Twelfth Census of the United States.

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MANUFACTURES.

BICYCLES AND TRICYCLES.

Hon. WILLIAM R. MERRIAM,
Director of the Census.

SIR: I transmit herewith, for publication in bulletin form, a report on the manufacture of bicycles and tricycles for the census year 1900, prepared under my direction by Mr. Axel Josephsson, of the Census Office.

The statistics included in the report were collected, as in the previous census, upon the schedule used for general statistics of manufactures. But owing to the extraordinary development of the bicycle industry during the last decade, it was decided to supplement the canvass made by the enumerators and local special agents with a special report. The manufacture of bicycles and tricycles was first reported as a separate industry at the census of 1890, and this is the first time it is made the subject of a special report.

The accompanying bulletin presents, in addition to the statistics collected at the census of 1900, a concise history of the bicycle and its manufacture. It is a noteworthy fact that, while previous to 1890 most of the bicycles used in America were imported from England, now the American manufacturer annually exports hundreds of thousands.

The statistics are presented in 9 tables: Table 1 showing the comparative figures for the industry at the censuses of 1890 and 1900; Table 2 showing, by states, the number of establishments in operation in 1890 and 1900, and the increase during the decade; Table 3 showing statistics for the industry by states for 1900; Table 4 showing a summary of the number of establishments, capital, and product by geographical divisions for 1900; Table 5 showing statistics of capital for 1890 and 1900; Table 6 showing the kinds, quantity, and value of products manufactured in the factories engaged exclusively in the manufacture of cycles for 1900; Table 7 showing the number of establishments reporting cycles as a by-product and the quantity and value of their cycle product, 1900; Table 8 showing the combined quantity and value of products shown in Tables 6 and 7, the per cent of each kind to the total number, and of the value of each kind to the total value; and Table 9 presenting the detailed statistics for the industry, by states, for 1900.

As the methods of taking the censuses of 1890 and 1900 were almost identical, with the exceptions noted below, the rate of growth in the manufacture of bicycles and tricycles may be practically inferred from the figures given in Table 1. In drafting the schedules of inquiry for the census of 1900 care was taken to preserve the basis of comparison with the prior census. Comparison may be made safely with respect to all the items of inquiry except those relating to salaried officials, clerks, etc., and their salaries, the average number of employees, and the total amount of wages paid.

Changes were made in the inquiries relating to employees and wages in order to eliminate defects found to exist on the form of inquiry adopted in 1890. At the census of 1890 the average number of persons employed during the entire year was called for, and also the average number employed at stated weekly rates of pay, and the average number was computed for the actual time the establishments were reported as being in opera-

tion. At the census of 1900 the greatest and least numbers of employees were reported, and also the average number employed during each month of the year. The average number of wage-earners (men, women, and children) employed during the entire year was ascertained by using 12, the number of calendar months, as a divisor into the total of the average numbers reported for each month. This difference in the method of ascertaining the average number of wage-earners during the entire year may have resulted in a variation in the number, and should be considered in making comparisons.

At the census of 1890 the number and salaries of proprietors and firm members actively engaged in the business or in supervision were reported, combined with clerks and other officials. In cases where proprietors and firm members were reported without salaries, the amount that would ordinarily be paid for similar services was estimated. At the census of 1900 only the number of proprietors and firm members actively engaged in the industry or in supervision was ascertained, and no salaries were reported for this class. It is therefore impossible to compare the number and salaries of salaried officials of any character for the two censuses.

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

The number of proprietors and firm members, shown in the accompanying tables, falls short of the number of establishments reported. This is accounted for by the fact that no proprietors or firm members are reported for corporations or cooperative establishments. The number of salaried officials, clerks, etc., is the greatest number reported employed at any one time during the year.

The reports for 1900 show a capital of $29,783,659 invested in the manufacture of bicycles and tricycles in the 312 establishments reporting for the United States. This sum represents the value of land, buildings, machinery, tools, and implements, and the live capital utilized, but does not include the capital stock of any of the corporations engaged in this industry. The value of the product is returned at $31,915,908, to produce which involved an outlay of $1,753,235 for salaries of officials, clerks, etc.; $8,189,817 for wages; $2,252,604 for miscellaneous expenses, including rent, taxes, etc.; and $16,792,051 for materials used, mill supplies, freight, and fuel. It is not to be assumed, however, that the difference between the aggregate of these sums and the value of the products is, in any sense, indicative of the profits in the manufacture of bicycles and tricycles during the census year. The census schedule takes no cognizance of the cost of selling manufactured articles, or of interest on capital invested, or of the mercantile losses incurred in the business, or of depreciation in plant. The value of the product given is the value as obtained or fixed at the works. This statement is necessary in order to avoid erroneous conclusions from the figures presented.

The statistics contained in this report, it should be noted, do not include the reports from the 6,328 establishments engaged in bicycle and tricycle repairing, which returned products to the value of $13,766,033. The general statistics for these establishments will be found in the Report on Manufactures, Parts I and II, under the classification "Bicycle and tricycle repairing."

Very respectfully,

Chief Statistician for Manufactures.

BICYCLES AND TRICYCLES.

By Axel Josephsson.

Table 1 is a comparative summary of the statistics for the cycle industry as returned at the censuses of 1890 and 1900, with the percentages of increase for the decade.

Table 1.—COMPARATIVE SUMMARY, 1890 AND 1900, WITH PER CENT OF INCREASE FOR THE DECADE.

	1900	1890	Per cent of increase.
Number of establishments	312	27	1,055.6
Capital	$29,783,659	$2,058,072	1,347.2
Salaried officials, clerks, etc., number	2,034	[1]128	1,489.1
Salaries	$1,753,235	[1]$123,714	1,317.2
Wage-earners, average number	17,525	1,797	875.3
Total wages	$8,189,817	$982,014	734.0
Men, 16 years and over	16,700	1,747	855.9
Wages	$7,952,257	$971,539	718.5
Women, 16 years and over	517	15	3,346.7
Wages	$175,028	$3,729	4,593.7
Children, under 16 years	308	35	780.0
Wages	$62,532	$6,746	826.9
Miscellaneous expenses	$2,252,604	$242,018	830.8
Cost of materials used	$16,792,051	$718,848	2,236.0
Value of products	$31,915,908	$2,568,326	1,142.7

[1] Includes proprietors and firm members, with their salaries; number only reported in 1900. (See Table 9.)

The census of 1890 was the first at which the manufacture of bicycles and tricycles was returned as a separate industry. Previous to the decade ending with 1880 the manufacture of cycles was spasmodic and intermittent, the only important periods being in 1819 and 1869. In the censuses prior to 1890 the statistics of the manufacture of cycles were included with those for carriages and wagons. The comparative figures presented in Table 1 cover, therefore, only the period from 1890 to 1900. During this decade, taken as a whole, the industry made extraordinary progress; but the climax was reached about the middle of the period, and since then there has been a decided decline.

During the decade from 1890 to 1900 the number of establishments increased from 27 to 312, or 285; capital from $2,058,072 to $29,783,659, or $27,725,587; the number of wage-earners from 1,797 to 17,525, or 15,728; their wages from $982,014 to $8,189,817, or $7,207,803; miscellaneous expenses from $242,018 to $2,252,604, or $2,010,586; the cost of materials used from $718,848 to $16,792,051, or $16,073,203; and the value of products from $2,568,326 to $31,915,908, or $29,347,582.

The average capital, which in 1890 was $76,225, had in 1900 increased to $95,460. This increase in the average capital is a consequence of the crisis at the end of the decade, when many of the smaller concerns were forced out of the business. It is to be noted that each of the 35 plants belonging to the American Bicycle Company reported as an individual establishment. The cost of materials used shows the largest percentage of increase. In 1890 it was $718,848, or 28 per cent of the product, and in 1900 $16,792,051, or 52.6 per cent. Of this amount $16,161,638, or 96.2 per cent, was expended for principal materials, and $630,413, or 3.8 per cent, for fuel, freight, etc. This increase in the proportion between materials and product was largely caused by the keen competition among cycle manufacturers and the attendant decrease in prices of finished products.

Table 2 presents, by states, the number of active establishments from which returns were received in 1890 and 1900 and the increase during the decade.

Table 2.—COMPARATIVE SUMMARY: NUMBER OF ACTIVE ESTABLISHMENTS IN 1890 AND 1900, WITH INCREASE, BY STATES, ARRANGED GEOGRAPHICALLY.

STATES.	1900	1890	Increase.
United States	312	27	285
New England states	55	9	46
Maine	1	.....	1
New Hampshire	1	.....	1
Massachusetts	25	7	18
Rhode Island	4	.....	4
Connecticut	24	2	22
Middle states	98	8	90
New York	66	4	62
New Jersey	7	1	6
Pennsylvania	24	3	21
Maryland	1	.....	1
Southern states	1	.....	1
Kentucky	1	.....	1
Central states	152	9	143
Ohio	34	2	32
Michigan	11	1	10
Indiana	19	1	18
Illinois	60	5	55
Wisconsin	23	.....	23
Minnesota	4	.....	4
Iowa	1	.....	1
Western states	2	.....	2
Nevada	1	.....	1
Colorado	1	.....	1
Pacific states	4	1	3
Oregon	.....	1	[1]1
California	4	.....	4

[1] Decrease.

Table 2 shows the territorial extension of the industry. In 1890 it was carried on in 10 states by 27 establishments; in 1900 it had extended into 20 states, with 312 establishments. The greatest gain was shown in New York, where the number of establishments increased from 4 in 1890 to 66 in 1900, of which 7 were established during the census year. Illinois followed next with an increase of 55, of which 5 were established in the census year; and then Ohio with a gain of 32. Other states showing a large increase in number of establishments were Wisconsin from none to 23, Connecticut 2 to 24, Pennsylvania 3 to 24, Indiana 1 to 19, and Massachusetts 7 to 25. Oregon was the only state which showed a decrease, having 1 in 1890 and none in 1900. Twenty-two of the 285 plants were added during the census year. In 1900, in addition to the 312 active establishments, there were 5, having a capital of $103,500, reported as idle.

Table 3 is a summary, by states, of the general statistics of the industry for 1900.

TABLE 3.—SUMMARY BY STATES: 1900.

	United States.	California.	Connecticut.	Illinois.	Indiana.	Massachusetts.	Michigan.
Number of establishments	312	4	24	60	19	25	11
Capital	$29,783,659	$19,254	$4,215,399	$7,694,658	$2,061,560	$2,646,498	$757,021
Salaried officials, clerks, etc., number	2,034	----	263	642	123	139	53
Salaries	$1,753,235	----	$251,091	$522,477	$96,996	$117,242	$39,643
Wage-earners, average number	17,525	19	2,139	4,388	1,481	1,581	311
Total wages	$8,189,817	$11,080	$1,150,736	$2,144,897	$613,840	$815,028	$141,639
Men, 16 years and over, number	16,700	19	1,995	4,143	1,352	1,543	294
Wages	$7,952,257	$11,080	$1,107,485	$2,078,334	$570,858	$798,504	$138,457
Women, 16 years and over, number	517	----	104	104	126	38	17
Wages	$175,028	----	$34,662	$38,276	$42,150	$16,524	$3,182
Children, under 16 years, number	308	----	40	141	3	----	----
Wages	$62,532	----	$8,589	$28,287	$832	----	----
Miscellaneous expenses	$2,252,604	$3,144	$323,629	$630,442	$121,260	$125,076	$39,485
Cost of materials used	$16,792,051	$25,470	$1,720,249	$4,826,585	$1,221,786	$1,307,900	$345,725
Value of products	$31,915,908	$17,670	$3,672,225	$8,960,421	$2,115,901	$2,715,310	$627,658

	Minnesota.	New Jersey.	New York.	Ohio.	Pennsylvania.	Rhode Island.	Wisconsin.	All other states.[1]
Number of establishments	4	7	66	34	24	4	23	7
Capital	$38,205	$204,465	$3,326,943	$4,074,576	$1,550,957	$24,300	$2,337,975	$831,848
Salaried officials, clerks, etc., number	2	24	267	209	110	6	160	36
Salaries	$2,320	$23,457	$216,120	$197,406	$91,681	$3,600	$134,007	$57,195
Wage-earners, average number	47	183	2,103	2,380	947	17	1,572	357
Total wages	$8,440	$71,343	$988,052	$1,017,061	$431,369	$6,100	$625,149	$165,083
Men, 16 years and over, number	47	170	2,032	2,340	891	17	1,500	357
Wages	$8,440	$68,185	$970,043	$998,218	$419,958	$6,100	$611,512	$165,083
Women, 16 years and over, number	----	12	46	40	29	----	1	----
Wages	----	$2,972	$11,009	$18,843	$7,280	----	$130	----
Children, under 16 years, number	----	1	25	----	27	----	71	----
Wages	----	$186	$7,000	----	$4,131	----	$13,507	----
Miscellaneous expenses	$4,673	$19,548	$366,501	$247,332	$128,931	$1,309	$170,266	$51,008
Cost of materials used	$30,997	$147,317	$1,856,065	$2,251,358	$1,065,461	$23,195	$1,536,592	$423,351
Value of products	$66,505	$295,226	$3,842,020	$4,099,980	$1,855,048	$43,382	$2,795,236	$779,331

[1] Includes establishments distributed as follows: Colorado, 1; Iowa, 1; Kentucky, 1; Maine, 1; Maryland, 1; Nevada, 1; New Hampshire, 1.

In 1890 returns were received from 10 states, only 4 of which had three or more establishments; in 1900 the returns were from 20 states, 13 of which had three or more establishments. In order to avoid disclosing the operations of individual establishments, states having less than three establishments are grouped under "all other states."

Table 4 presents a summary, by geographical divisions, of the statistics for 1900 of the number of establishments, capital, and value of products, and the per cent for each of these items that the several divisions and states bear to the total thereof.

TABLE 4.—SUMMARY BY STATES, ARRANGED GEOGRAPHICALLY: 1900.

STATES.	ESTABLISHMENTS. Number.	ESTABLISHMENTS. Per cent of total.	CAPITAL. Amount.	CAPITAL. Per cent of total.	PRODUCTS. Value.	PRODUCTS. Per cent of total.
The United States.	312	100.0	$29,783,659	100.0	$31,915,908	100.0
New England states	55	17.6	7,046,197	23.7	6,567,292	20.6
Massachusetts	25	8.0	2,646,498	8.9	2,715,310	8.5
Connecticut	24	7.7	4,215,399	14.2	3,672,225	11.5
All other New England states[1]	6	1.9	184,300	0.6	179,757	0.6
Middle states	98	31.4	5,701,613	19.1	6,517,665	20.4
New York	66	21.1	3,326,943	11.2	3,842,020	12.0
Pennsylvania	24	7.7	1,550,957	5.2	1,855,043	5.8
All other Middle states[2]	8	2.6	823,713	2.7	820,602	2.6
Central states	152	48.7	16,974,995	57.0	18,675,701	58.5
Ohio	34	10.9	4,074,576	13.7	4,099,980	12.8
Michigan	11	3.5	757,021	2.5	627,658	2.0
Indiana	19	6.1	2,061,560	6.9	2,115,901	6.6

[1] Includes establishments distributed as follows: Maine, 1; New Hampshire, 1; Rhode Island, 4.
[2] Includes establishments distributed as follows: Maryland, 1; New Jersey, 7.

TABLE 4.—SUMMARY BY STATES, ARRANGED GEOGRAPHICALLY: 1900—Continued.

STATES.	ESTABLISHMENTS. Number.	ESTABLISHMENTS. Per cent of total.	CAPITAL. Amount.	CAPITAL. Per cent of total.	PRODUCTS. Value.	PRODUCTS. Per cent of total.
Central states—Cont'd.						
Illinois	60	19.2	$7,694,658	25.8	$8,960,421	28.1
Wisconsin	23	7.4	2,337,975	7.9	2,795,236	8.8
All other Central states[1]	5	1.6	49,205	0.2	76,505	0.2
All other divisions	7	2.3	60,854	0.2	155,250	0.5
California	4	1.3	19,254	0.1	47,670	0.2
All other states[2]	3	1.0	41,600	0.1	107,580	0.3

[1] Includes establishments distributed as follows: Iowa, 1; Minnesota, 4.
[2] Includes establishments distributed as follows: Colorado, 1; Kentucky, 1; Nevada, 1.

Table 4 shows that at the close of the decade the manufacture of bicycles and tricycles was, as in 1890, almost entirely confined to the New England, Middle and Central divisions, but that the relative location of the industry within those sections had undergone a considerable change. In 1890 the New England and Central divisions each had 9 establishments and the Middle division 8. In 1900 the New England states showed an increase of 46 establishments, giving them 17.6 per cent of the aggregate number for the United States; the Middle states an increase of 90 establishments, giving them 31.4 per cent of the aggregate; the Central states an increase of 143, giving them 48.7 per cent of the aggregate; and all other states an increase of 6, giving them 2.3 per cent of the aggregate. In the New England states capital increased from $1,231,691 to $7,046,197, or $5,814,506, but its proportion of the

aggregate decreased from 59.8 to 23.7 per cent; in the Middle states it increased from $76,000 to $5,701,613, or $5,625,613, and its per cent of the aggregate from 3.8 to 19.1; in the Central states it increased from $746,381 to $16,974,995, or $16,228,614, and its per cent of the aggregate from 36.2 to 57. In the New England states the value of products increased from $1,150,142 to $6,567,292, or $5,417,150, but its per cent of the aggregate decreased from 44.8 to 20.6; in the Middle states it increased from $125,916 to $6,517,665, or $6,391,749, and its per cent of the aggregate from 4.9 to 20.4; in the Central states it increased from $1,276,268 to $18,675,701, or $17,399,433, and its per cent of the aggregate from 49.7 to 58.5. In 1890 Massachusetts stood first among all the states, not only in the number of establishments, but in the capital employed, and in the value of products. In 1900 New York reported the greatest number of establishments, while Illinois ranked first in capital and products, reporting 25.8 per cent of the aggregate capital and 28.1 per cent of the aggregate value of products.

