----------	----------	9	2
164	Lithuanian	9	----------	----------	----------	----------	----------
165	Polish	33	----------	----------	----------	1	----------
166	Portuguese	2	----------	----------	----------	2	----------
167	Scandinavian	115	----------	----------	----------	----------	----------
168	Slavonic, not specified	4	----------	----------	----------	----------	----------
169	Spanish	39	----------	1	----------	4	3
170	Spanish and English	1	----------	----------	----------	----------	----------
171	Welsh and English	1	----------	----------	----------	----------	----------
172	All other	52	----------	----------	----------	8	2
	Comparison of products:						
173	Number of establishments reporting for both years	11,002	111	20	144	373	144
174	Value for census year	$195,575,301	$669,965	$179,855	$693,563	$5,390,288	$2,182,244
175	Value for preceding business year	$177,563,659	$596,962	$147,410	$610,411	$4,988,975	$1,945,560

BY STATES AND TERRITORIES: 1900—Continued.

Connecticut.	Delaware.	District of Columbia.	Florida.	Georgia.	Idaho.	Illinois.	Indiana.	Indian Territory.	Iowa.	Kansas.	
$432,772	$56,047	$288,491	$120,627	$370,920	$67,022	$4,188,184	$1,442,214	$31,872	$1,082,549	$533,452	80
10,693,278	1,299,582	8,787,333	1,706,343	7,689,963	617,790	114,853,569	25,546,899	396,180	20,716,211	8,512,671	81
$311,939	$44,143	$227,287	$76,318	$254,880	$44,888	$3,263,149	$908,517	$23,503	$823,192	$391,252	82
9,400,729	1,143,268	7,523,221	1,307,823	6,824,393	325,769	92,016,473	18,304,963	283,539	17,097,375	6,008,311	83
$213,034	$31,918	$163,988	$41,392	$178,889	$15,299	$2,075,730	$471,067	$9,219	$516,538	$203,502	84
34,412	9,955	457,240	13,920	102,680	14,221	12,330,387	1,975,468	6,050	341,156	603,469	85
$2,403	$611	$22,521	$878	$4,757	$936	$530,728	$68,284	$346	$14,905	$21,930	86
605,710	20,084	553,548	114,400	42,970	19,500	4,145,642	2,386,327	30,251	326,378	272,410	87
$39,621	$1,034	$17,312	$6,991	$3,341	$1,413	$204,936	$92,167	$1,486	$18,532	$12,574	88
652,427	126,275	253,324	270,200	719,915	258,300	6,361,067	2,880,141	126,340	2,951,302	1,628,491	89
$56,881	$10,580	$23,466	$27,057	$67,893	$27,240	$451,755	$276,999	$12,452	$273,217	$153,246	90
125,319	12,710	92,055	19,344	113,460	7,430	1,017,503	263,565	5,650	207,731	91,801	91
$11,082	$979	$7,421	$3,380	$10,282	$1,480	$111,011	$52,803	$1,239	$29,496	$16,938	92
$20,711	$2,311	$6,147	$2,150	$11,724	$3,445	$91,353	$36,846	$1,266	$49,180	$23,763	93
$13,863	$2,359	$5,510	$2,322	$9,908	$1,458	$64,637	$21,005	$67	$18,542	$6,670	94
$9,910	$2,276	$15,406	$5,886	$9,984	$3,591	$200,273	$49,221	$1,601	$32,480	$18,543	95
$57,277	$2,746	$24,786	$24,456	$62,928	$4,266	$351,736	$338,554	$1,552	$70,544	$36,590	96
$7,990	$1,283	$1,984	$6,165	$11,219	$7,894	$55,975	$35,268	$2,644	$59,115	$39,696	97
$2,129,073	$219,184	$1,846,535	$480,368	$1,687,049	$299,805	$19,404,955	$6,093,191	$174,069	$4,935,453	$2,348,453	98
$1,755,779	$174,933	$1,690,643	$398,594	$1,441,968	$199,948	$16,386,952	$3,912,514	$110,916	$3,777,690	$1,698,656	99
$1,068,998	$116,116	$1,069,480	$228,352	$808,284	$110,010	$9,029,291	$2,070,544	$60,394	$1,939,852	$893,780	100
$686,781	$68,817	$621,163	$170,242	$633,684	$89,938	$7,357,661	$1,841,970	$50,522	$1,837,838	$804,876	101
$333,368	$43,289	$131,378	$81,349	$230,168	$96,622	$2,866,530	$2,131,503	$62,143	$1,086,713	$628,008	102
$48,980	$450	$38,103	$8,750	$4,593	$75	$974,821	$514,070	$4,404	$57,878	$29,575	103
				$5,000	$2,800	$153,175	$4,765		$1,050	$13,888	104
$273,707	$41,947	$76,475	$72,324	$185,477	$91,807	$1,647,454	$940,935	$57,554	$949,667	$534,924	105
$5,678	$842		$200	$11,185	$1,400	$54,827	$621,568	$110	$21,052	$17,126	106
$1,105	$50	$4,800	$75	$13,908	$1,040	$31,977	$15,771	$75	$49,792	$26,365	107
$3,898		$12,000		$10,000		$3,276	$34,394		$7,279	$6,130	108
$39,926	$962	$24,514	$425	$14,918	$3,235	$152,473	$49,174	$1,010	$71,050	$21,789	109
208,315	34,277	100,848	27,907	102,872	5,100	1,449,087	345,404	3,350	217,589	105,348	110
39,400	34,277	69,606	27,907	55,841	3,000	500,673	96,599	2,100	125,473	86,619	111
169,415		31,242		47,031	2,100	948,414	248,805	1,250	92,116	68,729	112
			1,000			5,338			19,224	800	113
29,325	1,700	1,000	5,000	33,941	4,645	170,720	77,185		168,672	20,040	114
155,507	43,773	304,037	66,295	331,905	36,300	3,866,983	858,424	45,891	1,105,666	653,507	115
44,375	6,150	354,050	12,100	67,425	1,500	3,072,932	715,292	900	301,205	321,050	116
1,800		2,760		1,000		1,683,434	77,700		27,529	21,800	117
17,800		58,140		12,350	1,250	180,874	34,800		44,990	21,775	118
155	30	69	97	265	72	1,548	841	64	1,045	684	119
44	6	8	11	27	5	197	156	6	65	53	120
3	6	7	11	13	1	43	23	4	39	8	121
1	2	3	4	12	1	25	22	1	14	6	122
2	4	4	7	1		18	1	3	25	2	123
41		1		14	4	154	133	2	26	45	124
12				8	2	19	4		2	1	125
29		1		11	2	135	129	2	24	44	126
			1			4			7	1	127
22	1	1	1	9	5	72	41		58	3	128
74	21	31	76	205	59	1,000	561	56	831	563	129
9	2	22	8	17	1	219	64	2	64	51	130
2		2		1		23	10		8	5	131
4		5		6	2	33	9		12	8	132
130	28	32	86	236	69	1,141	730	62	942	608	133
6		4	7	10		85	36	1	39	16	134
2		1	2	2	1	35	16		14	16	135
4		3		1		17	8		2	2	136
1		2		5	1	101	14		4	6	137
		5	2	2		28	3		2	2	138
3		2				4	5		1		139
2		1		4		12	4				140
		1		1		8			1		141
		5				9			1		142
4	1	2			1	18	13		13	11	143
3	1	1				17	3	1	5	6	144
		1				24	1		3	1	145
		2		1		10	8		9	7	146
		7		3		39	5		9	9	147
						11			3		148
											149
											150
									5		151
						3					152
145	29	67	96	264	72	1,415	814	64	976	668	153
						1					154
											155
											156
						68	24		46	12	157
5	1	2		1			2			3	158
											159
						3					160
1											161
											162
						5					163
1						2					164
						10	1				165
											166
						30			15	1	167
2											168
											169
											170
											171
											172
1			1								
103	15	51	49	158	42	943	501	28	653	413	173
$2,037,255	$142,259	$1,819,560	$363,726	$1,162,212	$217,900	$16,371,047	$4,063,399	$83,279	$4,067,777	$1,938,818	174
$1,857,312	$130,049	$1,612,374	$356,947	$1,074,676	$199,631	$14,608,718	$3,648,787	$65,716	$3,594,407	$1,591,326	175

TABLE 58.—NEWSPAPERS AND PERIODICALS,

		United States.	Alabama.	Arizona.	Arkansas.	California.	Colorado.
	Power:						
176	Number of establishments reporting	6,515	30	12	27	206	72
177	Total horsepower	76,264	341	70	169	1,769	610
	Owned—						
	Engines—						
178	Steam, number	2,080	4	1	6	20	16
179	Horsepower	34,607	149	20	91	242	249
180	Gas or gasoline, number	2,836	13	10	16	99	17
181	Horsepower	10,508	40	36	52	334	56
182	Water wheels, number	420	3	.....	1	9	21
183	Horsepower	1,912	16	.....	2	30	86
184	Electric motors, number	534	.....	.....	2	.....	.....
185	Horsepower	6,175	.....	.....	5	.....	.....
186	Other power, number	367	1	.....	.....	6	.....
187	Horsepower	1,168	2	.....	.....	28	.....
	Rented—						
188	Electric, horsepower	18,292	.....	14	19	1,054	214
189	Other kind, horsepower	3,607	184	.....	.....	86	5
190	Furnished to other establishments, horsepower	869	.....	.....	.....	1	.....
	Establishments classified by number of persons employed, not including proprietors and firm members:						
191	Total number of establishments	15,305	156	32	217	512	212
192	No employees	1,174	9	20	12	43	26
193	Under 5	8,764	110	11	159	290	108
194	5 to 20	4,809	33	1	43	144	65
195	21 to 50	673	4	.....	3	21	5
196	51 to 100	204	.....	.....	.....	8	5
197	101 to 250	133	.....	.....	.....	5	3
198	251 to 500	36	.....	.....	.....	1	.....
199	501 to 1,000	9	.....	.....	.....	.....	.....
200	1,001 to 5,000	3	.....	.....	.....	.....	.....