Among the New England states Connecticut in 1900 stood first in capital. Capital in Massachusetts increased from $1,202,691 to $2,646,498, or $1,443,807. The value of products in Massachusetts increased from $998,342 to $2,715,310, or $1,716,968. In 1890, however, the products reported for Massachusetts constituted 38.9 per cent of the aggregate for the United States, but in 1900 only 8.5 per cent. Among the Middle states New York retained its position as first; its capital increased from $44,700 to $3,326,943, or $3,282,243, and in 1900 constituted 11.2 per cent of the aggregate; in value of products the increase was from $85,786 to $3,842,020, or $3,756,234, placing the state in third position, with 12 per cent of the aggregate. In Pennsylvania capital increased from $30,100 to $1,550,957, or $1,520,857, and was 5.2 per cent of the aggregate in 1900, and the value of products increased from $32,630 to $1,855,043, or $1,822,413, and constituted 5.8 per cent of the aggregate. Among the Central states, Illinois retained its position as first in the division and became first among all the states in capital and in value of products, the increase in capital being $7,129,046, and in value of products $7,990,421. The capital in 1900 constituted 25.8 per cent of the aggregate, and the products 28.1 per cent. This latter percentage was, however, a decrease from 1890, when Illinois produced 37.8 per cent of the total for the United States. In 1900 Ohio stood second among the Central states, with an increase of $3,956,376 in capital and of $3,978,472 in value of products. The total value of products in Ohio was $4,099,980, placing the state in that respect second among all the states. The third place in the Central states, and the fourth place among all the states, was occupied by Wisconsin, where in 1890 the industry did not exist. In 1900, 23 establishments, with a capital of $2,337,975, reported products to the value of $2,795,236, or 8.8 per cent of the aggregate for the United States. Indiana showed a considerable change; capital increased from $58,650 to $2,061,560, or $2,002,910, and value of products from $180,000 to $2,115,901, or $1,935,901.

Table 5 is a comparative summary of capital for 1890 and 1900, with the percentage of increase for the decade and the percentage of each item to the total.

TABLE 5.—COMPARATIVE SUMMARY, CAPITAL: 1890 AND 1900.

	1900		1890		Per cent of increase.
	Amount.	Per cent of total.	Amount.	Per cent of total.	
Total	$29,783,659	100.0	$2,058,072	100.0	1,347.2
Land	1,501,003	5.0	22,650	1.1	6,526.9
Buildings	3,705,462	12.4	339,371	16.5	991.9
Machinery, tools, and implements	9,462,031	31.8	564,400	27.4	1,576.5
Cash and sundries	15,115,163	50.8	1,131,651	55.0	1,235.7

Table 5 shows the changes in the relative percentages of land, buildings, machinery, etc., and live capital since 1890. Land increased from $22,650 to $1,501,003, or $1,478,353; buildings from $339,371 to $3,705,462, or $3,366,091; machinery, tools, and implements from $564,400 to $9,462,031, or $8,897,631; and live capital from $1,131,651 to $15,115,163, or $13,983,512. The last item includes cash on hand, bills receivable, unsettled ledger accounts, raw materials, stock in process of manufacture, finished products on hand, and other sundries. The total in this table does not include the capital stock of the corporations engaged in the manufacture of cycles.

Table 6 shows, for 1900, the kinds, quantity, and value of products for the industry, and the per cent of each item of value to the total.

TABLE 6.—NUMBER AND VALUE OF DIFFERENT KINDS OF PRODUCTS, WITH PER CENT THAT VALUE OF EACH KIND FORMED OF TOTAL VALUE: 1900.

	Number.	Value.	Per cent of total value.
Total		$31,915,908	100.0
Bicycles	1,113,039	22,160,260	69.4
Individual:			
Chainless	41,899	1,893,821	5.9
Chain	1,067,524	20,081,600	62.8
Tandem	3,457	201,889	0.6
Motor	159	32,950	0.1
Tricycles	18,110	47,985	0.2
Automobiles	56	60,758	0.2
All other products		9,646,875	30.2

In Table 6, as in preceding tables, are included only the 312 establishments in which the manufacture of cycles was the principal industry; but in 1900 returns were also received from 16 establishments reporting cycles as a by-product.

The number and value of the bicycles and tricycles thus added is shown in Table 7.

TABLE 7.—SUMMARY OF ESTABLISHMENTS REPORTING CYCLES AS A BY-PRODUCT, WITH THE NUMBER AND VALUE OF SUCH PRODUCTS: 1900.

STATES.	Number of establishments.	CYCLES PRODUCED AS BY-PRODUCTS.											
		Aggregate value.	Bicycles.								Tricycles.	
			Total.		Individual.				Tandem.			
					Chainless.		Chain.					
			Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
The United States	16	$1,553,177	69,811	$1,529,177	1,030	$63,508	68,598	$1,456,989	183	$8,680	8,000	$24,000
Illinois	3	447,198	18,600	447,198	.....	.....	18,543	444,633	57	2,565	.....	.....
New York	4	141,374	7,792	141,374	1,000	62,488	6,792	78,886	.....	.....	.....	.....
Ohio	4	605,994	26,231	581,994	.....	.....	26,145	577,479	86	4,515	8,000	24,000
All other states[1]	5	358,611	17,188	358,611	30	1,020	17,118	355,991	40	1,600	.....	.....

[1] Includes establishments distributed as follows: Massachusetts, 1; Michigan, 2; Pennsylvania, 2.

Table 8 combines, for 1900, the number and value of all kinds of bicycles and tricycles manufactured, whether as principal product or as by-product, and of automobiles made in cycle factories, the per cent of each kind to the total, both in number and in value, and the average price of each kind.

TABLE 8.—TOTAL PRODUCTION OF CYCLES, INCLUDING THOSE PRODUCED AS BY-PRODUCTS, WITH PERCENTAGES: 1900.

	Number.	Value.	Per cent of total number.	Per cent of total value.	Average value.
Total	1,209,016	$23,822,210	100.0	100.0	.....
Bicycles	1,182,850	23,689,437	97.8	99.4	$20.03
Individual:					
Chainless	42,929	1,957,329	3.5	8.2	45.59
Chain	1,136,122	21,488,589	94.0	90.2	18.91
Tandem	3,640	210,569	0.3	0.9	57.85
Motor	159	32,950	(1)	0.1	207.23
Tricycles	26,110	71,985	2.2	0.3	2.76
Automobiles	56	60,788	(1)	0.3	1,085.50

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

The total number of vehicles manufactured was 1,209,016, of which 1,182,850, or 97.8 per cent, were bicycles. The census year 1900 was one of the first in which the chainless bicycle was produced in any considerable quantity, 42,929 being manufactured. Very few tandems were manufactured, constituting only three-tenths of 1 per cent of the total number, and only 159 motor cycles. Fifty-six automobiles were manufactured in cycle factories. The number of tricycles was 26,110, or 2.2 per cent of the total. The average price of chain bicycles at the factories was $18.91; chainless, $45.59; tandems, $57.85; and motors, $207.23. Most of the tricycles were children's toys, which accounts for their very low average price. In value, the chain bicycles constituted 90.2 per cent of the total; the chainless, 8.2 per cent; the tandems, nine-tenths of 1 per cent; and the motors, one-tenth of 1 per cent. The value of the tricycles was only three-tenths of 1 per cent of the total, and of the automobiles three-tenths of 1 per cent. There were produced in cycle factories, in addition to vehicles, other products to the value of $9,646,875, or 30.2 per cent of the total for the industry. These "other products" consisted chiefly of parts for bicycles, like chains, spokes, handle bars, saddles, rims, etc. In the beginning of the industry the larger establishments made nearly all the different parts of bicycles they required, but of late factories have more and more specialized their output, and now even some of the largest bicycle manufacturers merely buy the majority of the different parts and assemble them. The American Bicycle Company, controlling the majority of the output, is an example. Certain parts of its machines are manufactured in those of its factories best adapted for the purpose, and sent to other plants to be assembled. This procedure greatly economizes the cost of manufacture.

In addition to the bicycles given in Table 8, there was undoubtedly a considerable number manufactured by the 6,328 establishments classified as bicycle and tricycle repair shops, but as the value of their product was not reported in detail, but only the gross sum received for custom work and repairing, statistics as to the number of cycles manufactured by them are not available. The value of custom work and repairing in these establishments aggregated the large amount of $13,766,033, which should be taken into consideration in connection with the value of products of the manufacture of bicycles and tricycles. The general statistics for these latter establishments will be found in the Report on Manufactures, Parts I and II, under the classification "Bicycle and tricycle repairing."

HISTORICAL AND DESCRIPTIVE.

It is safe to say that few articles ever used by man have created so great a revolution in social conditions as the bicycle. Most of its evolution and all its perfection to the point of practical usefulness having taken place during the last fifteen years, the present generation is enabled to judge of the change it has brought in its wake. Lord Charles Beresford once said, "Whoever invented the bicycle deserves the thanks of humanity," and no expression was more fit. The bicycle has been the means of bringing out for exercise in the open air millions of persons, men and women, young and old, who otherwise would have confined themselves to homes, stores, and offices. The bicycle industry has, directly and indirectly, given employment to many thousands of persons in the manufacture and sale of its product. The very wide use of the bicycle led to the formation of the League of American Wheelmen, with a membership, at one time, of more than 100,000; and this organization started the agitation for better roads, which led, in many states, to great improvements in public highways. Like all other articles depending upon public favor for their use, the bicycle has had its successive periods of prosperity and depression. The boom of a few years ago has passed, and in its place has been established a legitimate demand for the bicycle as a mode of conveyance. It is probable that a normal stage in the manufacture has been reached, and that from now on the industry will show stability and progress. Already there is hardly a spot in the known world where the bicycle has not penetrated.

The question when the first vehicle was used by man for self-propulsion is difficult to answer. Contrivances, somewhat similar to the bicycle, were not unknown even in the most ancient times, as is shown by the hieroglyphics of the Egyptians, in which appear images bearing a faint resemblance to the "hobbyhorse" of a few generations ago; and upon the frescoes of Pompeii are to be seen winged figures astride a stick connecting two wheels. Rudimentary velocipedes were mentioned in the Fifteenth and Sixteenth centuries. The first record of a bicycle is in a stained-glass window, dated 1642, in the church of Stoke Pogis, a town near Windsor, England; but, though a bicycle is pictured, there is no explanation of its origin. John Evelyn noted in his diary that in August, 1665, he called at Durdans, near Epsom, and found Dr. Wilkins, Sir William Petty, and Mr. Hooke, contriving, among other things, "a wheele for one to run races in."[1] In 1693 Ozanam read a paper before the Royal Academy of Science, describing a vehicle driven by the pedaling of a footman. Ozanam's vehicle was followed, about 1761, by another, built on a somewhat similar plan by an Englishman named Ovenden, at which time a description of the machine appeared in the Universal Magazine.

In 1690 M. de Sivrac, a Frenchman, invented a vehicle consisting of two wheels joined with a wooden frame representing the body of an animal, upon the back of which was placed a saddle for the rider. This contrivance had no handle bar, but was steered by the feet of the rider. It was called the célérifère. In the London Magazine for August, 1769, there is a description of a "chaise to go without horses." Le Journal de Paris, July 27, 1779, contains a description of the wonderful invention of MM. Blanchard and Magurier, which was called the velocipede. This, however, was only a reappearance of the célérifère with the addition of an upright bar for the support of the hands. Though this vehicle was much used, it was only with the advent of the draisine that the riding of a velocipede became fashionable.

The draisine was invented by Baron Carl von Drais, of Manheim on the Rhine, in 1816. It consisted of two wheels, tandem style, connected by a bar or perch over them, the forward wheel axled in a fork swiveled to the fore end of the perch and bearing at the top a cross-bar or handle with which to guide the machine. The rider sat astride the perch, on a saddle, propelling the vehicle on the level or on an upgrade by thrusting his feet on the ground. On a descending grade he lifted his feet and coasted. In his application for a patent Baron Drais described the capacities of his invention as follows: "1, that on a well-maintained post-road it will travel uphill as fast as a man can walk; 2, on a plain, even after a heavy rain, it will go 6 to 7 miles an hour, which is as swift as a courier; 3, when roads are dry and firm it runs on a plain at the rate of 8 to 9 miles an hour, which is equal to a horse's gallop; 4, on a descent it equals a horse at full speed." The real improvement made by von Drais was that the front wheel turned on a pivot and thus the handle bar was movable, enabling the rider to steer the wheel.

The draisine excited much attention in Germany and France and was finally brought to England, where Dennis Johnson, in 1818, patented an improved draisine under the name of a "pedestrian curricle;" this had an adjustable saddle and a rest for the elbows. The enthusiasm in England was raised to a high pitch by this machine; all the fashionables adopted its use and it was soon nicknamed "dandyhorse" and "hobbyhorse." Among the names used for the draisine in England, about 1817, were "the patent accelerator," "the velocipede or swift walker," "the manivelociter," "the bivector," etc.; and in 1819 they were called bicipedes and tricipedes. The Gentlemen's Magazine for March, 1819, contains an article describing the use of the velocipedes, from which the following is an extract:

[1] Temple Bar, June, 1898.

"The new machine, entitled a velocipede, consisting of two wheels, one before the other, connected by a perch, on which the pedestrian rests the weight of his body while with his feet he urges the machine forward on the principle of skating, is already in very general use. 'The road from Ipswich to Whitton,' says the Bury paper, 'is traveled every evening by several pedestrian hobbyhorses; no less than six are seen at a time.' * * * The crowded state of London does not admit of this novel mode of exercise and it has been put down by the magistrate of police." And the Monthly Magazine for October, 1819, said: "Considerable progress continues to be made in the improvement and useful extension of the traveling vehicles named velocipedes. It being found that the propelling action of the legs led to diseases of them, it has been contrived that a propelling reaction shall be created by the energy of the arms, and Mr. Birch, who has succeeded in this new application, may soon expect to work his levers, not only by the hands, but by steam. Indeed, there can be little doubt but this triumph of mechanics will be effected within the ensuing winter."

In England the velocipede was considerably improved in 1821 by Louis Gompertz. His machine had the handle connected with a segment rack, gearing in a pinion on the front wheel, so that it could be driven either by the hands or, as before, with the feet on the ground. About this time inventive genius came to a standstill, so far as self-propelled vehicles were concerned and remained so for more than forty years, though rival claims exist that in 1836 Kirkpatrick McMillan, of Courthill, Scotland, invented a bicycle driven by the aid of cranks and levers from the rear wheel; and that Gavin Dalzell, of Lesmahgon, Scotland, about 1845, also made one on similar principles; but, as neither of these types was ever manufactured for any other person than the owner, neither claim has been recognized.

In 1865 M. Mareschal, a Frenchman, obtained a patent on a frame connecting five wheels, each having an independent axle provided with foot-cranks bearing loose pedals. Each wheel was to be mounted and driven by its own rider, the front wheel being also the guide wheel. Thus the vehicle could carry from one to five riders. The next improvement came in September, 1865, when MM. Woirin and Leconde obtained their French patent. Their machine had three wheels, two smaller rear ones on the same axle, and one larger front wheel having an axle with cranks on which were loose pedals for the feet of the rider. The frame connecting these wheels was in the shape of a wooden horse, on whose back the rider sat, well over the front wheel. From this invention sprang the tricycle, which for many years was popular.

There has been considerable controversy about who was the inventor of the first crank-driven bicycle—whether it was Ernest Michaux, the son of a French manufacturer, or Pierre Lallement, one of the workmen in the senior Michaux's shop. Most authorities seem satisfied that the honor belongs to Lallement. He conceived the idea that the foot-cranks would work as well on a two-wheeled as on a three-wheeled velocipede. He took off one of the rear wheels and set the other directly back of the front wheel, and the "bone shaker" was an accomplished fact. At that period it was generally thought impossible for anyone to balance himself on a velocipede without keeping his feet on the ground; but Lallement finally succeeded in mastering the art, and his machine was exhibited at the Paris Exposition in 1865, but he thought so little of its usefulness that he did not patent it. In 1866 Lallement came to the United States, and while looking for work he made one of these two-wheeled velocipedes and rode it on the streets of New Haven, Conn. There James Carroll, a Yankee, noticed him, and foreseeing the opportunity for establishing a new and successful industry, he and Lallement obtained a patent on the 20th of November, 1866. The velocipede described in this patent consisted of two wooden wheels, with iron tires, of nearly equal size, one before the other, surmounted by a wooden perch, from which projected downward, near its rear end, two arms on either side of the rear wheel, each pair of arms meeting at the end of the hub and forming a bearing for the end of the axle; one similar wooden bar projected from the fore end of the perch on either side the forward wheel, furnishing bearings for its axle, and arranged with a pivot in the perch so that the fore wheel could be turned in either direction. On a steel spring extending over the perch was a saddle, about midway between the wheels. The rider started the machine by pushing it along the ground with his feet, and afterwards propelled it by working the pedals, which were attached to the front wheel.

The word bicycle, thus spelled, first occurs in the English patent records in the specification of J. I. Stassen, filed April 8, 1869. For a few years previous a somewhat similar word had appeared in print, though the spelling of it varied considerably. Thus the London Daily News of that date wrote of "bysicles" and "trysicles." One of our own papers called it "bicycular velocipede," and Harper's Weekly, in 1868, called it "bicircle" and "veloce." The Franco-Prussian war of 1870 brought the flourishing velocipede industry of France to a standstill, but in England about the same time the foundation was being laid for the new industry, which, ere long, was to take such a dominating place. Improvements, however, were slow. In 1871, W. H. J. Grant proposed to use rubber pedals, so as to permit the rider to use the ball instead of the hollow of the foot; he also attached rubber tires to curved metal rims by vulcanization. By this time there was a marked increase in the size of the front wheel, while the back one grew smaller, until, in 1873, J. K. Starley, who has been called the "Father of the bicycle," produced

a machine which embodied the rudiments of the modern bicycle. It was constructed of metal and rubber and its front wheel was twice the size of the rear one. The front wheel was continually increased in size until in 1886 bicycles were built with a front wheel 60 inches in height, while the rear wheel had been reduced to 16 inches.

The first appearance of the bicycle in the United States was in 1819, when Johnson's pedestrian curricle was introduced into New York. The excitement it created rapidly spread to Boston, Philadelphia, and other places, and many riding schools were opened. On June 26, 1819, William K. Clarkson was granted a patent for improvement in a velocipede. After the first novelty had worn off, little was heard of velocipedes in the United States until Lallement's patent had been granted, nearly half a century later. Another patent was taken out in July, 1868, by the Hanlon brothers. In 1869 the new velocipede craze was at its height; rinks and riding schools were opened everywhere, but, as was the case with the hobbyhorse in 1819, the "bone-shaker" was found too cumbersome a machine to gain lasting favor, and two years later scarcely any were ridden in the United States.

In England the development of Lallement's velocipede was carried on; the first important improvement was in the construction of the wheels, which were made of steel; but progress was slow until 1874, when J. K. Starley patented the tangent wheel. In the United States nothing was done in the way of perfecting the bicycle; and until fifteen years ago the manufacture of bicycles had been more experimental and devoid of all rational theory than any other branch of the engineering industry. Up to a few years ago the designing of bicycles was thought unworthy the study of competent engineers.

The bicycle as a modern vehicle has been before the world for about thirty years. Its evolution in a diversity of patterns may be said to have taken place principally between 1868 and 1885; and its perfection, transformation, and the almost complete extinction of all but one class, in the decade 1885–1895. The first modern bicycles were imported from England in 1876 and exhibited at the Centennial Exposition in Philadelphia. There they were seen by Col. Albert A. Pope, of Boston, Mass., and he immediately recognized the opportunities that lay before this new mode of conveyance. The following year he set about carrying his idea into effect. He went to England to study the industry, which then flourished there. On his return he brought some wheels, and the same year W. S. Atwell, of Boston, built for Colonel Pope the first American bicycle. This was a very cumbersome affair, weighing 70 pounds and costing $313. After another visit to England where he found more than 100 factories busy producing bicycles, Colonel Pope decided that the field for the new vehicle in America was broad enough to warrant starting a factory. He interested the Weed Sewing Machine Company, of Hartford, Conn., in the manufacture of bicycles, and in a corner of their shop the Columbias were first manufactured.

From this small beginning evolved a chain of factories in Hartford, at times giving employment to more than 5,000 workmen, and contributing their share toward making Hartford one of the wealthiest cities in the United States. Colonel Pope bears the undisputed title "Father of the American bicycle," and a great part of the credit for the extraordinary development of the industry was due to him. The "ordinary" bicycles, however, were almost entirely built after foreign patterns. One of the American ideas to prevent "headers" was shown in the Star bicycle, patented in 1880 by G. W. Pressey, on which the small wheel was placed in front. The seat was moved so as to place the center of gravity forward of the big wheel, the feet of the rider resting upon adjustable treadles, working independent of each other.

As early as 1876 H. T. Lawson, an Englishman, invented a safety bicycle in which the rear wheel was driven by levers, but it was not until 1880 that the first rear-driving "geared" safety was built at the works of the Coventry Machinists' Company at Coventry, England, after the design of Mr. J. K. Starley. But the energies of the bicycle makers were still bent on improving the high wheel. Comparatively great as the demand was for these machines it was limited to a certain class of riders, and it was only with the advent of the "safety" that the manufacture of cycles on a large scale began. It was not until 1885 that the "safety" became a feature at the Stanley show in England, where, in the early days of the industry, all manufacturers gathered ideas.

In 1887 Mr. A. H. Overman invented a bicycle, the Victor, a machine with two wheels of the same size, set tandem style and connected by a frame on the principle of a triangular truss, with the seat at the apex of the triangle and a sprocket wheel at one end. The sprocket wheel was connected with the hub of the rear wheel by an endless chain and was turned by pedals on each side. This wheel had narrow steel tires, which were soon replaced with solid rubber, and it weighed more than 50 pounds. The history of the "safety" is a record of rapid development. Immediately after its acceptance as a popular type of a wheel, a series of changes began in design and construction, and in the ideas of manufacturers as to the necessary requirements of such a machine. Between 1885 and 1890 the evolution of the cycle industry was especially rapid; pregnant ideas and startling changes followed each other in quick succession.

A noteworthy fact is that the development of the bicycle was the result of constant experimenting, instead of being based on knowledge of the needs of the industry. While the United States took little part in the early development of the velocipede and bicycle,

it has led the world during the last decade not only in the quality and quantity of bicycles produced, but in improvements in methods of manufacture. Through the ingenuity of American engineers, tools and automatic machines have been invented by the use of which the cost of producing bicycles has been so greatly reduced as practically to place the machine within reach of all classes.

The developments which converted the velocipede into the practical bicycle of to-day may be summed up as the rubber tire, the suspension wheel, the ball bearing, weldless steel tubing, the wooden rim, the chain gearing, the coaster brake, and the chainless gear.

The rubber tire (including its later variation, the pneumatic tire) was perhaps the most important of these improvements. As early as 1845 an English civil engineer, R. W. Thompson, patented a pneumatic tire, which differed but little from the present form; but at that time there were no cyclists and little use for such a tire, so the patent was allowed to lapse without having reached any commercial importance. When the velocipede came into use in 1867, steel tires were used; later the idea was conceived of nailing rubber strips on steel rims. When the "ordinary" came into use, "U" or "V" shaped steel rims were used, into which solid rubber tires were cemented, or fastened with corrugated wires. Between 1876 and 1882 the tendency was to reduce the size of the tire. This continued until 1889, when John B. Dunlop, an Irish veterinary surgeon, fitted a piece of rubber hose to his son's bicycle.

From this inconspicuous beginning grew the pneumatic tire, the great marvel in the construction of the modern bicycle, and the basis upon which the present industry rests. At every period throughout the history of bicycle construction attempts had been made to decrease the vibration, thus at the same time contributing to the comfort of the rider and increasing velocity by lessening the rolling friction; but all efforts were in vain until the advent of the pneumatic tire. At first it was received with incredulity by the manufacturers and by the riders, who feared to meet with punctures, but it soon demonstrated its indispensability; which is abundantly proven by the fact that, though previous to 1889 a pneumatic tire was unheard of, 40 per cent of all machines manufactured were fitted with them in 1891, and two years later a bicycle fitted with any other style was a curiosity.

The general distrust of the usefulness of the pneumatic tire led to the invention of the cushion tire in 1891. This was an india-rubber tire very much larger than the solid tire, and having a small hollow air space running through it. The pneumatic and the cushion were made on the same principle; in the pneumatic the thickness of the outer wall was reduced to a minimum, the diameter was further increased, and air was forced inside and retained, at a pressure of about 40 pounds to the square inch. The pneumatic tires soon demonstrated their superiority over the cushions, and in a very short time they had surmounted all prejudices. The single-tube pneumatic tire was first suggested and described by Mr. I. W. Boothroyd, of London, England, who, however, did not patent his invention; at about the same time P. W. Tillinghast, of Providence, R. I., had invented, patented, and brought out in the United States a pneumatic tire on the same lines as Boothroyd's.

The suspension wheel is one of the oldest of all the parts which enter into the make-up of the modern bicycle. Both the English and the French claim the honor of having invented it—the former in 1826 and the latter in 1864. It, however, belongs to neither, as manuscripts left by a Spaniard, Leonardo da Vinci, a contemporary of Columbus, contain a sketch of a suspension wheel and an autographic note describing the device as one "by which wheels are strengthened and a light wheel made strong." This invention antedates 1490. A wheel in the National Museum in Washington is a reproduction from this sketch. The next record of a suspension wheel is found in the British Patent Office, where Theodore Jones, in 1826, filed his application for a patent on an "improved construction of carriage wheels, of such nature that the weight they have to carry is suspended from that part of the wheel which happens to be uppermost, instead of being supported, as is usual, by the spokes that happen to be under the axle-tree." All modern bicycle wheels are built on this principle.

The first bearing used in bicycle construction was the "plain" bearing. To this a nicely fitted and hardened sleeve was added, and this became known as the parallel bearing. The next change was to the roller bearing, which was not a success. About the same time the adjustable cone was tried. This was a male cone, threaded on the axle and fitting into a female coned space in the hub. The final and most important step in the evolution of the bearings was the innovation of interposing steel balls between these coned faces, a change which revolutionized previous theories and reduced the friction to an almost imperceptible point. The inventor of the ball bearing was Bonn, an Englishman. These bearings have now been applied to every point in a bicycle where friction may be encountered. They are, perhaps, to be more admired than any other part of the machine. Instead of allowing the axle to slide around in its bearings hard steel balls are introduced so that the parts which come in contact roll over, and do not slide upon, one another. These balls have to be made with the greatest possible accuracy, as the least flaw in them will put the wheel out of order. It is interesting to note how little the balls lose in weight by wear in traveling. Experiments have proved that 12 balls, which, when new, weighed 25:80,400 gram, after having been ridden 1,000 miles weighed 25:80,088 gram, the loss being 3:12 milligram, which is equal to 1/20.8 grain; i. e., in running 1,000 miles each ball lost

1/250 grain. This corresponds to a wear off of the surface of only 1/158,000 of an inch.[1]

The construction of the frames of bicycles has passed through many eras. In the first hobbyhorses the connections between the wheels were made of wood; on the early velocipedes the frame was made of solid steel or iron bars; then came the change from solid forgings to tubing and finally the weldless steel tube. Attempts to produce weldless tubes by a drawing process were made some thirty-five years ago. The process was, however, a costly and difficult one, and before it could reach its modern development it awaited important improvements, both in respect to the drawing appliances and to the manipulation of the ingot from which the tube was produced. W. C. Stiff, of Birmingham, England, perfected the methods of manufacture to such a degree that about 1880 weldless steel tubing began to be employed for the backbone and fork of the "ordinary" bicycle. The great demand, however, arose when the safety bicycle came into vogue. There are various modes of producing the cold-drawn steel tube, but the principle is practically the same in all. Only a very high grade of steel is suitable for the purpose, and Swedish charcoal steel containing a particular proportion of carbon has proven itself superior to all others.

Previous to 1893 a very small portion of the tubing required for bicycle manufacture was produced in the United States, and that produced was of an inferior grade, which could not be used in high-grade bicycles. In 1892 and 1893 several tube works were started in the United States, but it was not until about 1897 that the home factories could supply the demand. George F. Parker, United States consul at Birmingham, England, in his report of May 8, 1896, states that the exports of bicycle tubing from Birmingham to the United States in 1895 amounted to $507,041, and for the first quarter of 1896 the amount had risen to $231,200. The fiscal year 1897 was the first in which imports of bicycle tubing were given separately in the United States Treasury reports, the value imported that year being $185,259; in 1898, only $33,798; in 1899, $26,413; and in 1900, $16,573. The mode of making the tubing has been greatly improved, and our manufacturers are now turning out a product superior to any made in England and are exporting large quantities to all parts of the world. An idea of the amount produced can be formed when it is remembered that every bicycle requires about 20 feet of tubing, and that, during 1900, 1,182,850 bicycles were manufactured.

The frame of the modern bicycle is a marvel of construction. It is really a bridge on wheels built for the support of a man. Until a few years ago the tendency was to reduce the weight, and tubing was used which was hardly thicker than a sheet of stout paper; but, after roadsters had been produced weighing about 16 pounds, a change took place, and the average is now about 22 pounds. Originally the different parts of the frame were joined together with drop-forge connections, but now sheet-steel stampings are almost entirely used. The joints were of three kinds, flush, outside, and lapped, of which flush joints are now used almost exclusively. After the drop forgings or stampings are finished the tubes are cut down to proper lengths and closely fitted into the open joint of the stamping connection. In order to hold them securely they are pinned through, and are then taken to the brazing furnace. The process of brazing as applied in the bicycle industry is of very recent origin. Until 1880 it was generally thought impossible to braze light tubing to solid forgings, and all connections were welded together. The difficulties were solved, however, and the brazing and the flush joints make the bicycle of to-day as solid as if it were cut out of one piece of steel. A few years ago hickory wood was substituted for steel tubing by some manufacturers, but this did not prove satisfactory and was soon discontinued. The frames have also been made of papier-maché. The diamond-frame construction was not used until 1891, when Humber, in England, made a bicycle with straight tubing; previous to this the frames had been of the most fantastic shapes. One of the improvements greatly enlarging the use of the bicycle was the drop frame, which enabled women to ride. The first drop-frame bicycle was disclosed to the Patent Office on February 2, 1886, and a patent for it was granted to E. G. Latta on March 29, 1887.

The improvement in rims has also been of far-reaching proportions. The dandy-horse had wooden rims, shod with iron, but in the more modern velocipedes these were supplanted by steel or iron rims. The first rims used for rubber tires were of solid metal, grooved to receive the tire. In 1877 J. S. Smith, of London, England, patented the hollow metal rim. Until 1891 steel and iron rims were used exclusively, but the latter year a wheel with a wooden rim was put on the market by Mr. Charles Harrington. This was a purely American innovation. Makers and riders were very skeptical as to its value, but in less than two years it had completely superseded the steel rim in the American market. The steel rim is now used only on wheels exported to England, where it is claimed that climatic conditions are unfavorable to the wooden rim. In 1896 rims of papier-maché were manufactured, but as none of the prominent manufacturers accepted them, their use was very limited, and they soon disappeared.

Of all the component parts of a bicycle, the gearing has probably caused the most brain work. Lallement's velocipedes and all the early "ordinary" bicycles were fitted with a crank directly attached to the driving wheel. In 1875 Rousseau patented a bicycle using a chain gearing applied to the big wheel. The application of the chain marked an extraordinary epoch in the development of the bicycle. Before its introduction

[1] Lecture delivered by C. Vernon Boys, A. R. S. M., at the Royal Institution, March 7, 1884.

gearing had been obtained by the working of treadles or toothed gear. At first it was thought that toothed gearing could be more accurately constructed than a chain and that it was more economical of power, but as the bevel or tooth-geared machines could not be manufactured to run as fast as the chain-geared, the latter soon had the entire field.

The first patent for a bevel-gear chainless bicycle was granted in 1885, but the first practical ones were not put on the market to any extent until 1897; since then there has been a steady increase in the number manufactured. The mechanism of the "bevel gear" chainless bicycle consists of a pair of gear wheels at the crank bracket and another pair at the rear hub, with a connecting rod which rotates on ball bearings, and runs near the stationary rear fork of the bicycle. The gear wheels are furnished with roller-bearing pegs or teeth which engage each other nearly at right angles. Another type of chainless bicycle is the spur sprocket. This obtains its power by the interlocking of cogs in three spur wheels; the first wheel revolves with the cranks, communicating power by cogs to the intermediate wheel, and this in turn causes the third wheel, which is attached directly to the rear hub, to rotate.

One of the contrivances which has lately done much to restore the bicycle to public favor is the free wheel and coaster brake. The first patent for this was granted in 1880, since which time it has been greatly improved. The coaster brake is a device which allows the rider to rest his feet on the pedals, while allowing the driving wheel to revolve freely. A slight backward pressure on the pedal throws a clutch mechanism into action, which in turn operates a braking device. The foremost in use has an expanding rim inside a hub; by very slight application of power this ring generates a very high braking power and gives the rider complete control over the wheel. One of the most popular styles of coaster brakes consists of two hubs, i. e., an inner or driving hub, and an outer or coasting hub. While driving, the two hubs are locked together by means of a ball clutch; this is released by a backward pressure on the pedal, and when coasting the driving hub remains at rest, allowing the outer hub to revolve freely on an independent set of bearings resting on the inner hub.

It is easy to perceive the great advantage of the coaster brake over other brakes. The first brake on the "ordinary" bicycle was the remarkable drag brake, which was pivoted under the rear fork crown, and was operated by a cord passing over the backbone to the handle bar. It was applied by turning the handle, when the prongs of the drag were forced against the ground. An improvement over this was the "spoon" brake, which at first also was applied to the small wheel; later on it was applied to the big wheel. This has also been the most common brake used on the "safety."

The first crank hanger was made from a casting, for which later a drop forging was substituted. The latter was considered one of the best, but was also the most expensive form of brackets. As the demand for cheaper wheels arose, stamped brackets usually consisting of two pieces brazed together were used. The crank hanger is now usually of one piece construction, the steel being drawn into the shape of a tube by means of 5 separate operations. The 4 lugs to carry the rear forks, the lower main tube and diagonal stays, are then drawn and formed upon it through hydraulic pressure, making 12 more operations; the seat-pillar lug, while not seamless, is of the one piece construction with the 3 lugs drawn and formed in the same manner. The rear fork jaws are stamped out of crucible steel and are of what is known as semi-hollow construction—i. e., a half section of a circular tube. The basic patent is for a crank hanger formed with lugs to receive the tubes of the frame. A great many attempts have been made to invent brackets to evade this patent. The advantage of the sheet-metal bracket, besides its economy, is the preservation of the metallic skin, the toughest portion of the metal.

The first pedals on the velocipedes consisted of 2 elliptical side plates of sheet steel, joined in the center by a tube to slip over the pedal shaft, and having, on rods riveted into the ends of the side plates, 2 round rubbers for the tread. The bearing was either plain or the adjustable cone. The greatest improvement was the application of ball bearings to the pedals. Two forms are now used—rubber and rat-trap. The rubber pedals consist of rubber-covered disks for the feet to rest on and give them a cushion. Rat-trap pedals consist of toothed blades, and are largely used by racing men on account of their lightness and nonslipping qualities.

Originally all hubs were made of gun metal; flanges were very thick at the edge and tapered toward the center, in order to provide sufficient room for tapping and threading the hub flanges to allow for the direct spokes. From these the barrel hub in its different varieties evolved.

The spokes have also been greatly improved. At first they were one-quarter of an inch in diameter, made of iron, and headed at both ends. Then steel-wire spokes were used with a considerably smaller diameter. The nipple and nut spokes were abandoned about 1882 and the direct spoke was substituted. Manufacturers continued to reduce the size of the wire, and now use .069 wire. The first tangent spokes were made in England by the Coventry Tangent Company, and soon after their introduction the manufacturers inaugurated the method of swaging the spokes, that is, tapering them toward the center. A set of spokes for a modern wheel weighs only 15 ounces.