		Kentucky.	Louisiana.	Maine.	Maryland.	Massachusetts.	Michigan.
1	Number of establishments	248	184	120	141	396	591
	Character of organization:						
2	Individual	151	92	62	72	191	395
3	Firm and limited partnership	36	15	23	33	73	123
4	Incorporated company	55	27	31	36	121	69
5	Miscellaneous	6	.....	4	.....	11	4
	Capital:						
6	Total	$2,683,855	$1,132,148	$1,068,820	$2,473,094	$10,392,258	$4,114,760
7	Land	$294,025	$83,700	$36,225	$259,263	$793,085	$176,957
8	Buildings	$290,240	$88,205	$113,550	$391,888	$618,784	$352,416
9	Machinery, tools, and implements	$929,157	$542,297	$716,944	$1,028,707	$4,074,133	$2,083,949
10	Cash and sundries	$1,170,433	$417,946	$802,101	$793,236	$4,906,256	$1,501,438
11	Proprietors and firm members	225	123	101	145	346	644
	Salaried officials, clerks, etc.:						
12	Total number	367	127	219	388	2,141	836
13	Total salaries	$325,851	$129,937	$182,099	$383,027	$2,027,034	$685,533
	Officers of corporations—						
14	Number	62	15	27	16	131	87
15	Salaries	$96,918	$23,040	$51,402	$40,560	$310,136	$136,601
	General superintendents, managers, clerks, etc.—						
16	Total number	305	112	192	372	2,010	749
17	Total salaries	$228,933	$106,897	$130,697	$342,467	$1,716,898	$548,932
	Men—						
18	Number	248	101	139	316	1,573	590
19	Salaries	$208,487	$104,212	$109,427	$326,937	$1,513,395	$501,093
	Women—						
20	Number	57	11	53	56	437	159
21	Salaries	$20,446	$2,685	$21,270	$15,530	$203,503	$47,839
	Wage-earners, including pieceworkers, and total wages:						
22	Greatest number employed at any one time during the year	1,393	973	1,524	1,635	5,954	3,451
23	Least number employed at any one time during the year	1,099	858	1,168	1,478	5,142	2,789
24	Average number	1,154	873	1,309	1,529	5,482	2,916
25	Wages	$521,789	$532,895	$473,026	$758,335	$3,769,204	$1,302,493
	Men, 16 years and over—						
26	Average number	1,015	766	664	1,427	4,066	2,186
27	Wages	$491,715	$508,281	$331,651	$735,469	$3,220,702	$1,126,228
	Women, 16 years and over—						
28	Average number	102	52	615	43	1,278	553
29	Wages	$26,260	$18,262	$137,137	$16,488	$532,912	$154,227
	Children, under 16 years—						
30	Average number	37	55	30	59	88	177
31	Wages	$3,764	$6,352	$4,238	$6,378	$15,590	$22,043
	Average number of wage-earners, including pieceworkers, employed during each month:						
	Men, 16 years and over—						
32	January	1,023	776	671	1,449	4,116	2,205
33	February	1,026	782	677	1,440	4,115	2,191
34	March	1,043	788	692	1,417	4,157	2,191
35	April	1,045	765	679	1,415	4,105	2,183
36	May	1,053	767	666	1,418	4,114	2,188
37	June	1,004	760	647	1,396	4,043	2,118
38	July	966	745	640	1,387	3,894	2,108
39	August	960	741	645	1,408	3,937	2,166
40	September	1,004	740	656	1,436	4,015	2,168
41	October	1,014	787	664	1,461	4,092	2,221
42	November	1,005	775	664	1,459	4,086	2,244
43	December	1,036	769	666	1,439	4,124	2,243
	Women, 16 years and over—						
44	January	103	52	639	45	1,311	561
45	February	105	53	646	45	1,312	569
46	March	110	53	662	44	1,322	571
47	April	110	53	656	45	1,312	572
48	May	107	53	641	45	1,283	562
49	June	101	55	588	43	1,245	535
50	July	91	51	553	41	1,171	525

BY STATES AND TERRITORIES: 1900—Continued.

Connecticut.	Delaware.	District of Columbia.	Florida.	Georgia.	Idaho.	Illinois.	Indiana.	Indian Territory.	Iowa.	Kansas.	
89	17	15	22	41	16	531	325	13	442	178	176
1,341	130	390	149	698	43	5,121	2,695	41	2,283	971	177
56	4	6	4	16	1	121	68	1	88	41	178
750	38	195	39	316	2	2,009	795	8	705	356	179
6	7	5	13	13	3	271	217	12	284	97	180
63	24	45	55	87	8	959	917	33	888	316	181
11	1	.....	1	6	10	18	9	.....	23	11	182
35	2	.....	5	79	27	186	47	.....	77	61	183
3	.....	1	.....	1	.....	45	33	.....	1	1	184
23	.....	50	.....	10	.....	427	168	.....	10	3	185
6	.....	.....	2	.....	.....	11	10	.....	.....	18	186
13	.....	.....	6	.....	.....	25	48	.....	5	78	187
457	66	100	44	202	6	1,151	685	.....	564	157	188
.....	.....	.....	.....	4	.....	414	35	.....	34	.....	189
43	.....	10	1	.....	.....	256	5	.....	.....	4	190
116	26	60	86	233	66	1,259	638	58	910	595	191
4	.....	4	5	35	9	79	30	9	71	68	192
38	13	20	48	131	40	704	365	37	558	382	193
52	7	25	27	55	16	396	210	12	239	131	194
19	6	7	5	5	1	56	24	.....	27	10	195
3	.....	1	1	4	.....	14	5	.....	15	4	196
.....	.....	3	.....	3	.....	4	3	.....	.....	.....	197
.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	198
.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	199
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	200

Minnesota.	Mississippi.	Missouri.	Montana.	Nebraska.	Nevada.	New Hampshire.	New Jersey.	New Mexico.	New York.	North Carolina.	
560	165	814	78	492	29	75	261	35	1,206	165	1
379	124	524	45	382	14	43	169	23	682	101	2
116	27	164	11	64	12	16	31	6	186	34	3
60	14	117	22	41	3	16	60	6	323	30	4
5	.....	9	.....	5	.....	.....	1	.....	15	.....	5
$6,382,125	$405,042	$6,507,800	$715,985	$2,252,555	$92,372	$1,018,753	$4,210,267	$163,472	$55,486,474	$645,432	6
$369,400	$13,055	$192,115	$54,885	$62,770	$5,396	$103,179	$440,915	$1,650	$3,977,982	$35,155	7
$778,091	$29,450	$667,565	$88,402	$154,865	$18,363	$103,700	$468,162	$6,850	$3,944,294	$62,675	8
$1,948,076	$250,031	$2,706,241	$393,111	$1,118,389	$45,104	$467,622	$2,331,640	$119,541	$15,564,120	$366,463	9
$3,286,558	$112,506	$2,941,879	$179,587	$916,531	$23,509	$344,252	$969,540	$35,481	$32,000,078	$191,139	10
617	180	860	68	506	36	74	240	36	1,107	170	11
933	28	1,264	91	277	3	65	354	17	7,415	145	12
$750,386	$22,965	$1,130,265	$134,788	$242,814	$2,400	$63,084	$344,461	$18,790	$9,096,420	$87,851	13
62	5	155	15	39	.....	20	54	4	458	22	14
$99,882	$6,460	$271,545	$23,930	$59,951	.....	$25,284	$80,325	$5,290	$1,346,523	$17,089	15
871	23	1,109	76	238	3	45	300	13	6,957	123	16
$650,504	$16,505	$858,720	$110,858	$182,863	$2,400	$37,800	$264,136	$13,500	$7,749,897	$70,762	17
612	21	902	70	202	3	31	257	13	5,578	116	18
$550,511	$16,037	$765,472	$106,618	$167,789	$2,400	$31,153	$247,047	$13,500	$7,102,814	$67,875	19
259	2	207	6	36	.....	14	43	.....	1,379	7	20
$99,993	$468	$93,248	$4,240	$15,074	.....	$6,647	$17,089	.....	$647,083	$2,887	21
2,970	551	4,284	499	1,628	80	673	2,359	178	18,071	733	22
2,483	416	3,597	426	1,315	67	520	1,907	124	15,317	627	23
2,714	440	3,758	455	1,384	68	571	2,077	142	16,460	653	24
$1,304,229	$164,435	$2,056,148	$310,802	$626,597	$35,024	$261,871	$1,162,033	$75,477	$10,924,755	$230,941	25
2,187	315	2,747	395	947	48	395	1,775	114	13,304	492	26
$1,195,120	$144,891	$1,839,571	$295,513	$542,826	$31,434	$196,346	$1,082,939	$69,416	$9,861,947	$210,356	27
313	35	567	27	212	3	170	201	12	2,849	41	28
$90,564	$9,066	$161,528	$10,625	$58,721	$1,303	$64,548	$64,633	$4,025	$1,018,564	$8,580	29
214	90	444	33	175	17	6	101	16	307	120	30
$18,545	$10,478	$55,049	$4,664	$25,050	$2,287	$977	$14,461	$2,036	$44,244	$12,005	31
2,195	341	2,804	393	957	48	393	1,782	118	13,509	500	32
2,186	337	2,717	390	961	48	391	1,776	116	13,417	494	33
2,247	320	2,835	387	952	48	404	1,814	122	13,362	494	34
2,218	304	2,830	389	947	49	397	1,815	111	13,254	491	35
2,213	310	2,778	392	939	47	401	1,804	113	13,453	487	36
2,178	303	2,727	392	909	47	412	1,763	115	13,280	500	37
2,108	303	2,638	380	904	47	389	1,741	102	12,966	483	38
2,119	297	2,586	388	903	48	389	1,712	102	12,925	487	39
2,155	302	2,676	402	929	46	388	1,707	111	13,048	486	40
2,208	317	2,747	405	988	47	390	1,782	116	13,267	491	41
2,225	328	2,777	417	986	49	389	1,800	117	13,502	494	42
2,193	324	2,854	410	985	47	386	1,800	119	13,669	498	43
306	35	582	27	208	4	166	215	12	3,018	40	44
300	35	578	27	209	4	165	211	13	3,071	39	45
314	33	575	26	214	4	184	219	12	3,041	40	46
316	32	570	26	215	4	171	220	12	2,962	39	47
311	33	561	26	212	4	169	192	12	2,877	45	48
314	29	566	26	209	4	172	182	11	2,820	44	49
310	29	547	27	204	3	167	180	11	2,519	41	50