The saddle is the one of the component parts of a bicycle, the idea of which has undergone the least

change. On the early velocipedes the saddle was made out of a piece of wood; later on this was covered with leather and padded. On the high wheels the saddles were formed by a base of metal covered with leather. The next type was the suspension, or hammock type, where the seat rested on a piece of leather suspended between the front and rear forks. Then followed the era of the so-called hygienic saddles, of which the pneumatic saddles were the most prominent. The use of the pneumatic and other cushion saddles has been abandoned, as they were apt to produce chafing and soreness; some of them were even apt to produce forms of internal injury. The desire has been to produce saddles of such a design as to reduce vibration to its lowest degree, and at the same time to get a saddle which will retain its form under hard usage and different conditions. The perfection is exemplified in the present rigid type of saddle. Spring frames, seat posts, and forks are other devices for such reduction.

The accessories to the bicycle are too many to be enumerated; among them are air pumps, lamps, shoes, clothing, carrying baskets, cyclometers, etc.

Tricycles may be divided into three classes: children's, carriers, and vehicles for invalids. Few, except the children's, are now manufactured.

During the census year 1900 only a few motor bicycles were manufactured, and it is too early to speak of the development of this branch of the industry. The price of such machines has been considerably reduced during the last two years.

The evolution of the bicycle industry can be gauged to some extent by the number of patents issued. Since the establishment of the United States Patent Office 7,573 patents have been granted for cycles and their component parts. Of these only 16 had been granted before January 1, 1865, and the great majority were issued after 1890. The first patent issued was to J. B. Bolton, September 29, 1804, for a vehicle driven by a hand-worked toothed gear; the others issued previous to 1865 mostly covered toys. In 1892, the number of applications for patents on improvements in cycles increased at such a rate that a special division for their examination was established in the Patent Office. Patents of the velocipede class are divided into five groups, as follows: Unicycles, bicycles, dicycles, epicycles, and polycycles. All patents in this class must refer to velocipedes propelled by hand or foot, or to parts of such vehicles. Wheels and their component parts, such as hubs, spokes, rims, and tires, are not, however, included in this class, but with carriage and wagon wheels. The following tabular statement shows the number of patents that have been granted on all parts entering into the construction of cycles. The miscellaneous item includes clamps, rests, casings, mudguards, etc.

Unicycles	46
Epicycles	32
Dicycles	38
Bicycle propulsion	1,326
Polycycle propulsion	718
Frames	831
Pneumatic tires	764
Cushion and solid tires	652
Saddles	514
Brakes	451
Handlebars and handles	448
Wheels, spokes, rims, and hubs	358
Pedals and toe clips	223
Bearings	133
Miscellaneous	1,039
Total	7,573

From this tabular statement it appears that 2,044 different devices for cycle propulsion have been patented, 1,416 for rubber tires, 831 for frames, 514 for saddles, and 451 for brakes. Unicycle is a velocipede with only one wheel; dicycle is one where 2 wheels are placed side by side, and polycycle is one having 3 or more wheels placed in such a manner as to furnish a stable support. The epicycle is a vehicle very seldom seen in public. It is a portable annular track propelled by a traction wheel on the inside. The rider is seated inside the wheel in such a position that the center of gravity is a little below the axis of the annulus.

The number of patents applied for during the last two years has been considerably reduced.

The following tabular statement, taken from the reports of the United States Treasury Department, shows the exports and imports of cycles and parts thereof for the last five years of the decade. Prior to 1896 there was no separate classification for this industry, its statistics being included either with carriages and wagons, or with manufactures of iron and steel.

FISCAL YEAR.	Imports.	Exports.
1896	$56,960	$1,898,012
1897	21,122	7,005,323
1898	4,845	6,846,529
1899	4,577	5,768,880
1900	3,516	3,553,149

Almost the entire demand for bicycles in the United States and many foreign countries was, until recent years, supplied from England; but American bicycle manufacturers have had the satisfaction of reversing trade conditions, and now the United States is supplying bicycles not only to England, but also to all other parts of the world.

Table 9 shows in detail for 1900 the statistics relating to the industry.

TABLE 9.—BICYCLES AND TRICYCLES, BY STATES: 1900.

		United States.	California.	Connecticut.	Illinois.	Indiana.
1	Number of establishments	312	4	24	60	19
	Character of organization:					
2	Individual	95	3	6	17	2
3	Firm and limited partnership	54	1	3	7	2
4	Incorporated company	163	.....	15	36	15
5	Established during the decade	253	3	16	48	15
6	Established during the census year	22	1	1	5	1
	Capital:					
7	Total	$29,783,659	$19,254	$4,215,399	$7,694,658	$2,061,560
8	Land	$1,501,003	.....	$241,675	$478,407	$110,873
9	Buildings	$3,705,462	.....	$882,071	$561,680	$302,102
10	Machinery, tools, and implements	$9,462,031	$4,400	$1,487,357	$2,018,283	$782,015
11	Cash and sundries	$15,115,163	$14,854	$1,604,296	$4,636,288	$866,570
12	Proprietors and firm members	209	5	12	31	5
	Salaried officials, clerks, etc.:					
13	Total number	2,084	.....	263	642	123
14	Total salaries	$1,753,235	.....	$251,091	$522,477	$96,996
	Officers of corporations—					
15	Number	194	.....	16	37	19
16	Salaries	$430,787	.....	$47,733	$93,658	$35,140
	General superintendents, managers, clerks, and salesmen—					
17	Total number	1,840	.....	247	605	*104*
18	Total salaries	$1,322,448	.....	$203,358	$428,819	$61,856
	Men—					
19	Number	1,369	.....	194	406	79
20	Salaries	$1,169,087	.....	$179,385	$380,504	$53,413
	Women—					
21	Number	471	.....	53	199	25
22	Salaries	$153,361	.....	$24,023	$48,315	$8,443
	Wage-earners, including pieceworkers, and total wages:					
23	Greatest number employed at any one time during the year	27,648	30	3,476	7,052	2,320
24	Least number employed at any one time during the year	8,423	22	1,309	2,076	965
25	Average number	17,525	19	2,139	4,388	1,481
26	Wages	$8,189,817	$11,080	$1,150,736	$2,144,897	$613,840
	Men, 16 years and over—					
27	Average number	16,700	19	1,995	4,143	1,352
28	Wages	$7,952,257	$11,080	$1,107,485	$2,078,334	$570,858
	Women, 16 years and over—					
29	Average number	517	.....	104	104	126
30	Wages	$175,028	.....	$34,662	$38,276	$42,150
	Children, under 16 years—					
31	Average number	308	.....	40	141	3
32	Wages	$62,532	.....	$8,589	$28,287	$832
	Average number of wage-earners, including pieceworkers, employed during each month:					
	Men, 16 years and over—					
33	January	21,486	15	2,486	5,439	1,661
34	February	22,645	23	2,936	5,681	1,847
35	March	22,671	23	3,092	5,661	1,878
36	April	21,043	23	2,993	4,783	1,810
37	May	19,103	28	2,526	4,630	1,609
38	June	14,755	20	1,821	3,588	1,085
39	July	11,564	20	1,264	3,613	756
40	August	10,157	20	1,298	2,361	736
41	September	11,458	15	1,373	2,688	1,211
42	October	12,416	15	721	3,261	1,108
43	November	15,209	15	1,554	3,737	1,145
44	December	17,893	15	1,871	4,274	1,380
	Women, 16 years and over—					
45	January	749	.....	142	142	248
46	February	764	.....	144	128	250
47	March	720	.....	134	121	225
48	April	645	.....	133	96	200
49	May	532	.....	118	89	148
50	June	423	.....	90	78	81
51	July	327	.....	60	65	71
52	August	386	.....	78	106	86
53	September	*449*	.....	79	*98*	*136*
54	October	359	.....	88	98	21
55	November	413	.....	90	109	28
56	December	437	.....	92	120	21
	Children, under 16 years—					
57	January	372	.....	57	166	5
58	February	388	.....	63	179	5
59	March	394	.....	64	185	5
60	April	385	.....	64	177	5
61	May	343	.....	54	156	5
62	June	281	.....	36	116	5
63	July	249	.....	28	93	3
64	August	203	.....	25	81	1
65	September	224	.....	27	102	2
66	October	247	.....	.....	143	1
67	November	278	.....	22	141	2
68	December	337	.....	36	148	2
	Miscellaneous expenses:					
69	Total	$2,252,604	$3,144	$323,629	$630,442	$121,260
70	Rent of works	$221,881	$1,180	$26,653	$94,453	$8,200
71	Taxes, not including internal revenue	$107,709	$56	$15,656	$23,870	$11,138
72	Rent of offices, interest, insurance, etc	$1,881,997	$1,333	$277,866	$496,719	$101,922
73	Contract work	$41,517	$575	$3,454	$15,900	.....
	Materials used:					
74	Aggregate cost	$16,792,051	$25,470	$1,720,249	$4,836,585	$1,221,786
	Principal materials—					
75	Total cost	$13,957,756	$24,425	$1,514,139	$3,735,094	$1,096,173
76	Purchased in raw state	$20,405	.....	.....	.....	$8,405
77	Purchased in partially manufactured form	$13,937,351	$24,425	$1,514,139	$3,735,094	$1,087,768
78	Fuel	$341,471	$364	$32,906	$95,895	$23,127
79	Rent of power and heat	$57,957	$71	$2,509	$13,475	$7,875
80	Mill supplies	$311,775	$110	$33,251	$72,966	$15,078
81	All other materials	$1,892,107	$500	$63,208	$881,524	$54,346
82	Freight	$230,985	.....	$24,236	$37,031	$25,187

TABLE 9.—BICYCLES AND TRICYCLES, BY STATES: 1900.

Massachusetts.	Michigan.	Minnesota.	New Jersey.	New York.	Ohio.	Pennsylvania.	Rhode Island.	Wisconsin.	All other states.[1]	
25	11	4	7	66	34	24	4	23	7	1
7	4	4	1	22	9	8	3	7	2	2
6	.....	.....	1	16	5	7	1	3	2	3
12	7	.....	5	28	20	9	.....	13	3	4
18	9	4	5	55	27	20	4	22	7	5
.....	1	.....	1	7	3	2	.....	.....	.....	6
$2,646,498	$757,021	$38,205	$204,465	$3,326,943	$4,074,576	$1,550,957	$24,300	$2,337,975	$831,848	7
$51,614	$6,900	.....	$13,700	$240,167	$74,587	$78,930	$4,000	$157,200	$43,000	8
$444,863	$44,893	.....	$16,000	$365,320	$437,853	$211,840	$7,000	$804,586	$127,254	9
$908,361	$117,513	$7,433	$78,668	$948,042	$1,736,524	$422,635	$7,600	$685,218	$257,982	10
$1,241,660	$587,715	$30,772	$96,097	$1,773,414	$1,825,662	$837,552	$5,700	$1,190,971	$403,612	11
19	4	4	3	57	20	26	4	13	6	12
139	53	2	24	267	209	110	6	160	36	13
$117,242	$39,643	$2,320	$23,457	$216,120	$197,406	$91,681	$3,600	$134,007	$57,195	14
9	10	.....	5	31	35	13	.....	13	6	15
$23,400	$14,462	.....	$10,480	$62,036	$69,580	$20,688	.....	$20,610	$38,000	16
130	43	2	19	236	174	97	6	147	30	17
$93,842	$25,181	$2,320	$12,977	$154,084	$127,826	$70,993	$3,600	$113,397	$24,195	18
102	34	1	14	174	129	78	5	130	23	19
$81,947	$22,003	$1,840	$11,374	$132,018	$111,913	$65,048	$3,300	$105,157	$21,235	20
28	9	1	5	62	45	19	1	17	7	21
$11,895	$3,178	$480	$1,603	$22,066	$15,913	$5,945	$800	$8,240	$2,960	22
2,407	535	61	274	3,151	3,659	1,550	36	2,469	623	23
936	127	25	61	867	965	375	9	588	98	24
1,581	311	47	183	2,103	2,380	947	17	1,572	357	25
$815,028	$141,639	$8,440	$71,343	$988,052	$1,017,061	$431,369	$6,100	$625,149	$165,083	26
1,543	294	47	170	2,032	2,340	891	17	1,500	357	27
$798,504	$138,457	$8,440	$68,185	$970,043	$998,218	$419,958	$6,100	$611,512	$165,083	28
38	17	.....	12	46	40	29	.....	1	.....	29
$16,524	$3,182	.....	$2,972	$11,009	$18,843	$7,280	.....	$130	.....	30
.....	.....	.....	1	25	.....	27	.....	71	.....	31
.....	.....	.....	$186	$7,000	.....	$4,131	.....	$13,507	.....	32
1,837	453	60	217	2,671	2,949	1,122	9	2,032	535	33
1,913	440	60	221	2,845	3,085	1,178	14	1,850	552	34
1,922	380	56	250	2,819	3,073	1,256	22	1,715	524	35
1,967	362	56	239	2,703	2,812	1,160	22	1,602	511	36
1,793	332	51	220	2,442	2,434	1,026	31	1,507	474	37
1,443	275	36	168	1,595	2,083	897	36	1,342	866	38
1,022	142	30	167	1,103	1,650	504	26	1,088	119	39
1,064	127	32	70	1,158	1,408	584	14	1,204	131	40
1,126	135	37	64	1,286	1,607	580	8	1,172	161	41
1,304	186	51	63	1,448	1,932	658	8	1,458	203	42
1,528	300	44	162	1,925	2,333	788	7	1,378	298	43
1,597	400	49	204	2,326	2,708	990	7	1,650	422	44
43	26	.....	15	44	48	40	.....	1	.....	45
42	26	.....	15	56	57	45	.....	1	.....	46
49	16	.....	15	55	57	47	.....	1	.....	47
47	13	.....	15	51	47	42	.....	1	.....	48
39	13	.....	14	53	29	28	.....	1	.....	49
40	13	.....	14	54	31	21	.....	1	.....	50
25	11	.....	10	39	26	20	.....	.....	.....	51
27	11	.....	10	36	17	14	.....	1	.....	52
32	11	.....	10	33	36	14	.....	.....	.....	53
35	11	.....	5	37	45	18	.....	1	.....	54
37	26	.....	7	46	45	24	.....	1	.....	55
43	26	.....	10	45	46	33	.....	1	.....	56
.....	.....	.....	1	26	.....	40	.....	77	.....	57
.....	.....	.....	2	26	.....	43	.....	70	.....	58
.....	.....	.....	2	27	.....	42	.....	69	.....	59
.....	.....	.....	1	25	.....	41	.....	72	.....	60
.....	.....	.....	1	24	.....	28	.....	75	.....	61
.....	.....	.....	1	16	.....	24	.....	83	.....	62
.....	.....	.....	1	25	.....	20	.....	79	.....	63
.....	.....	.....	1	11	.....	18	.....	66	.....	64
.....	.....	.....	1	29	.....	12	.....	51	.....	65
.....	.....	.....	1	25	.....	15	.....	62	.....	66
.....	.....	.....	.....	28	.....	19	.....	61	.....	67
.....	.....	.....	.....	39	.....	28	.....	84	.....	68
$125,076	$59,485	$4,673	$19,548	$366,501	$247,332	$128,031	$1,309	$170,266	$51,008	69
$11,156	$2,693	$1,184	$3,490	$34,428	$13,756	$10,597	$496	$9,807	$3,288	70
$17,311	$1,353	$74	$718	$10,628	$16,491	$1,700	$80	$7,805	$1,329	71
$96,559	$49,501	$915	$14,540	$320,148	$217,085	$110,834	$733	$147,451	$46,391	72
$50	$5,938	$2,500	$800	$1,297	.....	$5,800	.....	$5,203	.....	73
$1,307,900	$345,725	$30,997	$147,317	$1,856,065	$2,251,358	$1,065,461	$23,195	$1,536,592	$423,351	74
$1,139,814	$280,490	$29,400	$132,265	$1,675,353	$1,881,992	$951,521	$9,550	$1,109,512	$378,028	75
.....	$12,000	.....	.....	.....	.....	.....	.....	.....	.....	76
$1,139,814	$268,490	$29,400	$132,265	$1,675,353	$1,881,992	$951,521	$9,550	$1,109,512	$378,028	77
$25,652	$4,395	$745	$3,488	$42,714	$49,537	$11,701	$130	$40,328	$10,489	78
$5,801	$2,740	$132	$1,959	$7,384	$7,450	$3,565	$315	$1,110	$3,571	79
$11,323	$2,947	$110	$1,371	$31,206	$42,054	$20,210	$110	$28,323	$2,716	80
$96,223	$52,495	$300	$4,024	$72,138	$233,822	$58,051	$13,090	$342,356	$20,030	81
$29,087	$2,658	$310	$4,210	$27,270	$36,503	$20,413	.....	$14,963	$8,517	82

[1] Includes establishments distributed as follows: Colorado, 1; Iowa, 1; Kentucky, 1; Maine, 1; Maryland, 1; Nevada, 1; New Hampshire, 1.

TABLE 9.—BICYCLES AND TRICYCLES, BY STATES: 1900—Continued.