TABLE 58.—NEWSPAPERS AND PERIODICALS,

		Kentucky.	Louisiana.	Maine.	Maryland.	Massachusetts.	Michigan.
	Average number of wage-earners, including pieceworkers, employed during each month—Continued.						
	Women, 16 years and over—Continued.						
51	August	93	51	545	41	1,190	527
52	September	95	52	579	40	1,261	527
53	October	102	52	607	40	1,300	546
54	November	101	51	636	42	1,313	565
55	December	105	51	639	41	1,313	577
	Children, under 16 years—						
56	January	33	61	31	58	89	178
57	February	34	60	29	57	91	177
58	March	32	61	29	57	88	182
59	April	34	58	28	55	92	187
60	May	34	56	28	57	91	178
61	June	35	58	26	56	86	177
62	July	36	52	29	58	83	173
63	August	41	51	29	58	79	172
64	September	40	52	29	61	85	172
65	October	41	50	32	62	89	175
66	November	40	52	32	63	89	178
67	December	40	48	32	67	94	176
	Compositors (included in wage-earners)—						
68	Men, 16 years and over	692	332	290	604	1,932	1,251
69	Women, 16 years and over	56	31	278	24	634	351
70	Children, under 16 years	6	7	8	11	5	78
	Compositors operating type-casting or typesetting machines—						
71	Men	81	72	42	151	362	94
72	Women	2	----------	34	----------	46	101
73	Type-casting and typesetting machines used, number	66	10	44	82	291	97
	Miscellaneous expenses:						
74	Total	$325,093	$161,383	$480,690	$349,663	$3,301,822	$591,407
75	Rent of works	$50,601	$19,055	$27,928	$52,607	$315,707	$80,168
76	Taxes	$12,273	$6,581	$9,468	$14,968	$97,819	$27,488
77	Newspaper and periodical postage	$49,841	$18,406	$175,039	$38,827	$235,966	$88,605
78	Rent of offices, interest, insurance, and all sundry expenses not hitherto included.	$139,609	$87,773	$215,384	$171,220	$1,951,182	$302,027
79	Contract work	$72,769	$29,568	$52,876	$72,041	$701,148	$98,119
	Materials used:						
80	Aggregate cost	$445,000	$307,421	$514,384	$578,563	$3,921,665	$1,023,853
	Paper—						
81	Total pounds	11,416,789	6,982,114	16,055,803	16,464,816	92,347,453	24,267,484
82	Total cost	$336,048	$241,096	$382,172	$420,574	$2,603,528	$781,125
83	News, pounds	10,115,952	6,470,564	8,621,379	15,475,805	79,207,152	19,059,894
84	Cost	$248,156	$201,863	$189,798	$347,120	$1,822,451	$459,692
85	Periodical, pounds	75,005	181,450	6,446,350	65,785	4,589,082	1,016,314
86	Cost	$4,274	$9,988	$117,897	$3,284	$187,941	$43,772
87	Book and periodical, pounds	585,760	47,000	330,313	146,250	4,067,948	1,783,680
88	Cost	$27,844	$3,079	$15,587	$6,604	$212,287	$65,669
89	Job printing, pounds	640,072	283,100	657,761	776,976	4,483,271	2,407,590
90	Cost	$55,774	$26,166	$58,890	$63,566	$380,849	$211,992
91	Ink, pounds	95,726	77,572	159,794	209,025	1,040,069	286,659
92	Cost	$14,001	$8,409	$13,457	$14,766	$88,134	$28,778
93	Fuel	$15,727	$7,994	$14,759	$16,454	$65,442	$45,558
94	Rent of power and heat	$10,488	$8,937	$9,446	$9,256	$56,082	$18,949
95	Office supplies	$16,748	$5,848	$30,832	$22,207	$118,912	$35,521
96	All other materials	$38,858	$19,471	$59,306	$86,565	$976,459	$87,771
97	Freight	$13,180	$15,666	$4,412	$3,741	$13,108	$26,151
	Products:						
98	Total value	$2,240,724	$1,436,738	$2,190,017	$2,618,799	$16,765,100	$5,119,740
99	Newspaper products	$1,818,706	$1,300,338	$1,876,214	$2,263,338	$13,170,875	$3,819,560
100	Advertising	$942,010	$751,304	$1,044,695	$1,490,189	$6,906,320	$2,137,461
101	Subscriptions and sales	$876,696	$549,034	$831,519	$773,149	$6,264,555	$1,682,099
102	Book and job printing products	$308,567	$128,045	$269,675	$292,333	$3,547,927	$1,153,364
103	Book and pamphlet publications	$84,349	$26,631	$49,452	$44,750	$1,509,622	$144,398
104	Sheet music and books of music	$1,893	----------	----------	$2,000	$173,060	$2,315
105	Job printing	$211,873	$99,389	$219,823	$237,583	$1,497,491	$830,619
106	Bookbinding	$4,870	----------	$300	$500	$313,587	$140,913
107	Blank books	$4,634	$25	$50	----------	$1,350	$8,037
108	Electrotyping, engraving, etc	$948	$2,000	$50	$7,500	$52,817	$27,082
109	All other products	$113,451	$8,355	$44,128	$63,128	$46,298	$146,816
	Aggregate circulation per issue:						
110	Daily	164,624	106,990	59,838	247,552	1,130,820	370,848
111	Including Sunday	77,124	88,900	14,298	39,172	581,097	224,798
112	Except Sunday	87,500	18,090	45,540	208,380	549,723	146,050
113	Triweekly	1,800	2,400	----------	----------	----------	7,975
114	Semiweekly	125,575	32,698	17,728	17,360	32,350	192,098
115	Weekly	425,323	137,434	220,759	316,505	2,066,369	752,032
116	Monthly	262,450	14,750	6,120,490	93,250	2,257,142	984,025
117	Quarterly	6,500	----------	7,050	3,000	363,096	50,400
118	All other classes	112,900	5,800	8,200	2,200	349,350	17,025
	Number of publications:						
119	Total	282	160	177	166	486	698
	By period of issue—						
120	Daily	27	23	15	18	98	70
121	Including Sunday	12	10	2	2	11	8
122	Morning	7	6	1	2	8	5
123	Evening	5	4	1	----------	3	3
124	Except Sunday	15	13	13	16	87	62
125	Morning	3	2	4	6	17	9
126	Evening	12	11	9	10	70	53
127	Triweekly	1	2	----------	----------	----------	5
128	Semiweekly	24	6	5	2	7	23
129	Weekly	190	112	100	127	273	522
130	Monthly	32	15	45	15	85	65
131	Quarterly	3	----------	8	1	15	5
132	All other classes	5	2	4	3	8	8
	By character—						
133	News, politics, and family reading	220	134	128	130	312	615
134	Religion	22	6	9	12	48	23
135	Agriculture, horticulture, dairying, and stock raising	8	4	1	3	6	7
136	Commerce, finance, insurance, and railroads	----------	1	4	2	3	3
137	Trade journals	10	3	1	6	27	18
138	General literature, including magazines	----------	3	21	1	27	8
139	Sunday newspapers	1	----------	----------	----------	8	1
140	Medicine and surgery	3	----------	1	1	2	5

BY STATES AND TERRITORIES: 1900—Continued.

Minnesota.	Mississippi.	Missouri.	Montana.	Nebraska.	Nevada.	New Hampshire.	New Jersey.	New Mexico.	New York.	North Carolina.	
311	31	538	27	209	3	158	179	11	2,724	41	51
319	32	563	27	220	3	164	186	12	2,634	43	52
324	42	571	30	220	3	171	209	12	2,805	38	53
316	44	565	30	212	3	173	208	11	2,848	38	54
312	44	588	30	216	4	177	213	12	2,869	38	55
229	94	436	35	182	17	7	100	17	309	120	56
227	93	433	35	181	17	7	102	16	316	123	57
231	94	437	33	177	17	7	103	16	315	121	58
230	88	453	33	174	17	7	101	16	307	122	59
233	90	451	33	176	17	7	101	16	308	121	60
206	86	446	33	177	17	8	101	18	302	118	61
200	83	446	33	173	17	5	99	16	296	113	62
194	81	432	33	171	17	4	99	16	294	117	63
198	82	437	33	166	17	5	97	16	303	117	64
203	95	448	33	174	17	6	101	16	315	123	65
204	97	447	33	174	17	6	101	16	309	123	66
211	97	457	33	176	17	6	106	17	311	125	67
1,252	228	1,525	224	647	37	204	1,081	85	6,026	350	68
149	35	298	7	187	4	128	159	9	704	27	69
101	65	165	.....	119	5	4	37	.....	80	93	70
186	10	156	43	61	2	26	115	6	962	22	71
14	.....	105	1	2	.....	12	.....	.....	56	.....	72
113	8	168	27	51	3	23	108	4	799	21	73
$1,219,343	$31,372	$1,385,340	$96,453	$377,666	$6,570	$63,072	$289,011	$11,947	$15,178,916	$73,777	74
$131,267	$11,906	$182,513	$20,185	$60,354	$2,929	$16,517	$56,443	$5,969	$1,175,060	$15,188	75
$29,669	$2,691	$25,351	$5,240	$9,719	$934	$5,285	$18,142	$1,064	$241,097	$4,424	76
$146,792	$3,684	$347,346	$7,616	$49,887	$907	$7,941	$12,597	$1,318	$1,211,274	$13,640	77
$370,008	$9,733	$401,178	$58,625	$198,681	$1,800	$30,904	$155,209	$6,566	$6,666,869	$25,305	78
$241,607	$3,358	$428,952	$4,887	$59,015	.....	$2,425	$43,620	$30	$5,885,123	$5,130	79
$1,073,934	$114,325	$2,204,785	$178,570	$624,472	$17,669	$166,524	$892,690	$33,622	$14,511,890	$156,944	80
26,663,512	1,560,884	66,173,770	2,918,505	11,544,598	156,576	3,445,068	17,034,314	330,587	378,603,033	2,562,334	81
$803,873	$93,298	$1,681,103	$102,746	$495,462	$6,049	$124,978	$719,552	$23,173	$11,109,993	$123,579	82
21,724,809	996,379	60,058,571	2,399,065	7,980,338	109,020	2,769,676	11,912,651	177,522	261,858,413	1,838,139	83
$492,543	$42,600	$1,287,382	$58,231	$231,379	$5,089	$69,948	$328,647	$7,715	$5,426,625	$64,925	84
1,083,806	54,706	2,599,118	800	917,007	1,000	34,400	842,126	.....	61,190,338	76,420	85
$52,222	$2,794	$116,697	$40	$53,462	$75	$2,542	$43,580	.....	$2,863,185	$3,723	86
2,065,634	38,585	1,382,977	28,759	718,617	6,000	232,977	521,932	800	46,386,675	19,000	87
$82,866	$2,077	$84,940	$2,677	$41,261	$375	$11,826	$26,401	$64	$2,185,900	$1,031	88
1,789,263	471,214	2,133,104	489,881	1,928,636	40,556	408,916	3,757,605	152,265	9,167,607	629,275	89
$176,252	$45,827	$192,084	$41,798	$169,360	$3,510	$40,657	$320,924	$15,394	$684,373	$58,700	90
316,426	19,106	795,966	28,765	114,479	1,808	34,660	202,703	3,612	3,944,417	27,736	91
$29,488	$3,868	$54,414	$3,758	$12,915	$347	$5,072	$24,937	$790	$375,549	$4,116	92
$43,776	$3,280	$50,602	$5,725	$27,084	$2,127	$5,551	$25,826	$1,675	$262,041	$5,385	93
$14,924	$695	$18,167	$8,926	$4,353	$620	$8,561	$15,369	$1,030	$298,966	$3,643	94
$49,484	$4,027	$63,921	$4,012	$18,961	$1,405	$9,962	$53,512	$1,806	$618,130	$6,900	95
$109,968	$2,683	$292,490	$12,476	$36,033	$2,288	$13,465	$61,519	$1,866	$1,897,405	$6,005	96
$22,421	$6,474	$44,088	$35,927	$29,664	$1,838	$3,250	$11,675	$4,273	$49,746	$8,408	97
$5,790,148	$560,097	$9,254,097	$911,668	$2,558,051	$111,052	$752,560	$3,731,068	$197,521	$62,965,076	$827,425	98
$3,981,874	$395,068	$8,144,216	$705,229	$1,887,933	$93,702	$507,663	$2,663,899	$128,839	$49,216,268	$610,418	99
$2,905,183	$195,193	$4,615,545	$200,598	$1,002,469	$40,279	$274,318	$1,813,518	$76,513	$25,369,048	$290,566	100
$1,086,392	$199,935	$3,528,671	$314,631	$885,471	$44,430	$232,845	$850,381	$52,326	$23,847,220	$319,852	101
$1,625,001	$164,442	$1,016,109	$204,573	$655,127	$17,300	$238,266	$1,045,021	$68,632	$13,286,016	$206,339	102
$897,254	$9,560	$261,204	$3,500	$37,984	$1,650	$16,244	$103,794	$1,600	$9,986,552	$600	103
$2,775	.....	$6,630	.....	$3,625	.....	.....	$1,600	.....	$4,953	.....	104
$614,669	$146,747	$678,114	$175,648	$605,195	$15,550	$195,959	$921,888	$59,904	$2,896,680	$178,506	105
$13,566	$6,050	$51,429	$10,886	$26,622	$100	$12,013	$8,867	$3,300	$271,429	$14,508	106
$64,861	$2,085	$13,569	$14,489	$77,586	.....	35,050	$2,828	$2,050	$21,254	$12,725	107
$31,876	.....	$5,163	$50	$4,115	.....	$10,000	$6,094	$1,778	$105,148	.....	108
$183,273	$587	$98,772	$1,866	$9,991	$50	$6,631	$22,148	$50	$462,792	$10,668	109
300,266	16,348	810,492	42,164	122,414	5,226	42,419	223,233	3,820	3,896,967	44,620	110
144,119	5,586	713,004	28,922	92,615	.....	.....	6,545	.....	3,006,426	18,150	111
156,147	10,762	97,488	13,242	29,799	5,226	42,419	216,688	3,820	890,541	26,470	112
5,000	502	200	.....	1,200	160	5,250	.....	.....	140,175	.....	113
95,660	1,080	329,153	9,380	53,008	1,750	.....	1,900	.....	460,867	24,490	114
908,478	142,702	1,862,856	62,109	650,349	10,517	158,900	367,021	25,000	12,607,099	197,706	115
452,329	6,610	1,378,586	6,495	255,935	500	5,260	28,950	500	16,927,062	12,050	116
4,550	.....	895,050	7,000	2,950	.....	.....	136,500	800	2,276,625	700	117
183,347	1,700	219,465	.....	9,682	.....	.....	2,251,500	2,300	1,311,300	8,350	118
622	178	940	89	538	35	88	298	42	1,477	200	119
44	18	92	11	32	9	14	49	3	207	26	120
9	8	33	6	9	.....	.....	4	.....	49	8	121
5	3	16	5	5	.....	.....	2	.....	26	7	122
4	.....	17	1	4	.....	.....	2	.....	23	1	123
35	10	59	5	23	9	14	45	8	158	18	124
7	.....	8	.....	2	3	2	5	.....	37	1	125
28	10	51	5	21	6	12	40	3	121	17	126
1	1	1	.....	1	1	2	.....	.....	8	.....	127
9	2	14	4	16	3	.....	2	.....	52	15	128
493	156	695	70	454	21	67	225	35	872	142	129
60	4	101	3	28	1	5	17	1	272	10	130
2	.....	14	1	3	.....	.....	4	1	35	1	131
13	2	23	.....	4	.....	.....	1	2	31	6	132
516	169	739	79	481	34	80	274	36	1,004	168	133
20	5	45	2	14	.....	2	6	4	79	22	134
11	1	22	5	9	.....	2	1	1	25	4	135
5	.....	11	.....	2	.....	.....	1	.....	56	2	136
21	.....	36	.....	9	.....	1	5	.....	111	1	137
6	.....	12	.....	3	.....	1	1	.....	51	.....	138
.....	.....	2	.....	.....	.....	.....	.....	.....	8	2	139
4	.....	18	.....	.....	.....	.....	.....	.....	19	.....	140