		United States.	California.	Connecticut.	Illinois.	Indiana.
	Products:					
83	Aggregate	$31,915,908	$47,670	$3,672,225	$8,960,421	$2,115,901
	Bicycles—					
84	Total number	1,113,039	579	107,419	385,951	83,964
85	Total value	$22,160,260	$26,145	$3,029,418	$7,004,441	$1,473,609
	Individual—					
	Chainless—					
86	Number	41,899	350	15,803	5,899	525
87	Value	$1,893,821	$15,270	$888,938	$134,850	$21,250
	Chain—					
88	Number	1,067,524	217	91,309	379,026	83,064
89	Value	$20,031,600	$9,025	$2,122,369	$6,823,316	$1,441,350
	Tandem—					
90	Number	3,457	6	307	1,026	375
91	Value	$201,889	$450	$18,111	$46,275	$11,000
	Motor—					
92	Number	159	6	.....	.....	.....
93	Value	$32,950	$1,400	.....	.....	.....
	Tricycles—					
94	Number	18,110	47	5,440	.....	.....
95	Value	$47,985	$4,175	$12,000	.....	.....
	Automobiles—					
96	Number	56	3	.....	.....	40
97	Value	$60,788	$2,250	.....	.....	$47,195
98	All other products	$9,646,875	$15,100	$630,807	$1,955,980	$595,106
	Comparison of products:					
99	Number of establishments reporting for both years	236	3	20	49	11
100	Value for census year	$27,039,436	$42,170	$3,512,368	$7,154,765	$1,323,377
101	Value for preceding business year	$27,045,264	$36,000	$3,157,505	$7,680,519	$1,487,770
	Power:					
102	Number of establishments reporting	260	3	20	48	18
103	Total horsepower	21,588	11	2,372	6,417	2,164
	Owned—					
	Engines—					
	Steam—					
104	Number	177	.....	19	29	18
105	Horsepower	16,858	.....	2,078	4,589	1,700
	Gas or gasoline—					
106	Number	45	1	2	14	3
107	Horsepower	661	3	37	304	89
	Water wheels—					
108	Number	19	.....	5	3	.....
109	Horsepower	568	.....	88	100	.....
	Electric motors—					
110	Number	70	.....	4	33	1
111	Horsepower	1,741	.....	90	1,012	8
	Rented—					
112	Electric, horsepower	756	8	32	71	207
113	Other kind, horsepower	1,009	.....	47	341	160
114	Furnished to other establishments, horsepower	215	.....	.....	56	35
	Establishments classified by number of persons employed, not including proprietors and firm members:					
115	Total number of establishments	312	4	24	60	19
116	No employees	9	.....	1	1	.....
117	Under 5	43	1	2	5	.....
118	5 to 20	72	3	7	12	3
119	21 to 50	65	.....	6	16	2
120	51 to 100	50	.....	1	10	8
121	101 to 250	40	.....	3	8	3
122	251 to 500	21	.....	2	4	2
123	501 to 1,000	8	.....	1	1	1
124	1,001 to 5,000	4	.....	1	3	.....

TABLE 9.—BICYCLES AND TRICYCLES, BY STATES: 1900—Continued.

Massachusetts.	Michigan.	Minnesota.	New Jersey.	New York.	Ohio.	Pennsylvania.	Rhode Island.	Wisconsin.	All other states.	
$2,715,310	$627,658	$66,505	$295,226	$3,842,020	$4,099,980	$1,855,043	$43,382	$2,795,236	$779,331	83
62,915	18,196	2,250	42	95,093	112,397	67,632	599	143,515	32,487	84
$1,792,460	$498,042	$37,375	$1,470	$2,239,962	$1,878,978	$1,490,509	$20,000	$1,951,164	$716,696	85
2,841	6,506	.....	.....	3,662	2,566	602	.....	1,044	2,101	86
$206,006	$202,920	.....	.....	$157,901	$81,650	$27,380	.....	$54,626	$103,080	87
59,708	11,676	2,250	42	90,828	109,756	66,706	595	142,042	30,305	88
$1,522,507	$292,122	$37,375	$1,470	$2,051,855	$1,793,778	$1,442,784	$19,695	$1,863,138	$610,816	89
339	.....	.....	.....	600	75	322	4	322	81	90
$53,247	.....	.....	.....	$29,006	$3,550	$20,095	$305	$17,050	$2,800	91
27	14	.....	.....	3	.....	2	.....	107	.....	92
$10,700	$3,000	.....	.....	$1,200	.....	$300	.....	$16,350	.....	93
1	42	.....	.....	1	238	12,341	.....	.....	.....	94
$724	$3,900	.....	.....	$150	$9,036	$18,000	.....	.....	.....	95
3	.....	.....	.....	2	3	4	.....	.....	1	96
$4,143	.....	.....	.....	$1,700	$2,000	$2,500	.....	.....	$1,000	97
$917,983	$125,716	$29,130	$293,756	$1,600,208	$2,209,966	$344,034	$23,382	$844,072	$61,635	98
20	7	4	4	46	26	18	3	20	5	99
$2,637,298	$546,808	$66,505	$163,329	$2,805,774	$3,911,025	$1,657,325	$35,600	$2,524,911	$658,181	100
$2,691,816	$414,161	$51,500	$146,728	$2,486,605	$3,418,181	$1,990,949	$36,000	$2,364,552	$1,082,983	101
23	10	3	7	53	25	18	3	23	6	102
1,537	323	16	216	2,119	3,282	978	26	1,711	416	103
12	5	.....	4	27	23	16	1	18	5	104
983	197	.....	153	1,742	2,606	892	8	1,575	330	105
.....	4	2	.....	6	2	1	.....	9	1	106
.....	27	13	.....	74	53	2	.....	46	13	107
4	1	.....	1	4	.....	.....	.....	.....	1	108
285	10	.....	10	74	.....	.....	.....	.....	1	109
7	.....	.....	.....	2	18	1	.....	4	.....	110
109	.....	.....	.....	4	487	3	.....	28	.....	111
88	84	3	40	37	91	5	18	.....	72	112
72	5	.....	13	188	45	76	.....	62	.....	113
60	.....	.....	.....	9	45	.....	.....	10	.....	114
25	11	4	7	66	34	24	4	23	7	115
.....	.....	.....	1	3	3	.....	.....	.....	.....	116
3	2	2	.....	12	5	5	2	2	2	117
4	4	1	1	18	4	7	1	6	1	118
8	2	1	3	15	2	4	1	4	1	119
5	.....	.....	1	8	9	2	.....	5	1	120
2	2	.....	1	7	7	4	.....	2	1	121
1	1	.....	.....	2	3	2	.....	3	1	122
2	.....	.....	.....	1	1	.....	.....	1	.....	123
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	124

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Twelfth Census of the United States.

CENSUS BULLETIN.

No. 177. WASHINGTON, D. C. June 2, 1902.

AGRICULTURE.

COLORADO.

Hon. WILLIAM R. MERRIAM,
Director of the Census.

SIR: I have the honor to transmit herewith, for publication in bulletin form, the statistics of agriculture in the state of Colorado, taken in accordance with the provisions of section 7 of the act of March 3, 1899. This section requires that—

> The schedules relating to agriculture shall comprehend the following topics: Name of occupant of each farm, color of occupant, tenure, acreage, value of farm and improvements, acreage of different products, quantity and value of products, and number and value of live stock. All questions as to quantity and value of crops shall relate to the year ending December thirty-first next preceding the enumeration.

A "farm," as defined by the Twelfth Census, includes all the land, under one management, used for raising crops and pasturing live stock, with the wood lots, swamps, meadows, etc., connected therewith. It includes also the house in which the farmer resides, and all other buildings used by him in connection with his farming operations.

The farms of Colorado, June 1, 1900, numbered 24,700, and were valued at $106,344,035. Of this amount $16,002,512, or 15.0 per cent, represents the value of buildings, and $90,341,523, or 85.0 per cent, the value of land and improvements other than buildings. On the same date the value of farm implements and machinery was $4,746,765, and of live stock, $49,954,311. These values, added to that of farms, give $161,045,111, the "total value of farm property."

The products derived from domestic animals, poultry, and bees, including animals sold or slaughtered on farms, are referred to in this bulletin as "animal products." The total value of all such products, together with the value of all crops, is termed "total value of farm products." This value for 1899 was $33,048,576, of which amount $16,077,988, or 48.6 per cent, represents the value of animal products, and $16,970,588, or 51.4 per cent, the value of crops, including forest products, cut or produced on farms and ranges. The "total value of farm products" for 1899 exceeds that for 1889 by $19,911,766, or 151.6 per cent.

The value of "net farm products," or the "gross farm income," is obtained by deducting from the "total value of farm products" the value of the products fed to live stock on the farms of the producers. In 1899 the reported value of products fed was $6,182,830, leaving $26,865,746 as the gross farm income for that year. The percentage which this amount is of the "total value of farm property" is referred to as the "percentage of income upon investment." For Colorado in 1899 it was 16.7 per cent.

As no reports of expenditures for taxes, interest, insurance, feed for stock, and similar items have been obtained by any census, no statement of net farm income can be given.

Special reports as to the dimensions and cost of the leading irrigation ditches and canals, the area of land under them, methods for the artificial application of water to the growing crops, and other facts relating to irrigation, were obtained by correspondence with farmers, engineers, and others. This correspondence was under the joint direction of Mr. F. H. Newell, chief hydrographer of the Geological Survey, acting as expert special agent for the division of agriculture, and Mr. Clarence J. Blanchard. The office is indebted to the State Engineer of Colorado and his able force of water superintendents and commissioners for important data concerning canals, ditches, etc.

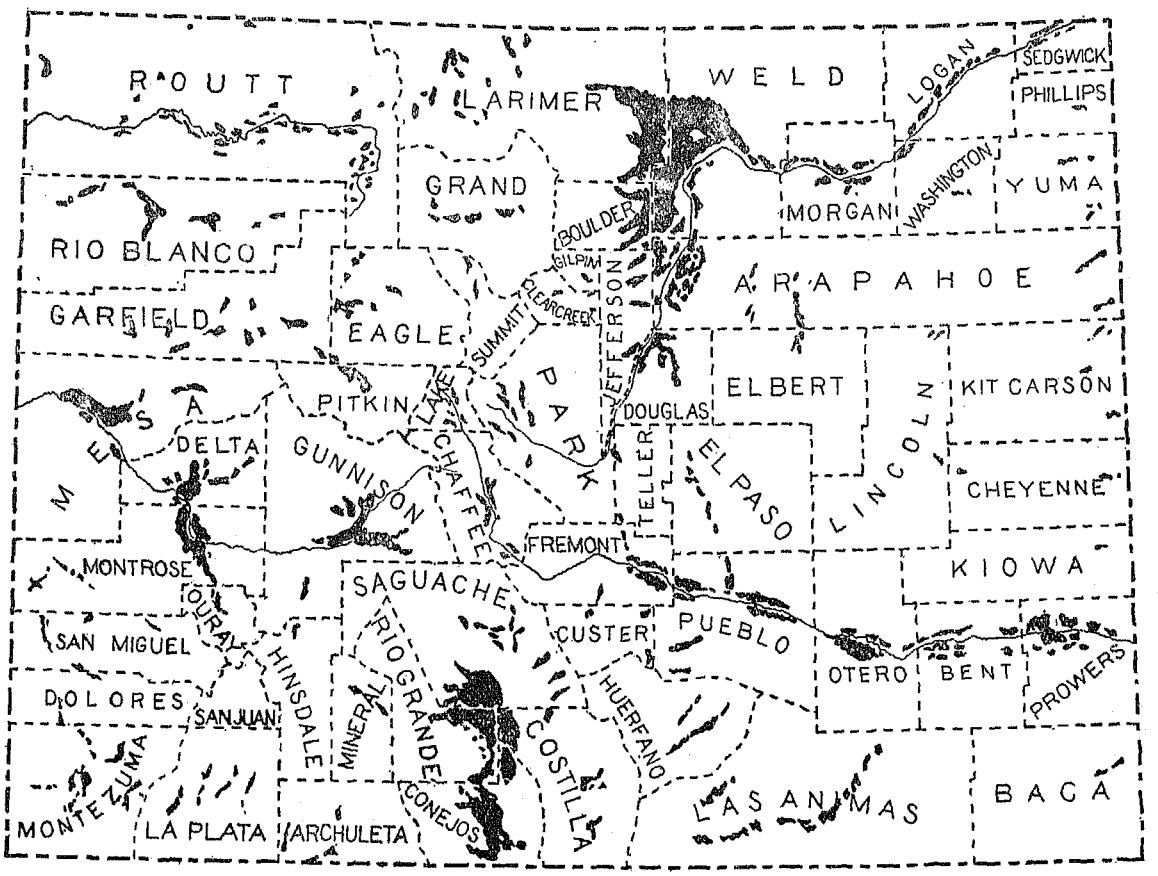
The statistics presented in this bulletin will be treated in greater detail in the final report on agriculture in the United States. The present publication is designed to present a summarized advance statement for Colorado.

Very respectfully,

L. G. Powers.

Chief Statistician for Agriculture.

CP 15M



Total Irrigated Area 1,611,271 *Acres*

SKETCH MAP
OF
COLORADO
SHOWING THE
IRRIGATED AREAS
ACCORDING TO THE CENSUS OF
1900.

Scale 25 0 25 50 75 100 MILES

AGRICULTURE IN COLORADO.

GENERAL STATISTICS.

Colorado has a total land area of 103,645 square miles, or 66,332,800 acres, of which 9,474,588 acres, or 14.3 per cent, are included in farms.

The central and western divisions of the state, comprising about two-thirds of its area, are traversed by the principal ranges of the Rocky Mountains. The eastern third is occupied by the great plains, which are not continuous levels, but a series of valleys separated by ridges and watered by numerous rivers. About one-third of the state is well adapted to agriculture, the remainder being better suited for grazing purposes. The soil of the foothills is fertile and among the mountains are rich valleys and fine grazing lands. The arid sands of the plains are generally surface deposits, covering a soil which can be rendered productive by irrigation.

NUMBER AND SIZE OF FARMS.

Table 1 gives, by decades since 1870, the number of farms, the total and average acreage, and the per cent of farm land improved.

TABLE 1.—FARMS AND FARM ACREAGE: 1870 TO 1900.

YEAR.	Number of farms.	NUMBER OF ACRES IN FARMS.				Per cent of farm land improved.
		Total.	Improved.	Unimproved.	Average.	
1900	24,700	9,474,588	2,273,968	7,200,620	383.6	24.0
1890	16,389	4,598,941	1,823,520	2,775,421	280.6	39.6
1880	4,506	1,165,373	616,169	549,204	258.6	52.9
1870	1,738	320,346	95,594	224,752	184.3	29.8

The development of the agricultural resources of the state dates from the early part of the decade 1860 to 1870, at about the time when the territory was organized. Previous to this time the inhabitants consisted, for the most part, of miners, who had settled in the region in 1859, and who had devoted little attention to farming. Since the first agricultural census in 1870, the number of farms has increased rapidly, the greatest gains taking place between 1880 and 1890. In the last decade there was an increase of 50.7 per cent. The total area in farms, also, has increased at a rapid rate, principally through entry of the public domain and purchase of railroad grant lands.

The percentage of farm land improved has decreased since 1880. This is due largely to a more strict construction of the term "improved," by the present census. The increased acreage and production of nearly all crops indicate that there has been little, if any, abandonment of improved land.

FARM PROPERTY AND PRODUCTS.

Table 2 presents a summary of the principal statistics relating to farm property and products for each census year, beginning with 1870.

TABLE 2.—VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND OF FARM PRODUCTS: 1870 TO 1900.

Year.	Total value of farm property.	Land, improvements, and buildings.	Implements and machinery.	Live stock.	Farm products.[1]
1900	$161,045,101	$106,344,035	$4,746,755	$49,954,311	$33,048,576
1890	110,356,040	85,035,180	2,728,850	22,591,010	13,136,810
1880	34,722,650	25,109,223	910,085	8,703,342	5,035,228
1870[3]	6,529,454	3,385,748	272,604	2,871,102	42,335,106

[1] For year preceding that designated.
[2] Exclusive of the value of animals on ranges.
[3] Values for 1870 were reported in depreciated currency. To reduce to specie basis of other years they must be diminished one-fifth.
[4] Includes betterments and additions to live stock.

The value of all classes of farm property has advanced rapidly in the last twenty years, the total value in 1900 being nearly five times as great as in 1880, and 45.9 per cent greater than in 1890. During the last decade there has been an increase of 25.1 per cent in the reported value of land, improvements, and buildings; of 73.9 per cent in that of implements and machinery; and of 121.1 per cent in that of live stock. Of the increase of $50,687,071 in the total value of farm property, $21,308,855, or 42.0 per cent, represents the gain in the value of land, improvements, and buildings; $27,360,301, or 54.0 per cent, in that of live stock; and $2,017,915, or 4.0 per cent, in that of implements and machinery. The value of farm products as returned in 1899 was 151.6 per cent greater than in 1889. But a portion of this increase, and of that noted in the case of implements and machinery, is doubtless the result of a more detailed enumeration in 1900 than in previous census years. The large increase in the reported value of live stock is also due in part to a more complete enumeration.

In 1880 and in 1890 domestic animals on ranges were not enumerated, and the values of live stock shown in the above table are therefore deficient for both these years. The value of domestic animals on ranges in 1890 is estimated to have been $6,659,016, which would make the total value of live stock in that year $29,253,026. Computed on this basis the increase in the value of live stock between 1890 and 1900 was approximately 41.4 per cent.

COUNTY STATISTICS.

In Table 3 general agricultural statistics are given by counties.

TABLE 3.—NUMBER AND ACREAGE OF FARMS, AND VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, JUNE 1, 1900, WITH GROSS INCOME OF 1899, AND EXPENDITURES IN 1899 FOR LABOR AND FERTILIZERS, BY COUNTIES.