TABLE 58.—NEWSPAPERS AND PERIODICALS,

		Kentucky.	Louisiana.	Maine.	Maryland.	Massachusetts.	Michigan.
	Number of publications—Continued.						
	Total—Continued.						
	By character—Continued.						
141	Law	1			2		1
142	Science and mechanics		1	1	4	5	1
143	Fraternal organizations	3	1	3		7	5
144	Education and history	1		1		8	4
145	Society, art, music, and fashion		1			7	
146	College and school periodicals	3	3	4		5	3
147	Miscellaneous	5	3	3	5	16	4
	By language—						
148	Bohemian						
149	Bohemian and English						
150	Chinese						
151	Dutch						
152	English	276	148	172	156	477	659
153	Finnish			1			2
154	French		5	4		2	2
155	French and English		2			2	
156	Gaelic and English						
157	German	6	3		8	4	18
158	German and English						
159	German and Hebrew						
160	Hebrew				1		
161	Hungarian						
162	Indian and English						
163	Italian		1				
164	Lithuanian						
165	Polish				1	1	4
166	Portuguese						
167	Scandinavian						1
168	Slavonic, not specified						
169	Spanish		1				
170	Spanish and English						
171	Welsh and English						
172	All other						12
	Comparison of products:						
173	Number of establishments reporting for both years	164	92	102	86	341	421
174	Value for census year	$1,820,987	$1,374,251	$2,126,834	$2,313,372	$14,977,009	$4,487,583
175	Value for preceding business year	$1,600,687	$1,221,297	$1,929,250	$2,107,114	$14,670,010	$4,014,390
	Power:						
176	Number of establishments reporting	97	29	84	65	241	317
177	Total horsepower	1,147	578	786	1,143	4,199	2,845
	Owned—						
	Engines—						
178	Steam, number	25	7	39	42	80	119
179	Horsepower	470	172	418	870	1,885	1,589
180	Gas or gasoline, number	41	15	8	17	37	144
181	Horsepower	132	67	42	63	139	507
182	Water wheels, number	13	1	6	3	17	11
183	Horsepower	38	6	27	7	74	50
184	Electric motors, number	12		2	9	29	11
185	Horsepower	154		10	105	478	145
186	Other power, number	2		11	2	3	12
187	Horsepower	3		36	4	6	37
	Rented—						
188	Electric, horsepower	350	333	253	85	1,533	441
189	Other kind, horsepower				9	84	76
190	Furnished to other establishments, horsepower	18		7	78	18	23
	Establishments classified by number of persons employed, not including proprietors and firm members:						
191	Total number of establishments	248	134	120	141	396	591
192	No employees	16	10	5	4	28	45
193	Under 5	134	86	42	76	112	367
194	5 to 20	82	29	56	45	187	151
195	21 to 50	12	6	10	11	45	19
196	51 to 100	3	1	4	1	11	4
197	101 to 250	1	1	3	2	9	3
198	251 to 500		1		1	2	2
199	501 to 1,000				1	2	
200	1,001 to 5,000						

		North Dakota.	Ohio.	Oklahoma.	Oregon.	Pennsylvania.	Rhode Island.
1	Number of establishments	131	837	98	159	1,042	32
	Character of organization:						
2	Individual	104	472	61	103	632	15
3	Firm and limited partnership	16	186	28	32	246	6
4	Incorporated company	1	157	9	24	152	11
5	Miscellaneous		22			12	
	Capital:						
6	Total	$553,052	$11,327,865	$389,158	$1,312,263	$28,952,145	$930,593
7	Land	$26,680	$651,865	$17,980	$40,485	$2,366,820	$191,200
8	Buildings	$51,200	$1,103,821	$30,875	$584,975	$3,297,929	$89,984
9	Machinery, tools, and implements	$251,640	$5,557,691	$245,445	$454,129	$9,333,799	$429,993
10	Cash and sundries	$223,532	$4,014,488	$94,858	$232,674	$8,953,597	$219,416
11	Proprietors and firm members	137	863	115	167	1,169	30
	Salaried officials, clerks, etc.:						
12	Total number	45	1,456	41	72	3,028	44
13	Total salaries	$38,195	$1,277,427	$30,446	$86,931	$2,812,873	$51,969
	Officers of corporations—						
14	Number	15	179	16	14	199	6
15	Salaries	$15,541	$291,325	$16,440	$24,000	$443,910	$20,700
	General superintendents, managers, clerks, etc.—						
16	Total number	30	1,277	25	58	2,829	38
17	Total salaries	$22,654	$986,102	$14,006	$62,931	$2,368,963	$31,269
	Men—						
18	Number	29	994	21	46	2,235	28
19	Salaries	$22,354	$884,874	$12,906	$58,484	$2,139,354	$27,905
	Women—						
20	Number	1	283	4	12	594	10
21	Salaries	$300	$101,228	$1,100	$4,447	$229,609	$3,364

BY STATES AND TERRITORIES: 1900—Continued.

Minnesota.	Mississippi.	Missouri.	Montana.	Nebraska.	Nevada.	New Hampshire.	New Jersey.	New Mexico.	New York.	North Carolina.	
4		7		1					9		141
2		7		1					15		142
12		7	1	7	1		1		12		143
6		5					2		16		144
1		5		1			1		18		145
5	2	8		3			1	1	5	1	146
9	1	16	2	7		2	5		49		147
		1							2		148
											149
											150
											151
							1				152
564	178	897	86	508	35	86	272	31	1,879	200	153
1									2		154
1						2			3		155
											156
											157
20		31	3	18			19		48		158
1		1							3		159
		2									160
		1							6		161
									1		162
									3		163
							4		10		164
		2									165
1									2		166
											167
34		1		4					1		168
									1		169
		4					2	10	5		170
								1			171
									1		172
				8					10		173
481	105	564	47	314	16	60	192	20	967	114	174
$5,364,445	$376,353	$7,859,426	$764,378	$2,020,841	$70,064	$670,037	$3,239,273	$160,844	$58,581,182	$685,368	175
$4,756,531	$319,758	$7,033,884	$702,688	$1,740,612	$64,430	$653,719	$2,954,946	$140,991	$53,522,514	$696,545	
203	21	238	39	144	11	60	181	7	610	40	176
2,211	111	3,026	299	921	66	515	1,731	45	16,556	250	177
41	8	66	19	27	5	23	97	2	808	9	178
896	47	1,546	78	335	29	188	932	16	7,176	72	179
118	10	152	6	94	3	7	49	4	139	19	180
310	34	511	18	275	8	23	198	12	686	72	181
12	2	4	1	4	6	13	9	2	61		182
42	12	9	2	11	29	46	26	9	406		183
17		25		4			6		169		184
157		371		71			33		2,277		185
4		9		5			10		116		186
8		24		10			32		407		187
798	18	556	160	1		229	510		3,937	85	188
		9	41	218		29		8	1,667	21	189
									219		190
79	7	6	5	4							
560	165	814	78	492	29	75	261	35	1,206	165	191
43	16	69	10	53	2	2	11	2	64	7	192
389	121	527	47	366	22	33	106	22	521	105	193
104	24	176	15	62	5	33	115	8	434	45	194
14	4	28	3	6		4	22	3	100	7	195
4		6	2	2		3	6		35	1	196
3		6	1	3			1		37		197
3		2							10		198
									3		199
									2		200

South Carolina.	South Dakota.	Tennessee.	Texas.	Utah.	Vermont.	Virginia.	Washington.	West Virginia.	Wisconsin.	Wyoming.	
98	198	217	654	62	61	162	188	147	495	38	1
57	155	128	466	82	37	105	107	99	322	20	2
22	31	51	146	17	8	27	40	26	98	12	3
19	11	29	86	13	14	21	31	21	73	6	4
	1	9	6		2	9	10	1	2		5
$434,255	$637,839	$2,622,242	$2,479,078	$679,281	$500,698	$1,126,786	$796,114	$1,050,150	$4,390,988	$143,620	6
$22,550	$33,760	$119,386	$110,088	$62,850	$25,987	$34,000	$16,315	$60,325	$374,395	$3,960	7
$37,550	$75,185	$411,482	$266,980	$63,445	$52,208	$75,525	$23,565	$77,725	$814,413	$7,900	8
$226,582	$333,177	$1,066,170	$1,364,515	$260,144	$283,029	$625,534	$517,523	$506,580	$1,847,556	$91,050	9
$147,573	$195,767	$1,025,204	$737,590	$302,842	$139,474	$391,677	$238,711	$405,520	$1,354,624	$40,710	10
99	215	239	775	63	54	160	192	151	522	40	11
56	43	403	263	78	71	178	217	92	411	6	12
$42,631	$30,376	$329,140	$275,910	$67,769	$50,135	$107,831	$175,974	$73,207	$349,073	$5,644	13
17	6	54	31	12	10	22	12	16	79	2	14
$8,885	$6,110	$73,552	$61,125	$14,060	$10,461	$21,798	$27,080	$21,330	$105,145	$2,500	15
39	37	349	232	66	61	156	205	76	332	4	16
$33,746	$24,266	$255,588	$214,785	$53,709	$39,674	$86,033	$148,894	$51,877	$248,928	$3,144	17
34	30	284	199	54	49	133	188	67	267	4	18
$31,186	$21,374	$230,037	$197,957	$50,188	$35,304	$80,785	$188,178	$47,981	$223,149	$3,144	19
5	7	65	33	12	12	23	17	9	65		20
$2,560	$2,892	$25,551	$16,828	$3,526	$4,370	$5,248	$10,716	$3,896	$20,779		21

TABLE 58.—NEWSPAPERS AND PERIODICALS,

		North Dakota.	Ohio.	Oklahoma.	Oregon.	Pennsylvania.	Rhode Island.
	Wage-earners, including pieceworkers, and total wages:						
22	Greatest number employed at any one time during the year	392	7,068	500	718	10,478	519
23	Least number employed at any one time during the year	295	6,011	327	485	9,022	472
24	Average number	326	6,360	379	610	9,565	488
25	Wages	$143,096	$3,119,596	$139,021	$292,579	$5,094,769	$818,219
	Men, 16 years and over—						
26	Average number	263	4,907	313	417	7,841	442
27	Wages	$128,683	$2,784,987	$127,978	$287,151	$4,677,768	$801,929
	Women, 16 years and over—						
28	Average number	37	1,149	44	142	1,125	39
29	Wages	$11,707	$300,146	$8,238	$48,743	$345,945	$15,245
	Children, under 16 years—						
30	Average number	26	304	22	51	599	7
31	Wages	$2,706	$34,463	$2,805	$6,685	$71,056	$1,045
	Average number of wage-earners, including pieceworkers, employed during each month:						
	Men, 16 years and over—						
32	January	261	4,957	319	425	8,002	439
33	February	262	4,958	327	412	7,831	443
34	March	267	4,959	332	420	7,872	439
35	April	268	4,996	312	422	7,890	445
36	May	267	4,955	305	446	7,799	444
37	June	265	4,825	279	417	7,682	443
38	July	238	4,738	292	395	7,613	442
39	August	244	4,752	304	385	7,613	443
40	September	267	4,828	318	399	7,764	440
41	October	276	4,934	310	404	7,956	439
42	November	272	4,960	324	434	8,009	440
43	December	272	5,009	335	447	8,063	441
	Women, 16 years and over—						
44	January	43	1,214	46	149	1,157	38
45	February	43	1,215	45	142	1,146	40
46	March	35	1,212	47	150	1,185	41
47	April	35	1,166	43	138	1,181	40
48	May	37	1,139	45	141	1,155	40
49	June	37	1,079	38	139	1,086	38
50	July	36	1,063	42	136	1,060	38
51	August	35	1,061	41	132	1,059	38
52	September	35	1,094	40	135	1,076	38
53	October	34	1,160	47	147	1,109	39
54	November	35	1,167	44	146	1,131	39
55	December	33	1,225	44	155	1,152	39
	Children, under 16 years—						
56	January	26	309	18	52	608	7
57	February	25	315	25	51	605	7
58	March	26	314	26	58	608	7
59	April	27	314	24	56	617	7
60	May	27	315	25	56	593	7
61	June	26	300	26	51	593	7
62	July	25	293	22	49	586	7
63	August	25	292	21	45	588	7
64	September	25	296	18	47	590	7
65	October	25	302	21	46	597	7
66	November	26	308	22	47	606	7
67	December	26	294	22	51	608	7
	Compositors (included in wage-earners)—						
68	Men, 16 years and over	202	2,609	161	262	4,160	159
69	Women, 16 years and over	17	716	23	105	484	24
70	Children, under 16 years	6	97	2	1	187	62
	Compositors operating type-casting or typesetting machines—						
71	Men	17	336	15	29	606	58
72	Women	1	17	3	9	26	4
73	Type-casting and typesetting machines used, number	11	281	1	17	497	34
	Miscellaneous expenses:						
74	Total	$50,920	$1,783,296	$20,782	$140,280	$3,621,281	$122,974
75	Rent of works	$14,221	$184,756	$6,875	$18,415	$388,907	$15,772
76	Taxes	$3,389	$60,616	$2,825	$7,030	$79,411	$5,348
77	Newspaper and periodical postage	$5,098	$242,673	$3,337	$15,316	$340,953	$4,099
78	Rent of offices, interest, insurance, and all sundry expenses not hitherto included.	$24,028	$910,646	$7,095	$68,380	$1,860,480	$87,263
79	Contract work	$3,684	$334,605	----------	$31,139	$951,530	$10,492
	Materials used:						
80	Aggregate cost	$119,002	$2,883,006	$118,193	$240,113	$5,969,788	$166,091
	Paper—						
81	Total pounds	1,662,800	73,544,764	1,407,298	4,276,251	155,846,813	5,564,505
82	Total cost	$78,122	$2,179,374	$91,516	$178,040	$4,645,709	$129,360
83	News, pounds	1,265,721	67,482,155	658,806	3,826,432	125,527,046	5,316,716
84	Cost	$42,141	$1,328,585	$27,141	$100,777	$2,726,880	$111,322
85	Periodical, pounds	25,550	7,788,563	7,622	183,299	14,811,777	42,680
86	Cost	$1,212	$293,976	$504	$11,027	$797,026	$2,307
87	Book and periodical, pounds	6,920	2,811,845	112,980	189,640	7,941,000	71,850
88	Cost	$412	$120,440	$6,092	$11,741	$448,785	$4,270
89	Job printing, pounds	364,609	5,462,201	627,890	576,880	8,066,990	133,259
90	Cost	$34,357	$436,373	$57,779	$54,495	$673,018	$11,461
91	Ink, pounds	14,076	787,257	8,601	64,399	1,958,268	59,233
92	Cost	$3,551	$92,325	$2,558	$9,115	$175,657	$3,555
93	Fuel	$6,248	$68,717	$4,264	$7,132	$130,909	$4,187
94	Rent of power and heat	$1,646	$34,825	$582	$4,906	$73,703	$6,727
95	Office supplies	$4,677	$128,590	$3,827	$6,414	$349,186	$2,376
96	All other materials	$15,876	$338,196	$4,947	$28,030	$544,211	$18,400
97	Freight	$3,882	$40,979	$5,499	$6,476	$50,413	$1,486
	Products:						
98	Total value	$587,889	$12,189,640	$481,663	$1,078,337	$23,249,080	$940,806
99	Newspaper products	$420,195	$9,643,982	$250,681	$825,455	$18,364,367	$866,401
100	Advertising	$259,041	$4,863,620	$138,587	$463,172	$10,741,028	$555,503
101	Subscriptions and sales	$161,154	$4,780,362	$112,144	$362,283	$7,623,339	$310,898
102	Book and job printing products	$150,605	$2,441,641	$225,377	$226,327	$4,679,371	$72,255
103	Book and pamphlet publications	$5,052	$702,351	$7,594	$13,223	$2,129,568	$10,611
104	Sheet music and books of music	----------	$59,018	----------	----------	$74,058	----------
105	Job printing	$133,458	$1,490,416	$175,912	$180,883	$2,326,634	$61,544
106	Bookbinding	$4,860	$108,799	$14,341	$5,776	$73,255	$100
107	Blank books	$7,225	$5,946	$27,530	$26,165	$19,319	----------
108	Electrotyping, engraving, etc	$10	$75,112	----------	$280	$56,537	----------
109	All other products	$17,089	$104,017	$5,605	$26,555	$205,342	$2,150

BY STATES AND TERRITORIES: 1900—Continued.