COUNTIES.	NUMBER OF FARMS.		ACRES IN FARMS.		VALUES OF FARM PROPERTY.				Gross income (products of 1899 not fed to live stock).	EXPENDITURES.	
	Total.	With buildings.	Total.	Improved.	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		Labor.	Fertilizers.
The State	24,700	23,532	9,474,588	2,273,968	$90,341,523	$16,002,512	$4,746,755	$49,954,311	$26,865,746	$4,100,905	$23,225
Arapahoe	2,105	2,029	904,708	202,047	11,904,190	1,858,050	408,490	3,126,165	2,677,537	444,460	9,970
Archuleta	215	190	41,298	10,372	277,460	71,930	23,210	913,011	319,380	32,370	----
Baca	137	135	77,751	7,832	127,050	40,860	20,860	549,992	80,807	13,100	----
Bent	274	256	118,485	38,858	1,137,100	131,920	61,160	1,295,766	670,541	94,500	----
Boulder	967	953	191,373	91,708	4,388,615	892,875	216,340	789,626	920,836	126,710	1,470
Chaffee	242	236	47,065	14,726	458,300	151,790	42,480	256,018	217,098	30,430	----
Cheyenne	57	49	116,191	2,740	141,630	30,370	7,520	461,403	141,717	14,040	----
Clear Creek	31	29	10,888	1,196	73,590	15,780	3,350	18,714	11,487	2,470	----
Conejos	617	529	208,245	98,960	1,804,710	284,870	94,510	1,154,600	538,772	35,390	----
Costilla	331	311	634,205	79,678	1,673,870	137,810	54,970	586,969	311,669	30,890	----
Custer	351	327	93,607	28,111	837,490	172,390	53,210	500,386	180,971	31,670	----
Delta	874	832	93,689	38,016	2,667,550	392,480	151,980	1,063,780	788,219	99,500	----
Dolores	36	22	3,382	942	22,110	5,320	3,440	114,759	19,577	2,800	----
Douglas	457	448	296,302	39,165	1,945,390	366,150	77,230	558,953	359,661	42,390	80
Eagle	208	199	52,352	19,709	811,775	146,700	52,400	625,196	325,574	72,810	----
Elbert	579	574	502,365	40,460	1,678,010	366,500	107,450	1,144,875	432,945	58,160	----
El Paso	729	720	566,790	62,408	2,361,554	675,945	118,250	1,297,117	651,624	106,570	----
Fremont	606	590	109,488	20,512	3,039,270	520,900	97,420	673,519	472,293	92,000	600
Garfield	507	482	81,357	29,002	1,503,770	270,810	120,080	1,086,965	557,979	92,400	----
Gilpin	49	49	12,035	2,110	50,770	30,680	5,510	22,999	26,129	8,330	----
Grand	179	168	66,538	18,504	502,100	63,930	33,940	360,615	138,812	31,970	----
Gunnison	289	234	52,795	28,163	577,000	154,475	61,340	636,472	280,738	71,120	200
Hinsdale	35	32	5,288	1,767	41,580	11,490	3,570	96,320	36,893	2,700	----
Huerfano	486	457	138,421	25,466	695,470	132,150	45,300	657,029	257,067	33,710	----
Jefferson	1,050	1,023	225,230	61,224	6,003,617	1,045,643	194,110	769,728	1,013,097	193,510	2,880
Kiowa	138	116	71,957	4,138	114,070	62,810	14,080	758,815	353,417	17,860	----
Kit Carson	305	289	88,344	19,581	154,860	97,710	37,760	676,581	115,352	18,290	----
Lake	71	68	19,724	7,636	420,320	76,670	19,950	186,696	152,902	25,510	200
La Plata	297	257	60,069	14,491	628,020	211,695	81,405	452,267	225,418	43,130	300
Larimer	1,412	1,382	543,463	180,353	5,837,718	1,189,015	323,720	2,569,700	1,970,665	280,630	200
Las Animas	1,037	991	419,503	38,441	1,565,820	302,200	115,490	1,850,724	648,944	118,450	100
Lincoln	138	124	163,144	8,195	269,885	83,025	17,860	819,783	202,134	47,510	----
Logan	413	386	182,513	57,639	1,421,440	218,820	66,820	1,737,762	293,356	66,670	----
Mesa	747	713	63,018	34,205	2,143,985	408,360	120,960	1,320,817	556,601	96,190	----
Mineral	48	42	11,784	2,929	49,524	19,575	5,330	49,429	23,176	7,400	----
Montezuma	261	240	46,072	15,204	435,640	135,340	38,390	353,917	201,454	21,520	125
Montrose	524	457	83,349	36,884	1,535,330	253,850	96,220	1,012,104	552,277	100,050	----
Morgan	378	361	125,074	43,282	1,370,000	232,140	68,740	1,156,862	601,010	93,290	----
Otero	814	730	244,594	68,036	3,562,360	433,270	157,450	2,335,016	1,089,344	156,920	600
Ouray	128	128	25,673	11,184	370,445	86,270	32,200	256,801	169,278	30,660	----
Park	220	213	212,801	40,258	1,260,203	265,030	66,670	661,653	368,615	88,420	80
Phillips	244	239	69,626	20,028	218,490	110,100	39,840	504,057	142,337	6,780	----
Pitkin	170	167	35,363	12,583	586,000	93,250	45,420	242,291	262,378	44,010	100
Prowers	478	445	217,332	58,172	2,569,998	349,260	106,974	1,780,010	465,688	65,750	660
Pueblo	663	634	478,821	40,821	3,511,040	408,680	115,480	1,321,522	691,693	90,070	1,850
Rio Blanco	264	255	68,124	21,846	883,980	148,250	59,150	1,336,979	207,296	68,260	----
Rio Grande	361	347	173,448	78,141	1,736,790	212,165	89,480	442,625	404,688	48,930	120
Routt	703	662	190,503	53,977	1,676,530	292,340	118,600	2,547,286	716,952	121,360	----
Saguache	406	385	329,337	119,587	2,139,023	238,610	98,590	1,102,353	606,803	78,480	----
San Juan	6	4	55	18	1,025	1,500	155	16,046	2,904	750	----
San Miguel	229	218	45,566	10,088	442,300	106,715	53,660	512,531	248,659	28,730	70
Sedgwick	156	140	51,014	9,209	302,640	56,835	12,340	355,560	81,668	4,630	----
Summit	77	73	13,676	4,031	153,750	31,410	6,730	108,138	37,054	5,480	70
Teller	143	141	31,538	4,685	218,290	79,735	15,433	168,010	167,229	13,135	----
Washington	201	197	107,440	17,961	272,540	82,090	27,950	768,425	147,600	24,420	----
Weld	2,002	1,959	556,044	251,307	9,484,426	1,610,214	601,920	2,949,360	3,528,928	505,260	3,550
Yuma	291	281	93,531	30,145	327,050	132,650	32,388	838,045	194,042	23,360	----
Southern Ute[1]	14	14	2,240	237	4,060	1,110	1,480	1,169	4,476	----	----

[1] Indian reservation.

During the last decade the number of farms increased in most of the counties. In each of twelve counties, the number of farms reported in 1900 is more than double that of ten years before, the largest gain being in Montezuma county, where there were more than seven times as many farms in 1900 as there were in 1890. Eight counties show decreases, the largest of which is 55.8 per cent in Baca county.

The portion of the total land surface included in farms in 1900 varied from 0.02 per cent in San Juan county to 52.1 per cent in Douglas county, and the average size of farms, from 9 acres in San Juan county to 1,916 in Costilla county.

The total acreage in farms increased during the last decade in all counties, except Phillips, Montrose, Yuma, and Sedgwick, which reported decreases of 26.2 per cent, 19.3 per cent, 14.9 per cent, and 3.2 per cent, respectively. The greatest relative increase was in Cheyenne county, where the acreage in 1900 was thirteen times that reported in 1890; in Costilla the increase was nearly tenfold. In 19 counties the area of improved farm land has decreased in the last decade, but in 12 others it has nearly doubled.

In the value of farms all counties, with the exception of 13, show increases since 1890. The counties showing the greatest losses are Gilpin, with a decrease of 68.4 per cent; Phillips, 46.2 per cent; Washington, 33.0 per cent; and Sedgwick, 22.6 per cent. Arapahoe and Douglas also show decreases, but as the value of the farm products of these counties in 1899 exceeds that reported for 1889, it is probable that the valuation of farm land reported to the Eleventh Census was, to some extent, speculative, and that there has been little, if any, actual loss. The average values per farm in 1900 vary from $421 in San Juan county to $6,999 in Lake county.

In all but 9 counties, the value of implements and machinery has increased greatly during the last decade, 21 counties showing a value more than twice as great, and one, Prowers, a sixteenfold increase. Sedgwick, Phillips, Washington, Custer, and Montrose counties are among those showing losses.

Since 1890 there has been a large increase throughout the state in the value of live stock, decreases appearing in 4 counties only. In Prowers county the value in 1900 was eighteen times as great as in 1890, in Otero county, eight times, and in Morgan and Delta counties, four times as great.

The average value per farm of the products of 1899 not fed to live stock varies from $371 in Clear Creek county to $2,561 in Kiowa county.

The average expenditure per farm for labor, including the value of board furnished, varies from $28 in Phillips county to $402 in Park county. The average expenditure for fertilizers is less than $1 per farm, and the total expenditure for the state is 7.4 per cent less than it was in 1890. Three-fourths of the total amount was expended in Arapahoe, Jefferson, and Weld counties.

CHANGES IN FARMING POPULATION.

The first agricultural census of Colorado, taken in 1870, showed 1,738 farms, and 6,462 males engaged in agriculture, 2,659 of whom were classed as farm laborers. The census of 1880 reported 4,506 farms, and 13,462 males engaged thereon, 2,525 of whom were reported as farm laborers.

The fact that in both years the number of males reported as engaged in agriculture, other than farm laborers, largely exceeded the number of farms, indicates either that many persons who were thus reported were really engaged in other occupations, or that many farms were omitted from the enumeration in both years.

In 1890 there were reported in Colorado 16,389 farms, 36,134 males engaged in agriculture, and 9,926 farm laborers, showing increases for the decade of 263.7 per cent in the number of farms, of 168.4 per cent in the number of males engaged in agriculture, and of 293.1 per cent in the number of farm laborers. The fact that there was a greater relative increase during this decade in the number of farms than in the number of persons engaged in agriculture, when considered in connection with the changes shown in the reports for 1870 and 1880, makes it appear very probable that a large number of farms were omitted from the enumeration, both in 1870 and in 1880, and that a considerable part of the increase shown for the decade from 1880 to 1890 was due to a more perfect census of agriculture in the latter year.

The occupation tables for 1900 are not yet available, but in the decade from 1890 to 1900, the number of farms increased 50.7 per cent, while the rural population, which includes not only those engaged in agriculture but also those employed in small mining centers throughout the state, increased only 14.2 per cent. Without the occupation tables, it is impossible to draw any definite conclusions, but the flourishing condition of agricultural and mining interests in Colorado in recent years makes it probable, after allowing for a more perfect census in 1900 than ever before, that there has been a greater relative increase in the last decade in the number of persons operating farms as owners and tenants than in the number of persons working on farms for wages, and consequently, that the average status of those employed on farms has been steadily improving.

FARM TENURE.

Table 4 gives a comparative exhibit of the number of farms operated by owners and tenants in 1880, 1890, and 1900. Tenants are subdivided into two groups: (1) "Cash tenants" who pay a cash rental or a stated amount of labor or farm produce, and (2) "share tenants" who pay as rental a share of the products. In Table 5 the tenure of farms for 1900 is given by race of farmer, and the farms operated by owners are subdivided into groups, designated as farms operated by "owners," "part owners," "owners and tenants," and "managers." These groups comprise, respectively: (1) Farms operated by individuals who own all the land they cultivate; (2) farms operated by individuals who own a part of the land and rent the remainder from others; (3) farms operated under the joint direction and by the united labor of two or more individuals, one owning the farm or a part of it, and the other, or others, owning no part, but receiving for supervision or labor a share of the products; and (4) farms operated by individuals who receive for their supervision and other services a fixed salary from the owners.

TABLE 4.—NUMBER AND PER CENT OF FARMS OF SPECIFIED TENURES: 1880 TO 1900.

YEAR.	Total number of farms.	NUMBER OF FARMS OPERATED BY—			PER CENT OF FARMS OPERATED BY—		
		Owners.[1]	Cash tenants.	Share tenants.	Owners.[1]	Cash tenants.	Share tenants.
1900	24,700	19,119	2,230	3,351	77.4	9.0	13.6
1890	16,389	14,546	585	1,258	88.7	3.6	7.7
1880	4,506	3,922	165	419	87.0	3.7	9.3

[1] Including "part owners," "owners and tenants," and "managers."

TABLE 5.—FARMS OF SPECIFIED TENURES, JUNE 1, 1900, CLASSIFIED BY RACE OF FARMER.

RACE.	Total number of farms.	Owners.	Part owners.	Owners and tenants.	Managers.	Cash tenants.	Share tenants.
The State	24,700	15,735	2,368	136	880	2,230	3,351
White	24,627	15,682	2,363	136	880	2,227	3,339
Colored[1]	73	53	5			3	12

[1] Comprising 58 negroes and 15 Indians.

The number of farms operated by owners is nearly five times as great in 1900 as in 1880; the number operated by cash tenants, over thirteen times; and the number operated by share tenants, nearly eight times as great. Between 1890 and 1900, the number operated by owners increased 31.4 per cent; by cash tenants, 231.2 per cent; and by share tenants, 166.4 per cent. In 1880, 71.7 per cent of all tenants were share tenants; in 1890, 68.3 per cent; and in 1900, 60.0 per cent. This change indicates a growing sentiment on the part of both landlord and tenant in favor of the cash payment system, as well as greater independence and financial responsibility on the part of the tenant. The farms operated by share tenants are principally hay and grain farms, while those conducted by cash tenants, as a rule, are live-stock and dairy farms.

Of the farms of the state, 99.7 per cent are operated by white farmers, and 0.3 per cent, by colored farmers. Of the white farmers, 73.3 per cent own all or a part of the land they operate, and 26.2 per cent operate farms owned by others. Of the colored farmers, 58 are negroes and 15 are Indians, all of the Indians and nearly three-fourths of the negroes, being owners or part owners.

No previous census has reported the number of farms operated by "part owners," "owners and tenants," or "managers," but it is believed that the number conducted by the last-named class is constantly increasing.

FARMS CLASSIFIED BY RACE OF FARMER AND BY TENURE.

Tables 6 and 7 present the principal statistics for farms classified by race of farmer and by tenure.

TABLE 6.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY RACE OF FARMER AND BY TENURE, WITH PERCENTAGES.

RACE OF FARMER, AND TENURE.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	24,700	383.6	9,474,588	100.0	$161,045,111	100.0
White farmers	24,627	384.2	9,461,241	99.7	160,887,318	99.9
Colored farmers[1]	73	182.8	13,347	0.3	157,793	0.1
Owners	15,735	206.9	3,255,081	34.4	75,334,633	46.8
Part owners	2,368	1,204.2	2,851,462	30.1	27,985,385	17.4
Owners and tenants	136	369.8	50,298	0.5	1,090,788	0.7
Managers	880	2,031.3	1,787,515	18.9	25,296,587	15.7
Cash tenants	2,230	361.0	804,968	8.5	13,155,121	8.1
Share tenants	3,351	216.4	725,264	7.6	13,182,597	11.3

[1] Comprising 58 negroes and 15 Indians.

TABLE 7.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY RACE OF FARMER AND BY TENURE.

RACE OF FARMER, AND TENURE.	AVERAGE VALUES PER FARM OF—					Per cent of gross income on total investment in farm property.
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$3,658	$648	$192	$2,022	$1,088	16.7
White farmers	3,664	649	193	2,027	1,090	16.7
Colored farmers[1]	1,463	280	90	329	395	18.3
Owners	2,538	603	169	1,473	778	16.3
Part owners	6,667	913	276	3,962	1,852	15.7
Owners and tenants	4,395	1,061	219	2,345	1,107	13.8
Managers	13,955	1,009	423	13,351	5,289	18.4
Cash tenants	3,917	672	162	1,148	872	14.8
Share tenants	3,881	544	199	802	1,040	19.2

[1] Comprising 58 negroes and 15 Indians.

The average values of farm property and products per farm are much lower for the farms of colored farmers than for those of white farmers. The higher percentage of gross income for farms of colored farmers is not due to superior farm management, but to the fact that the labor of the negro, whose farm and investment of capital are generally small, counts for more relatively than the labor of a white farmer with a larger and more valuable farm.

Except in the item of buildings, the highest average values are reported by managers. The high average value of live stock on farms operated by managers indicates that most of them are stock ranches, and their large average acreage sustains this view.

The total value of the farm property of the 15 Indian farmers was $7,684, and that of their products, $2,097. They operated an area of 2,190 acres.

FARMS CLASSIFIED BY AREA.

Tables 8 and 9 present the principal statistics for farms classified by area.

TABLE 8.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY AREA, WITH PERCENTAGES.

AREA.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	24,700	383.6	9,474,588	100.0	$161,045,111	100.0
Under 3 acres	794	1.8	1,432	(1)	3,716,924	2.3
3 to 9 acres	1,047	7.0	7,347	0.1	2,778,023	1.7
10 to 19 acres	1,032	13.3	13,744	0.1	3,588,979	2.2
20 to 49 acres	2,122	34.1	72,403	0.8	6,078,085	3.8
50 to 99 acres	2,526	78.8	199,057	2.1	9,532,952	5.9
100 to 174 acres	9,104	154.8	1,409,466	14.9	35,839,978	22.3
175 to 259 acres	1,573	216.7	341,241	3.6	10,224,236	6.3
260 to 499 acres	3,799	358.1	1,360,382	14.4	27,346,497	17.0
500 to 999 acres	1,466	712.0	1,043,856	11.0	18,847,930	11.7
1,000 acres and over	1,237	4,062.8	5,025,660	53.0	43,096,507	26.8

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

TABLE 9.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY AREA.

AREA.	AVERAGE VALUES PER FARM OF—					
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	Per cent of gross income on total investment in farm property.
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$3,658	$648	$192	$2,022	$1,088	16.7
Under 3 acres	400	422	64	3,795	1,406	30.0
3 to 9 acres	1,605	702	83	263	547	20.6
10 to 19 acres	2,357	704	129	288	615	17.7
20 to 49 acres	1,843	476	112	431	491	17.2
50 to 99 acres	2,514	392	162	706	697	18.5
100 to 174 acres	2,203	458	154	1,122	689	17.5
175 to 259 acres	4,133	721	244	1,402	1,170	18.0
260 to 499 acres	4,179	715	246	2,058	1,196	16.6
500 to 999 acres	6,960	1,046	323	4,528	2,022	15.7
1,000 acres and over	18,608	2,143	516	13,573	4,946	14.2

The group of farms of 1,000 acres, or over, comprises more than one-half of the total farm acreage, but only a little more than one-fourth of the value of farm property. The percentage of gross income on total investment in farm property is smaller for this group than for any other, while that for farms of less than 3 acres each is higher. The high average value of live stock for farms of this latter group is due to the fact that many of them are operated by stock raisers who pasture their cattle on ranges or the public domain. The high average and percentage of gross income for this group are doubtless due to the fact that it includes, besides the ranges just mentioned, 33 florists' establishments, and a number of city dairies. It should be borne in mind that the income from these industries is determined, not so much by the acreage of land used, as by the capital invested in buildings, implements, and live stock, and by the amounts expended for labor and fertilizers.