South Carolina.	South Dakota.	Tennessee.	Texas.	Utah.	Vermont.	Virginia.	Washington.	West Virginia.	Wisconsin.	Wyoming.	
464	511	1,055	2,139	501	509	865	748	797	3,003	110	22
398	414	890	1,802	409	405	773	548	665	2,523	80	23
413	422	951	1,829	431	436	771	626	707	2,679	86	24
$156,924	$164,456	$456,418	$916,029	$235,174	$176,748	$388,618	$315,500	$295,413	$1,174,242	$47,840	25
368	276	697	1,453	344	280	635	535	501	1,954	69	26
$149,400	$133,544	$395,188	$852,564	$216,994	$133,532	$315,928	$291,216	$250,106	$1,018,634	$42,492	27
27	48	152	99	52	144	48	50	140	519	10	28
$6,128	$16,928	$47,887	$29,899	$14,496	$41,445	$13,065	$18,924	$37,812	$135,228	$4,492	29
18	98	102	277	35	12	88	41	66	206	7	30
$1,396	$13,984	$13,343	$33,566	$3,684	$1,771	$9,625	$5,360	$7,495	$20,380	$856	31
383	278	704	1,472	347	287	648	539	501	1,969	72	32
376	274	705	1,470	341	290	644	530	508	1,961	69	33
375	274	709	1,463	362	290	643	553	501	1,975	68	34
375	279	709	1,452	336	288	652	550	506	1,999	69	35
372	277	709	1,444	351	286	648	548	507	1,967	69	36
355	279	704	1,375	347	281	612	534	504	1,947	70	37
355	275	689	1,363	326	271	603	523	498	1,901	66	38
356	265	656	1,389	322	267	605	520	493	1,890	65	39
358	272	672	1,445	338	272	620	524	499	1,917	70	40
365	278	705	1,497	348	275	636	519	497	1,945	67	41
369	279	702	1,517	344	280	650	518	499	1,986	69	42
375	284	701	1,550	360	275	662	556	497	1,994	70	43
27	51	150	104	51	144	51	49	139	528	11	44
27	48	149	100	52	151	51	48	136	526	11	45
27	47	155	100	57	149	51	55	137	525	9	46
27	48	160	99	59	152	49	54	142	525	10	47
27	47	160	103	57	149	47	51	145	519	10	48
27	48	159	95	51	144	47	49	146	511	9	49
26	46	161	93	47	137	43	49	137	498	9	50
28	45	146	90	47	139	44	50	136	500	9	51
28	49	142	94	45	140	49	50	137	509	10	52
28	48	154	99	50	137	47	50	139	520	10	53
27	49	147	101	54	138	47	50	142	531	10	54
26	48	145	107	55	148	47	49	142	533	10	55
19	105	101	285	34	12	86	41	65	207	7	56
19	105	102	282	36	13	86	42	66	207	7	57
19	102	101	283	36	13	87	42	66	206	7	58
18	98	101	279	35	12	97	42	66	204	7	59
18	96	98	280	35	13	97	43	66	204	7	60
18	94	96	266	32	12	86	41	67	200	7	61
18	92	96	268	33	12	84	41	64	201	7	62
18	94	96	267	33	12	84	41	64	201	7	63
18	95	104	275	36	12	85	40	65	208	7	64
18	96	107	277	35	12	85	41	67	206	7	65
18	100	109	283	36	12	93	41	69	210	7	66
18	99	112	284	38	13	92	41	66	212	7	67
260	242	539	996	134	176	411	322	276	1,144	51	68
22	39	98	94	23	105	30	38	93	352	10	69
.....	12	59	136	.....	.....	8	22	18	18	.....	70
.....	.....	60	90	25	12	63	50	35	119	9	71
.....	.....	15	.....	3	5	1	1	4	7	.....	72
16	7	59	15	24	10	43	33	29	61	6	73
$40,367	$55,504	$300,890	$391,325	$92,129	$53,113	$167,482	$202,906	$75,561	$462,784	$12,806	74
$9,230	$13,580	$26,212	$67,211	$11,147	$9,717	$23,169	$32,246	$16,674	$72,108	$5,230	75
$3,631	$4,644	$9,698	$15,796	$3,068	$2,783	$5,322	$4,518	$4,065	$21,502	$1,383	76
$7,101	$5,851	$46,941	$52,484	$14,126	$6,374	$19,728	$15,376	$13,128	$95,210	$916	77
$17,800	$26,163	$131,747	$190,631	$57,144	$25,639	$75,835	$95,642	$40,261	$205,581	$3,934	78
$2,545	$5,266	$86,292	$65,203	$6,644	$8,600	$43,428	$55,124	$1,433	$68,433	$1,343	79
$97,776	$127,066	$446,540	$631,382	$188,290	$115,285	$212,821	$206,540	$187,513	$902,588	$32,308	80
1,849,953	1,569,169	9,786,819	11,075,808	2,424,121	1,943,599	4,581,295	4,505,960	2,916,238	17,383,974	302,462	81
$74,354	$83,156	$351,186	$469,005	$93,803	$85,925	$170,265	$156,231	$146,307	$633,720	$20,542	82
1,431,464	1,144,559	7,029,904	9,315,392	2,050,961	1,295,780	3,651,782	4,016,211	2,023,297	12,747,208	173,132	83
$42,344	$45,884	$184,628	$320,943	$61,542	$39,013	$105,628	$113,981	$66,497	$336,153	$7,580	84
66,440	43,585	1,442,474	304,581	99,260	6,940	276,250	84,190	93,636	827,688	2,580	85
$2,897	$2,311	$63,420	$15,296	$6,647	$350	$13,051	$5,447	$4,954	$42,172	$193	86
105,764	32,713	459,580	82,635	78,015	55,334	169,860	37,820	136,725	400,603	20,600	87
$6,290	$1,901	$23,615	$5,371	$5,922	$3,005	$8,602	$2,382	$6,499	$21,778	$1,300	88
246,285	348,312	854,861	1,373,200	195,885	585,545	483,403	367,739	662,580	3,408,475	106,200	89
$22,823	$33,060	$79,523	$127,395	$19,692	$43,557	$42,984	$34,421	$68,357	$233,617	$11,469	90
24,643	18,073	121,600	111,911	22,981	27,520	52,560	49,038	29,513	210,381	3,235	91
$3,659	$4,090	$14,017	$16,658	$3,922	$3,372	$5,772	$5,627	$5,753	$30,249	$827	92
$3,594	$9,462	$15,733	$20,037	$2,727	$4,043	$7,380	$4,808	$5,471	$71,717	$3,175	93
$2,812	$2,038	$5,787	$11,604	$5,192	$5,033	$6,946	$11,050	$1,876	$21,174	$248	94
$3,123	$5,889	$14,745	$57,081	$4,135	$3,179	$7,388	$9,695	$5,837	$25,965	$1,319	95
$4,224	$11,233	$34,702	$31,780	$20,019	$3,634	$9,367	$11,360	$13,458	$94,214	$2,574	96
$6,010	$11,198	$10,370	$25,217	$8,492	$5,099	$5,703	$7,769	$8,811	$25,549	$3,623	97
$510,529	$633,125	$2,205,112	$3,387,410	$593,562	$546,991	$1,145,577	$1,321,044	$907,156	$4,103,415	$157,789	98
$416,594	$475,668	$1,715,886	$2,864,387	$455,498	$371,110	$907,025	$1,178,721	$576,493	$2,900,231	$108,851	99
$198,422	$245,737	$761,785	$1,600,616	$234,087	$200,307	$510,729	$772,517	$282,845	$1,414,475	$62,150	100
$218,172	$229,931	$954,101	$1,263,771	$221,411	$170,803	$396,296	$406,204	$293,648	$1,485,756	$46,701	101
$93,892	$146,437	$414,473	$486,172	$133,283	$171,554	$227,975	$131,737	$318,122	$1,116,487	$48,098	102
$15,852	$5,245	$86,982	$16,986	$42,378	$51,950	$58,354	$2,609	$11,921	$207,574	$11,710	103
.....	$1,125	$14,000	$4,513	$600	$772	.....	.....	$2,350	$1,637	.....	104
$72,940	$130,967	$245,984	$462,086	$72,139	$118,742	$163,526	$128,397	$276,537	$870,382	$36,388	105
$2,500	$5,225	$51,090	$1,922	$15,089	.....	$5,810	$250	$19,512	$29,889	.....	106
$2,000	$3,850	$3,115	$500	$2,639	$40	$280	$466	$7,777	$6,579	.....	107
$100	$25	$13,302	$165	$438	$50	$5	$15	$25	$426	.....	108
$548	$11,020	$74,753	$36,851	$4,781	$4,327	$10,577	$10,586	$12,541	$86,697	$840	109

TABLE 58.—NEWSPAPERS AND PERIODICALS,

		North Dakota.	Ohio.	Oklahoma.	Oregon.	Pennsylvania.	Rhode Island.
	Aggregate circulation per issue:						
110	Daily	18,021	1,224,715	14,674	51,191	1,917,426	118,844
111	Including Sunday	10,600	494,512	14,674	42,433	987,931	72,200
112	Except Sunday	7,421	730,203	.....	8,758	929,495	46,644
113	Triweekly	.....	13,300	.....	.....	8,206	100
114	Semiweekly	7,100	211,161	800	14,810	282,142	6,754
115	Weekly	106,219	2,411,172	99,953	166,511	3,691,954	37,671
116	Monthly	7,550	1,420,501	4,150	75,038	3,246,779	4,225
117	Quarterly	.....	1,795,609	.....	.....	1,991,819	3,000
118	All other classes	.....	390,900	500	4,400	142,041	.....
	Number of publications:						
119	Total	139	1,039	110	188	1,365	40
	By period of issue—						
120	Daily	9	170	9	21	196	12
121	Including Sunday	4	30	9	9	21	2
122	Morning	4	17	2	7	14	1
123	Evening	.....	13	7	2	7	1
124	Except Sunday	5	140	.....	12	175	10
125	Morning	.....	7	.....	2	38	2
126	Evening	5	133	.....	10	137	8
127	Triweekly	.....	8	.....	.....	5	1
128	Semiweekly	2	53	1	14	47	3
129	Weekly	126	692	96	124	883	21
130	Monthly	2	90	3	27	178	2
131	Quarterly	.....	15	.....	.....	42	1
132	All other classes	.....	11	1	2	14	.....
	By character—						
133	News, politics, and family reading	138	880	106	137	1,008	30
134	Religion	.....	55	2	11	164	3
135	Agriculture, horticulture, dairying, and stock raising	.....	8	.....	7	14	1
136	Commerce, finance, insurance, and railroads	.....	10	.....	3	20	.....
137	Trade journals	.....	29	.....	7	45	3
138	General literature, including magazines	.....	9	1	2	22	1
139	Sunday newspapers	.....	3	.....	.....	15	.....
140	Medicine and surgery	.....	5	1	1	11	.....
141	Law	.....	6	.....	1	6	.....
142	Science and mechanics	.....	1	.....	.....	7	.....
143	Fraternal organizations	.....	7	.....	10	12	.....
144	Education and history	.....	3	.....	3	4	.....
145	Society, art, music, and fashion	.....	5	.....	1	9	.....
146	College and school periodicals	1	9	.....	2	6	1
147	Miscellaneous	.....	9	.....	3	22	1
	By language—						
148	Bohemian	.....	5	.....	.....	.....	.....
149	Bohemian and English	.....	.....	.....	.....	.....	.....
150	Chinese	.....	.....	.....	.....	.....	.....
151	Dutch	.....	.....	.....	.....	.....	.....
152	English	132	945	109	185	1,277	37
153	Finnish	.....	.....	.....	1	.....	.....
154	French	.....	.....	.....	.....	1	3
155	French and English	.....	.....	.....	.....	.....	.....
156	Gaelic and English	.....	.....	.....	.....	3	.....
157	German	3	81	1	1	51	.....
158	German and English	.....	1	.....	.....	5	.....
159	German and Hebrew	.....	.....	.....	.....	1	.....
160	Hebrew	.....	.....	.....	.....	1	.....
161	Hungarian	.....	1	.....	.....	.....	.....
162	Indian and English	.....	.....	.....	.....	.....	.....
163	Italian	.....	.....	.....	.....	3	.....
164	Lithuanian	.....	.....	.....	.....	5	.....
165	Polish	.....	5	.....	.....	7	.....
166	Portuguese	.....	.....	.....	.....	.....	.....
167	Scandinavian	.....	.....	.....	1	1	.....
168	Slavonic, not specified	.....	.....	.....	.....	3	.....
169	Spanish	.....	1	.....	.....	2	.....
170	Spanish and English	.....	.....	.....	.....	.....	.....
171	Welsh and English	.....	.....	.....	.....	.....	.....
172	All other	4	.....	.....	.....	5	.....
	Comparison of products:						
173	Number of establishments reporting for both years	75	626	61	122	814	28
174	Value for census year	$355,153	$10,808,196	$381,065	$956,955	$21,534,388	$886,436
175	Value for preceding business year	$306,923	$9,898,415	$324,682	$813,413	$19,466,718	$824,350
	Power:						
176	Number of establishments reporting	33	509	22	49	654	23
177	Total horsepower	156	5,573	99	342	10,388	639
	Owned—						
	Engines—						
178	Steam, number	6	138	2	12	324	12
179	Horsepower	33	2,910	15	160	6,150	252
180	Gas or gasoline, number	26	276	21	7	212	.....
181	Horsepower	80	1,239	84	27	925	.....
182	Water wheels, number	4	21	.....	15	20	3
183	Horsepower	13	91	.....	43	93	10
184	Electric motors, number	2	56	.....	.....	78	.....
185	Horsepower	8	310	.....	.....	1,123	.....
186	Other power, number	.....	23	.....	.....	73	.....
187	Horsepower	.....	82	.....	.....	178	.....
	Rented—						
188	Electric, horsepower	19	794	.....	108	1,591	156
189	Other kind, horsepower	3	147	.....	4	328	221
190	Furnished to other establishments, horsepower	131	837	98	159	1,042	32
	Establishments classified by number of persons employed, not including proprietors and firm members:						
191	Total number of establishments	.....	35	.....	.....	10	.....
192	No employees	20	43	5	21	48	2
193	Under 5	86	435	67	85	498	9
194	5 to 20	23	277	22	47	387	13
195	21 to 50	2	52	2	5	67	7
196	51 to 100	.....	15	1	.....	17	.....
197	101 to 250	.....	12	1	1	18	1
198	251 to 500	.....	3	.....	.....	6	.....
199	501 to 1,000	.....	.....	.....	.....	1	.....
200	1,001 to 5,000	.....	.....	.....	.....	.....	.....

BY STATES AND TERRITORIES: 1900—Continued.

South Carolina.	South Dakota.	Tennessee.	Texas.	Utah.	Vermont.	Virginia.	Washington.	West Virginia.	Wisconsin.	Wyoming.	
18,850	16,463	165,718	147,602	24,163	26,699	92,370	84,570	43,577	213,882	3,300	110
13,600	6,000	58,168	96,989	15,538	.....	67,995	35,250	26,200	104,592	1,200	111
5,250	10,463	107,550	50,618	8,625	26,699	24,375	49,320	17,377	109,290	2,100	112
200	.....	.....	.....	2,000	.....	3,100	500	.....	1,000	500	113
23,327	1,600	7,700	101,392	30,630	8,400	13,030	7,850	4,900	161,995	985	114
110,111	151,488	1,136,199	782,867	36,036	107,597	291,690	161,990	169,936	771,574	20,902	115
8,000	34,400	270,150	61,400	13,800	35,250	96,890	41,418	6,400	189,948	7,000	116
.....	.....	1,540,900	1,250	150	300	120,500	5,300	.....	69,600	.....	117
1,500	28,265	10,350	10,250	16,500	10,400	9,700	5,500	1,200	18,500	.....	118
117	218	251	722	72	79	204	199	176	595	42	119
7	16	16	83	6	9	37	15	19	60	4	120
8	3	7	34	2	.....	16	7	6	13	1	121
3	3	7	20	2	.....	13	6	4	11	1	122
.....	.....	.....	14	.....	.....	3	1	2	2	.....	123
4	13	9	49	4	9	21	8	13	47	8	124
.....	1	2	2	.....	2	2	2	2	4	.....	125
4	12	7	47	4	7	19	6	11	43	3	126
1	.....	.....	.....	1	.....	3	1	.....	1	1	127
15	1	6	22	7	2	6	3	4	21	2	128
83	189	187	579	49	53	126	154	141	463	32	129
10	9	28	33	4	10	28	21	11	42	3	130
.....	.....	10	1	2	1	6	2	.....	5	.....	131
1	3	4	4	3	4	3	3	1	3	.....	132
100	203	198	648	55	63	153	152	165	527	40	133
9	.....	32	25	6	3	32	8	5	17	.....	134
3	3	5	12	3	4	4	5	3	5	1	135
.....	1	.....	.....	.....	.....	.....	9	.....	1	.....	136
1	2	3	9	.....	1	3	1	.....	5	.....	137
.....	1	1	1	.....	2	.....	2	.....	7	1	138
.....	.....	.....	6	.....	.....	2	.....	.....	3	.....	139
.....	.....	3	1	.....	1	2	1	.....	2	.....	140
.....	.....	.....	1	3	.....	1	1	.....	1	.....	141
.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	142
.....	3	3	.....	2	.....	1	9	2	3	.....	143
.....	4	2	3	.....	.....	1	3	.....	7	.....	144
.....	.....	.....	2	.....	.....	.....	1	.....	2	.....	145
4	.....	3	6	2	3	5	3	1	3	.....	146
.....	.....	1	8	1	2	.....	4	.....	12	.....	147
.....	.....	.....	1	.....	.....	.....	.....	.....	5	.....	148
.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	149
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	150
.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	151
116	211	249	692	70	79	201	196	171	486	42	152
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	153
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	154
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	155
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	156
1	5	2	19	1	.....	3	2	5	79	.....	157
.....	.....	.....	2	.....	.....	.....	.....	.....	2	.....	158
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	159
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	160
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.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	166
.....	2	.....	.....	1	.....	.....	1	.....	20	.....	167
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	168
.....	.....	.....	6	.....	.....	.....	.....	.....	.....	.....	169
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	170
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	171
.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	172
59	120	155	402	40	50	116	26	78	373	23	173
$318,322	$454,867	$1,644,398	$2,742,924	$545,378	$491,716	$967,089	$1,054,091	$596,829	$3,455,364	$111,786	174
$262,440	$387,758	$1,400,586	$2,444,512	$445,510	$455,106	$879,850	$928,466	$481,712	$3,108,786	$90,905	175
27	55	50	157	13	45	61	57	59	269	14	176
137	228	851	1,132	168	263	369	380	407	1,830	57	177
11	11	26	41	5	8	19	8	28	58	1	178
52	55	436	572	60	51	174	47	170	781	6	179
15	35	14	92	1	7	12	12	21	129	10	180
48	103	51	274	3	22	35	33	149	394	31	181
.....	5	3	.....	.....	6	5	14	14	21	.....	182
.....	17	11	.....	.....	22	22	69	62	62	.....	183
.....	.....	11	4	.....	.....	.....	1	1	10	.....	184
.....	.....	146	44	.....	.....	.....	2	7	38	.....	185
.....	2	1	.....	.....	11	6	2	5	15	1	186
.....	4	1	.....	.....	53	11	7	18	29	13	187
37	45	184	242	100	111	127	222	1	526	7	188
.....	4	22	.....	.....	4	.....	.....	.....	.....	.....	189
.....	.....	.....	.....	.....	.....	.....	.....	.....	40	.....	190
98	198	217	654	62	61	162	188	147	495	38	191
4	15	28	67	8	6	9	45	8	29	5	192
68	152	143	452	36	18	98	113	99	295	25	193
28	29	31	121	13	30	44	26	35	148	8	194
2	2	6	10	1	5	9	1	.....	15	.....	195
1	.....	7	4	2	2	2	1	5	4	.....	196
.....	.....	2	.....	2	.....	.....	2	.....	3	.....	197
.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	198
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	199
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
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