The group of farms between 100 and 174 acres comprises by far the largest number of farms of any single group and the largest aggregate acreage of any except the one comprising farms of 1,000 acres and over. The predominance of this group is due to the practice of taking up land in 160 acre, or quarter-section tracts. The next largest group is that of farms having 260 to 499 acres, which includes the 320 acre, or half-section holdings.

The average gross incomes per acre for the various groups classified by area are as follows: Farms under 3 acres, $779.81; 3 to 9 acres, $78.00; 10 to 19 acres, $46.18; 20 to 49 acres, $14.39; 50 to 99 acres, $8.85; 100 to 174 acres, $4.45; 175 to 259 acres, $5.39; 260 to 499 acres, $3.34; 500 to 999 acres, $2.84; 1,000 acres and over, $1.22.

FARMS CLASSIFIED BY PRINCIPAL SOURCE OF INCOME.

Tables 10 and 11 present the leading statistics for farms classified by principal source of income. If the value of the hay and grain raised on any farm exceeds that of any other crop and constitutes 40 per cent of the products not fed to live stock, the farm is classified as a hay and grain farm. If vegetables are the leading crop, constituting 40 per cent of the value of products, it is a vegetable farm. The farms of the other groups are classified according to the same general principle. "Miscellaneous" farms are those whose operators do not derive their principal income from any one class of products. Farms for which no income was reported are classified according to the agricultural operations upon other farms in the same locality.

TABLE 10.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY PRINCIPAL SOURCE OF INCOME, WITH PERCENTAGES.

PRINCIPAL SOURCE OF INCOME.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	24,700	383.6	9,474,588	100.0	$161,045,111	100.0
Hay and grain	7,070	265.9	1,880,052	19.8	44,523,504	27.6
Vegetables	2,363	114.9	271,409	2.9	9,943,867	6.2
Fruit	651	57.1	37,195	0.4	3,408,191	2.1
Live stock	8,761	696.5	6,102,102	64.4	79,385,132	49.3
Dairy produce	3,867	223.8	865,351	9.1	16,518,947	10.3
Sugar	50	96.4	4,821	0.1	166,079	0.1
Flowers and plants	53	2.9	153	(1)	686,270	0.4
Nursery products	21	36.4	765	(1)	127,673	0.1
Miscellaneous	1,864	167.8	312,740	3.3	6,285,388	3.9

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

TABLE 11.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY PRINCIPAL SOURCE OF INCOME.

PRINCIPAL SOURCE OF INCOME.	AVERAGE VALUES PER FARM OF—					
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	Per cent of gross income on total investment in farm property.
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$3,658	$648	$192	$2,022	$1,088	16.7
Hay and grain	4,564	652	223	859	897	14.2
Vegetables	2,957	606	187	458	972	23.1
Fruit	3,954	757	162	362	978	18.7
Live stock	3,953	673	202	4,233	1,583	17.5
Dairy produce	2,375	643	145	1,109	604	14.1
Sugar	2,613	382	116	211	410	12.4
Flowers and plants	8,705	3,983	278	82	3,744	28.9
Nursery products	4,851	955	169	105	2,442	40.2
Miscellaneous	2,147	448	143	634	598	17.7

It is seen by Table 10 that live-stock, hay and grain, and dairy farms are the leading classes of farms in the state, the three together making up 93.3 per cent of the acreage, and 87.2 per cent of the value of farm property for all farms. Of the three classes, live-stock farms are the most important, with 64.4 per cent of the total acreage and 49.3 per cent of the value of farm property.

The average values per acre of products not fed to live stock are as follows: For farms deriving their principal in-

come from flowers and plants, $1,296.75; nursery products, $67.02; fruits, $17.12; vegetables, $8.47; sugar, $4.26; miscellaneous, $3.56; hay and grain, $3.37; dairy produce, $2.70; and live stock, $2.27. In computing these averages the total area of the farms is used and not the acreage devoted to the crop from which the principal income is derived.

The wide variations shown in the averages and percentages of gross income are largely due to the fact that in computing gross income, no deduction is made for expenditures. For florists' establishments, nurseries, and market gardens the average expenditure for such items as labor and fertilizers represents a far larger percentage of the gross income than in the case of "hay and grain," "live stock," or "miscellaneous" farms. Were it possible to present the average net income, the variations shown would be comparatively slight.

FARMS CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK.

Tables 12 and 13 present data relating to farms classified by reported value of products not fed to live stock.

TABLE 12.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK, WITH PERCENTAGES.

VALUE OF PRODUCTS NOT FED TO LIVE STOCK.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	24,700	383.6	9,474,588	100.0	$161,045,111	100.0
$0	1,020	331.3	337,889	3.6	4,209,560	2.6
$1 to $49	979	156.5	153,212	1.6	1,848,340	1.1
$50 to $99	1,181	157.2	185,678	1.9	2,423,450	1.5
$100 to $249	3,691	169.3	624,721	6.6	9,187,382	5.7
$250 to $499	4,581	191.8	878,779	9.3	14,919,688	9.3
$500 to $999	5,579	249.5	1,391,955	14.7	27,367,420	17.0
$1,000 to $2,499	5,270	391.9	2,065,401	21.8	43,345,320	26.9
$2,500 and over	2,399	1,599.4	3,836,953	40.5	57,743,951	35.9

TABLE 13.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK.

VALUE OF PRODUCTS NOT FED TO LIVE STOCK.	AVERAGE VALUES PER FARM OF—					
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	Per cent of gross income on total investment in farm property.
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$8,658	$648	$192	$2,022	$1,088	16.7
$0	1,361	231	68	2,467		
$1 to $49	1,045	222	65	556	34	1.8
$50 to $99	1,134	284	75	559	66	3.2
$100 to $249	1,399	361	100	629	161	6.5
$250 to $499	1,806	467	126	858	356	10.9
$500 to $999	2,955	580	177	1,193	696	14.2
$1,000 to $2,499	5,100	907	263	1,955	1,502	18.3
$2,500 and over	12,418	1,554	501	9,597	5,307	22.0

The absence of reported income for farms of the first group is due in part to the inability of the enumerators to secure complete reports for farms which had changed hands shortly prior to the date of enumeration. Frequently the person in charge June 1, 1900, could not give definite information concerning the products of the preceding year. This is also true of some of the farms with reported incomes of less than $100. To this extent the reports fall short of giving a complete statement of farm income in 1899.

Some of the farms reporting no income were doubtless country places held for pleasure and not profit, and others were homesteads taken up in the spring of 1900. The high average value of live stock indicates that some were cattle ranches which reported no sales in 1899. Many of the farms of this group report products fed to live stock.

LIVE STOCK.

At the request of the various live-stock associations of the country, a new classification of domestic animals was adopted for the census of 1900. The age grouping for neat cattle was determined by their present and prospective relations to the dairy industry and the supply of meat products. Horses and mules are classified by age, and neat cattle by age and sex. The new classification permits a very close comparison with previous census reports.

Table 14 presents a summary of live-stock statistics.

TABLE 14.—DOMESTIC ANIMALS, FOWLS, AND BEES, ON FARMS AND RANGES, JUNE 1, 1900, WITH TOTAL AND AVERAGE VALUES, AND NUMBER OF DOMESTIC ANIMALS NOT ON FARMS.

LIVE STOCK.	Age in years.	ON FARMS AND RANGES.			NOT ON FARMS OR RANGES.
		Number.	Value.	Average value.	Number.
Calves	Under 1	269,154	$3,130,465	$11.63	2,625
Steers	1 and under 2	204,101	4,130,902	20.24	849
Steers	2 and under 3	136,775	3,927,154	28.71	1,229
Steers	3 and over	62,069	2,120,710	34.17	2,587
Bulls	1 and over	26,437	1,460,909	55.26	172
Heifers	1 and under 2	151,627	3,156,858	20.82	1,563
Cows kept for milk	2 and over	100,116	3,797,997	37.94	8,581
Cows and heifers not kept for milk.	2 and over	483,039	13,807,743	28.59	3,047
Colts	Under 1	23,645	291,280	12.32	503
Horses	1 and under 2	27,360	680,164	19.38	503
Horses	2 and over	185,541	6,487,282	34.96	35,757
Mule colts	Under 1	893	22,303	24.98	19
Mules	1 and under 2	874	33,300	38.10	22
Mules	2 and over	5,017	269,944	53.81	2,371
Asses and burros	All ages	5,513	52,010	9.43	2,029
Lambs	Under 1	691,991	1,144,294	1.65	281
Sheep (ewes)	1 and over	1,089,680	3,417,731	3.14	321
Sheep (rams and wethers).	1 and over	263,143	1,022,872	3.89	161
Swine	All ages	101,198	482,722	4.77	3,047
Goats	All ages	37,433	73,141	1.95	3,946
Fowls;[1]					
Chickens[2]		968,761	393,219		
Turkeys		30,781			
Geese		2,576			
Ducks		15,002			
Bees (swarms of)		59,756	195,096	3.26	
Unclassified			6,215		
Value of all live stock			49,954,311		

[1] The number reported is of fowls over 3 months old. The value is of all old and young.
[2] Including Guinea fowls.

The total value of all live stock on farms and ranges, June 1, 1900, was $49,954,311. Of this amount, 14.6 per cent represents the value of horses; 7.6 per cent, that of dairy cows; 63.5 per cent, that of other neat cattle; 11.2

per cent, that of sheep; and 3.1 per cent, that of all other live stock.

The low average value of asses and burros is due to the fact that the majority of these animals are the small burros of the mountainous districts. No reports were secured of the value of live stock not on farms and ranges, but it is probable that such animals have higher average values than farm or range animals. Allowing the same averages, however, the total value of all live stock in the state, exclusive of poultry and bees not on farms, would be approximately $52,018,800.

CHANGES IN LIVE STOCK ON FARMS AND RANGES.

The following table shows the changes since 1870 in the numbers of the most important domestic animals.

TABLE 15.—NUMBER OF SPECIFIED DOMESTIC ANIMALS ON FARMS AND RANGES: 1870 TO 1900.

YEAR.	Dairy cows.	Other neat cattle.	Horses.	Mules and asses.	Sheep.[1]	Swine.
1900	100,116	1,333,202	236,546	12,297	1,352,823	101,198
1890[2]	76,948	640,918	155,170	7,139	717,990	64,358
1880[2]	28,770	318,069	42,257	2,581	746,443	7,656
1870	25,017	45,719	6,446	1,173	120,928	5,509

[1] Lambs not included.
[2] Exclusive of animals on ranges.

Since the live-stock enumeration in 1880 and in 1890 did not include domestic animals on ranges, the figures presented in the table for these years are not comparable with the figures of 1900. The number of animals on ranges in 1890 was estimated by special agents to be as follows: All neat cattle, 448,681; horses, 31,209; mules and asses, 65; sheep, 178,820; swine, 33. The census shows a marked increase in dairy cows, the number reported in 1900 being four times as great as the number reported thirty years before, and 23,168, or 30.1 per cent greater than in 1890. The number of "other neat cattle" given for 1900 includes 269,154 calves. Whether any calves were reported in 1890 under this designation is uncertain. If not, the number of calves in 1900 should be deducted when making comparisons with reports for previous years, in which case the increase during the last decade in the number of "other neat cattle" over 1 year of age would be only 66.0 per cent, instead of 108.0 per cent, as indicated by the above table.

The number of horses has increased rapidly since 1870; taking into account the estimated number on ranges in 1890, the per cent of increase in the last decade was 26.9. Since 1890, mules and asses have increased in number 72.3 per cent, and swine, 57.2 per cent. Nearly one-third of the swine in the state are reported in Weld, Arapahoe, and Morgan counties.

In the number of sheep there was a slight decrease from 1880 to 1890, but since 1890 there has been a gain of 634,833, or 88.4 per cent. Sheep raising is confined in general to the southern counties, although Weld and Morgan counties report comparatively large numbers.

In comparing the poultry report for 1900 (see Table 14) with that of 1890, it should be borne in mind that in 1900 the enumerators were instructed not to report fowls less than 3 months old, while in 1890 there was no such limitation. During the past decade geese have increased in number 135.0 per cent; turkeys, 47.5 per cent; chickens, 36.3 per cent; and ducks, 23.9 per cent.

ANIMAL PRODUCTS.

Table 16 is a summarized statement of the products of the animal industry.

TABLE 16.—QUANTITIES AND VALUES OF SPECIFIED ANIMAL PRODUCTS, AND VALUES OF POULTRY RAISED, ANIMALS SOLD, AND ANIMALS SLAUGHTERED, ON FARMS, IN 1899.

PRODUCTS.	Unit of measure.	Quantity.	Value.
Wool	Pounds	8,543,937	$1,115,331
Mohair and goat hair	Pounds	1,843	550
Milk	Gallons	[1] 38,440,111	[2] 3,778,901
Butter	Pounds	4,932,482	
Cheese	Pounds	103,184	
Eggs	Dozens	5,704,290	852,978
Poultry			587,536
Honey	Pounds	1,732,630	171,740
Wax	Pounds	24,930	
Animals sold			8,477,587
Animals slaughtered			1,093,365
Total			16,077,988

[1] Comprises all milk produced, whether sold, consumed, or made into butter or cheese.
[2] Comprises the value of milk sold and consumed, and of butter and cheese made.

The value of animal products in 1899 was $16,077,988, or 48.6 per cent of the total value of all farm products, and 59.8 per cent of the gross farm income. Of the above amount, 59.5 per cent represents the value of animals sold and animals slaughtered on farms; 23.5 per cent, that of dairy produce; 9.0 per cent, that of poultry and eggs; 6.9 per cent, that of wool and mohair; and 1.1 per cent, that of honey and wax.

ANIMALS SOLD AND SLAUGHTERED.

The aggregate value of animals sold and slaughtered on farms and ranges in 1899 was $9,570,952, or 35.6 per cent of the gross farm income. Of all farmers reporting live stock, 10,949, or 46.1 per cent, reported sales of live animals, and 10,529, or 44.3 per cent, reported animals slaughtered. The average receipts per farm from the sale of live animals in 1899 were $774.28, and the average value per farm of animals slaughtered was $103.84.

DAIRY PRODUCTS.

Dairying stands third in importance among the several branches of agriculture in Colorado. Of the 24,700 farmers in the state, 3,867, or 15.7 per cent, reported dairy products as their principal source of income. While the population has increased but 30.7 per cent since 1890, and the number of dairy cows but 30.1 per cent, the quantity of milk produced shows a gain of 18,759,320 gallons, or 95.3 per cent. The discrepancy between the increase of milk production and dairy cows, however, is probably apparent rather than real, since the definition of "dairy cows," adopted in the census of 1900, was more strict than in preceding censuses. As a result, many animals that would have been included in the class of "dairy cows," if the classification of 1890 had been followed,

were doubtless excluded, causing reduction in the percentage of increase for the decade.

Arapahoe county reported 6,435,955 gallons of milk, or more than twice the quantity produced in any other county. The average production per capita increased from 47.7 gallons in 1889, to 71.2 gallons in 1899. Since 1879 the quantity of milk sold has increased 12,665,104 gallons, or approximately 250 per cent.

Comparison with the figures for 1889 shows a gain of 1,650,396 pounds, or 50.3 per cent, in the amount of butter, and of 16,001 pounds, or 18.4 per cent, in the quantity of cheese made on farms.

Of the $3,778,901 given in Table 16 as the value of dairy produce in 1899, $1,355,858, or 35.9 per cent, represents the value of such produce consumed on farms, and $2,423,043, or 64.1 per cent, the amount realized from sales. Of the latter sum, $1,747,424 was derived from the sale of 13,170,810 gallons of milk; $589,394, from 2,756,798 pounds of butter; $76,531, from 132,297 gallons of cream; and $9,694, from 80,333 pounds of cheese.

POULTRY AND EGGS.

The total value of the products of the poultry industry in 1899 was $1,440,514, of which 59.2 per cent represents the value of eggs produced, and 40.8 per cent, that of fowls raised. Over three million dozens more eggs were produced in 1899 than in 1889, an increase of 112.4 per cent.

WOOL.

In the last decade the production of wool has increased 5,209,703 pounds, or 156.2 per cent. As the wool product given for 1890, however, did not include wool produced on ranges, the real increase was probably considerably less than that shown by simple comparison of the figures. The average weight of fleeces has remained practically the same, being 5.9 pounds in 1890 and 6.1 pounds in 1900. Las Animas county reported the largest quantity of wool, 820,644 pounds. Mohair and goat hair were reported by but few counties, Las Animas, Mesa, La Plata, and Saguache counties reporting over 80 per cent of the total clip.

HONEY AND WAX.

In 1900, 4,518 farmers reported, in the aggregate, 59,756 swarms of bees. They obtained, in 1899, 1,732,630 pounds of honey and 24,930 pounds of wax, the gains in the last decade being 87.4 per cent in the former item, and more than twofold in the latter. The leading counties in 1900, as in 1890, were Jefferson, Arapahoe, Montrose, Delta, Larimer, and Weld.

HORSES AND DAIRY COWS ON SPECIFIED CLASSES OF FARMS.

Table 17 presents, for the leading groups of farms, the number of farms reporting horses and dairy cows, the total number of these animals, and the average number per farm. In the computation of these averages, only those farms are included which report the kind of stock under consideration.

TABLE 17.—HORSES AND DAIRY COWS ON SPECIFIED CLASSES OF FARMS, JUNE 1, 1900.

CLASSES.	HORSES.			DAIRY COWS.		
	Farms reporting.	Number.	Average per farm.	Farms reporting.	Number.	Average per farm.
Total	23,020	236,546	10.3	18,669	100,116	5.4
White farmers	22,954	236,283	10.3	18,637	99,924	5.4
Colored farmers	66	263	4.0	32	192	6.0
Owners[1]	17,166	166,037	9.7	13,942	74,826	5.4
Managers	763	32,548	42.7	564	3,876	6.9
Cash tenants	2,000	14,066	7.0	1,667	11,064	6.6
Share tenants	3,091	23,895	7.7	2,496	10,350	4.1
Under 20 acres	2,360	11,496	4.9	1,723	7,331	4.3
20 to 99 acres	4,243	20,188	4.8	3,331	13,068	3.9
100 to 174 acres	8,596	67,867	7.9	6,809	32,135	4.7
175 to 259 acres	1,502	14,194	9.5	1,326	7,238	5.5
260 acres and over	6,319	122,801	19.4	5,480	40,344	7.4
Hay and grain	6,482	54,650	8.4	5,121	20,597	4.0
Vegetable	2,156	10,407	4.8	1,528	4,205	2.8
Fruit	583	2,148	3.7	415	792	1.9
Live stock	8,455	136,132	16.1	6,489	34,632	5.3
Dairy	3,661	22,920	6.3	3,867	34,851	9.0
Miscellaneous[2]	1,683	10,289	6.1	1,249	5,039	4.0

[1] Including "part owners" and "owners and tenants."
[2] Including florists' establishments and nurseries.

CROPS.

The following table gives the statistics of the principal crops grown in 1899.

TABLE 18.—ACREAGES, QUANTITIES, AND VALUES OF THE PRINCIPAL FARM CROPS IN 1899.

CROPS.	Acres.	Unit of measure.	Quantity.	Value.
Corn	85,256	Bushels	1,275,680	$508,488
Wheat	294,949	Bushels	5,587,770	2,809,370
Oats	120,952	Bushels	3,080,180	1,121,745
Barley	21,949	Bushels	531,240	246,510
Rye	2,148	Bushels	26,180	13,876
Buckwheat	27	Bushels	226	151
Flaxseed	434	Bushels	1,820	1,851
Clover seed		Bushels	12,623	52,520
Grass seed		Bushels	1,012	775
Hay and forage	952,214	Tons	1,647,477	8,159,279
Kafir corn	18	Bushels	302	131
Peanuts	5	Bushels	138	173
Dry beans	2,634	Bushels	28,570	49,169
Dry peas	3,621	Bushels	47,461	29,906
Broom corn	1,241	Pounds	226,550	10,577
Potatoes	44,075	Bushels	4,465,748	1,717,111
Sweet potatoes	20	Bushels	2,291	2,064
Onions	754	Bushels	205,841	125,713
Sugar beets	1,094	Bushels	6,656	26,711
Miscellaneous vegetables	14,742			1,006,237
Sorghum cane	51	Tons	20	71
Sorghum sirup		Gallons	2,661	1,036
Small fruits	2,347			294,385
Grapes	[1] 436	Centals	5,863	[2] 17,174
Orchard fruits	[1] 43,528	Bushels	354,049	[3] 378,119
Nuts				433
Forest products				113,055
Flowers and plants	137			198,479
Seeds	495			11,113
Nursery stock	497			65,936
Miscellaneous	338			8,430
Total	1,593,962			16,970,588

[1] Estimated from number of vines or trees.
[2] Including value of raisins, wine, etc.
[3] Including value of cider and vinegar.

Of the total value of crops, hay and forage contributed 48.1 per cent; cereals, 27.7 per cent; vegetables, including potatoes, sweet potatoes, and onions, 16.9 per cent; fruits, 4.1 per cent; and all other crops, 3.2 per cent. Of the total acreage devoted to crops, that of hay and forage constituted 59.7 per cent; cereals, 33.0 per cent; vegetables, 3.8 per cent; fruits, 2.9 per cent; and other crops, 0.6 per cent.

The average values per acre of the principal crops were as follows: Flowers and plants, $1,448.75; onions, $166.73; nursery stock, $132.67; small fruits, $125.43; miscellaneous vegetables, $68.26; grapes, $39.39; potatoes, including sweet potatoes, $38.96; cereals, $8.95; orchard fruits, $8.69; and hay and forage, $8.57.

The crops yielding the highest returns per acre were grown upon highly improved land. Their production required a relatively great amount of labor and large expenditures for fertilizers.

CEREALS.

Table 19 shows the changes in cereal production since 1869.

TABLE 19.—ACREAGE AND PRODUCTION OF CEREALS: 1869 TO 1899.

PART 1.—ACREAGE.

YEAR.[1]	Barley.	Buckwheat.	Corn.	Oats.	Rye.	Wheat.
1899	21,949	27	85,256	120,952	2,148	294,949
1889	12,056	117	119,310	87,959	4,615	126,999
1879	4,112	8	22,991	23,023	1,294	64,693

[1] No statistics of acreage were secured prior to 1879.

PART 2.—BUSHELS PRODUCED.

1899	531,210	226	1,275,680	3,080,130	26,180	5,587,770
1889	331,556	2,081	1,511,907	2,514,480	54,158	2,845,439
1879	107,116	110	455,963	640,900	19,465	1,425,014
1869	35,141	178	231,903	332,940	5,235	258,474

The total area devoted to cereals in 1899 was 525,281 acres; in 1889, 351,086 acres; and in 1879, 116,121 acres. The acreage of each of the specified grains in 1899 shows a considerable increase over that reported twenty years before. In the last decade the total acreage in cereals has increased 49.6 per cent, the gains for wheat, barley, and oats being 132.2 per cent, 81.6 per cent, and 37.5 per cent, respectively, while the acreage devoted to corn shows a decrease of 28.5 per cent.

The acreages given in the above table are exclusive of 1,341 acres of corn, nonsaccharine sorghum, and similar crops grown for forage or ensilage, and of 46,530 acres of grain cut green for hay.

HAY AND FORAGE.

In 1900, 17,008 farmers, or 68.9 per cent of the total number, reported hay and forage crops. The average yield, exclusive of cornstalks, was 1.7 tons per acre. The total area in hay and forage in 1899 was 952,214 acres, an increase of 97.7 per cent over the acreage reported in 1889. In 1899 the acreages and yields of the various kinds of hay and forage were as follows: Wild, salt, and prairie grasses, 335,748 acres and 309,599 tons; millet and Hungarian grasses, 8,323 acres and 9,370 tons; alfalfa or lucern, 455,237 acres and 1,107,511 tons; clover, 2,582 acres and 5,410 tons; other tame and cultivated grasses, 80,566 acres and 113,392 tons; grains cut green for hay, 46,530 acres and 55,277 tons; crops grown for forage, 23,228 acres and 42,928 tons; and cornstalks, 5,741 acres and 3,990 tons.

In Table 18 the production of cornstalks is included, but not the acreage, as the forage secured was only an incidental product of the land on which it was raised.

ORCHARD FRUITS.

The changes in orchard fruits since 1890 are shown in the following table.

TABLE 20.—ORCHARD TREES AND FRUITS: 1890 AND 1900.

FRUITS.	NUMBER OF TREES.		BUSHELS OF FRUIT.	
	1900.	1890.	1899.	1889.
Apples	2,004,895	77,798	257,563	70,723
Apricots	14,854	1,512	2,363	284
Cherries	127,001	4,085	5,387	345
Peaches	319,998	8,204	47,381	3,135
Pears	168,837	3,752	19,272	2,141
Plums and prunes	259,332	10,615	15,224	1,675

Only 2,162, or 8.8 per cent, of the farmers in the state reported orchard fruits in 1899. In the census of 1890, the value of orchard products was not separately reported but in 1879 it was $3,246. For 1899 the value was $378,119, a hundredfold gain in twenty years. The three counties of Mesa, Fremont, and Delta produced over one-half the fruit crop of the state. The total number of trees shown in the above table is 2,894,917, of which 69.3 per cent are apple trees; 11.0 per cent, peach trees; 9.0 per cent, plum and prune trees; 5.8 per cent, pear trees; 4.4 per cent, cherry trees; and 0.5 per cent, apricot trees. Since 1890, there have been very marked gains in the number of all trees, the fruit-raising industry practically dating its origin from that year.

SMALL FRUITS.

The total area used in the cultivation of small fruits in 1899 was 2,347 acres, distributed among 1,778 farms. The value of the fruits grown was $294,385, an average of $125 per acre. Of the total area, 1,067 acres, or 45.5 per cent, were devoted to strawberries, the total production of which was 2,224,240 quarts. The acreage and production of other berries were as follows: Raspberries and Logan berries, 689 acres and 817,450 quarts; currants, 226 acres and 204,480 quarts; blackberries and dewberries, 195 acres and 216,020 quarts; gooseberries, 122 acres and 133,750 quarts; and other berries, 48 acres and 53,290 quarts.

VEGETABLES.

The value of all vegetables grown in the state in 1899, including potatoes, sweet potatoes, onions, and sugar beets, was $2,877,836. Of this amount, 59.7 per cent represents the value of potatoes, which were reported by more than one-fourth of the farmers of the state. Weld county led in the production of potatoes, reporting 2,821,285 bushels, valued at $1,013,325, or 59.0 per cent of the value of the entire crop.

In the growing of miscellaneous vegetables, 14,742 acres were used. The products of 4,957 acres were not reported in detail, but of the remaining 9,785 acres, 2,329 were devoted to muskmelons; 1,761, to cabbages; 1,316,

to green pease; 1,253, to tomatoes; 1,095, to sweet corn; 670, to watermelons; and 1,361, to other vegetables.

SUGAR BEETS.

The production of sugar beets bids fair to become an important branch of agriculture in this state. In 1899, 169 farmers devoted to this crop an area of 1,094 acres, or an average of 6.5 acres per farm, and obtained therefrom 6,656 tons of beets, an average of 6.1 tons per acre. The amount realized from the crop was $26,711, an average of $158 per farm, $24 per acre, and $4 per ton. Of the total acreage devoted to the crop, 85.3 per cent was reported by Mesa county.

FLORICULTURE.

The proprietors of 53 of the 72 establishments where flowers were grown for market in 1899 made commercial floriculture their principal business. They had a capital of $686,270, of which $461,375 represents the value of buildings; $208,475, that of land; $14,745, that of implements; and $1,675, that of live stock. In 1899 they raised flowers and plants valued at $183,303 and obtained other products valued at $15,100, making a total gross income of $198,403, or $1,296.75 for each of the 153 acres used. During the same year they expended $1,270 for fertilizers and $56,132 for labor. The 27 florists of Arapahoe county reported 71.5 per cent of the total product.

An aggregate of 859,700 square feet of land under glass was reported by the operators of 225 farms and florists' establishments. The greenhouses of the 53 florists had 698,682 square feet of glass surface, covering 524,012 square feet of land.

NURSERIES.

Nursery products were grown in 1899 by the operators of 41 farms, but of this number only 21 derived their principal income from this class of products. From 765 acres of land these 21 nurserymen secured products valued at $51,273, an average income per acre of $67.02. Of the total receipts, $45,288 was derived from the sale of trees, shrubs, and vines, and the balance from other farm products.

LABOR AND FERTILIZERS.

The total expenditure for labor on farms in 1899, including the value of board furnished, was $4,100,905, an average of $166 per farm. The average was highest on the most intensively cultivated farms, being $1,059 for florists' establishments, $415 for nurseries, $227 for fruit farms, $226 for live-stock farms, $157 for vegetable farms, $153 for hay and grain farms, $87 for dairy farms, and $62 for sugar farms. "Managers" expended on an average, $939; "share tenants," $137; "cash tenants," $118; and "owners," $113. White farmers expended $166 per farm, and colored farmers, $22.

Fertilizers purchased in 1899 cost $23,225, an average of less than $1 per farm, and a decrease since 1890 of 7.4 per cent. For florists' establishments the average expenditure was $24; for vegetable and fruit farms, $3; and for hay and grain farms, dairy farms, and nurseries, $1.

SOUTHERN UTE INDIAN RESERVATION.

The Southern Ute reservation, containing 870 square miles, is situated in the southwestern corner of Colorado, a small portion extending into New Mexico. On this reservation are located the Moache, Capote, and Wiminuche Ute, of Shoshonean stock. These bands are commonly known as the Southern Ute Indians.

The arable land, constituting about one-fifth of the total area, is confined to the river valleys. No part of the reservation is cultivable without irrigation, but the soil is everywhere fertile, and wherever water can be supplied, cereals, grasses, fruits, and vegetables may be successfully grown.

The eastern part of the reservation, on which the Moache and Capote bands reside, is well supplied with irrigation facilities. There are now in operation 4 large canals, aggregating 24.8 miles in length, and also many smaller ditches. The work is gradually being extended and new land is constantly being reclaimed. The unallotted western portion is without irrigation, although the land is as fertile as any in the eastern section. Congress has appropriated $150,000 for an irrigation system in this part of the reservation, but as yet the work of construction has not been begun.

Naturally adverse to manual labor, the Colorado Indians have been slow to adopt agriculture as a means of subsistence. The allotted Ute (Moache and Capote) are making steady advancement, and when their irrigation systems are fully developed they will doubtless become self-supporting. They are rapidly improving their allotments, constructing new roads and irrigation ditches, in addition to building fences, barns, and log houses. In some instances these improvements have been accomplished without the assistance of white men. Although most of the Indian farmers have from ten to twenty acres under cultivation, government rations still constitute 25 per cent of their subsistence.

The principal crops of the Southern Ute are wheat and alfalfa. In 1899, 14 farmers sowed 120 acres to wheat, and obtained a yield of 2,400 bushels, valued at $1,440. Their alfalfa yields two and three cuttings each season. From 102 acres sown to alfalfa in the census year they cut 409 tons, valued at $1,227. They find a ready market at good prices for everything they raise.

Their live stock, June 1, 1900, consisted of 48 horses, 22 neat cattle, and 30 goats. Their horses and sheep range all winter without shelter and without being fed, and it is estimated that 400 sheep and 100 horses perished during the severe winter of 1898–1899. Their horses are mostly pony stock of little value. The small number of animals reported in 1900 is due to the fact that the Wiminuche, who own most of the live stock, had left the reservation with their flocks and herds and no report of their animals could be obtained.

IRRIGATION STATISTICS.

During the decade 1889 to 1899, Colorado advanced to the front rank of irrigated states, surpassing California in the extent of land under irrigation, but remaining second in the number of irrigators and in the value of irrigated crops. The colder climate and greater altitude of Colorado make it impossible to raise the high-priced citrus or semitropical fruits, or to practice the degree of intensive farming for which Arizona and California are noted.

The surface of the state is divided about equally into mountain area and plains, the latter lying to the east, and being a continuation of the Kansas uplands. Among the mountains of the western half of the state are open valleys, surrounded by lofty ranges. In the southwest, the mountains are particularly abrupt, presenting jagged and rocky peaks, Alpine in their characteristics. At an elevation of 7,000 or 8,000 feet, surrounded by mountains rising 8,000 feet higher, are found a number of green parks which are widely different in aspect from the lower plains of the east, or the vast plateaus or table-lands of the middle west. Most of these parks, once the basins of lakes, have floors which are apparently level but which have sufficient fall to be easily irrigable.

The plains, which comprise an area of 30,000 square miles, are barren of timber, and have a gradual slope toward the Mississippi Valley. About two-thirds of the people of Colorado live in this area. The soil is rich and the vegetation is particularly luxuriant along the water courses. The rainfall is insufficient, however, and crops can not be produced without irrigation.

The land surface of Colorado comprises 66,332,800 acres, of which only 9,474,588, or 14.3 per cent, were included in farms in 1900, and 2,273,968 acres, or 3.4 per cent were improved. Of this area, 2,240 acres are included in the Indian reservations. Of the total area in farms, 24.0 per cent is improved.

The importance of irrigation as a feature of the agricultural development of the state is shown by the fact that the irrigated land outside of the Indian reservations amounts to 1,611,271 acres, or 70.9 per cent of the improved farm land. In 1890 the acres irrigated outside of the Indian reservations numbered 890,735, or 48.8 per cent of the improved land. Since then, by the opening of new ditches and canals, by the enlargement of those previously constructed, and by the application of more intelligent methods of water distribution, 720,536 acres of land have been added to the irrigated area of the territory, an increase of 80.9 per cent. In 1890 most of this land was public domain and comparatively valueless. At the present time its value, at a low estimate, is $28,968,552, an average of $40.77 per acre. Irrigation has added this large amount to the farm wealth of the state. The relation of irrigation to the various agricultural operations is shown in the following table.

TABLE A.—ACREAGE AND PRODUCTION OF ALL CROPS, AND OF IRRIGATED CROPS IN 1899.

CROPS.	ACREAGE.			Unit of measure.	PRODUCTION.		
	Total.	Irrigated.	Per cent irrigated.		Total.	Irrigated.	Per cent irrigated.
Corn	85,256	40,905	48.0	Bushels	1,275,680	871,560	68.3
Wheat	294,949	247,644	84.0	Bushels	5,587,770	5,309,350	95.0
Oats	120,952	100,515	83.1	Bushels	3,080,130	2,763,340	89.7
Barley	21,949	20,304	92.5	Bushels	531,240	509,960	96.0
Rye	2,148	888	41.3	Bushels	26,180	15,060	57.5
Alfalfa	455,287	452,433	99.4	Tons	1,107,471	1,100,706	99.4
Grain cut green for hay	46,530	19,277	41.4	Tons	55,277	29,940	54.2
Other hay	450,447	320,509	71.1	Tons	485,119	370,361	76.4
Broom corn	1,241	45	3.6	Pounds	226,550	17,000	7.5
Dry beans	2,634	2,359	84.6	Bushels	28,570	26,747	93.6
Dry pease	3,621	3,523	97.3	Bushels	47,461	46,704	98.4
Potatoes	44,075	36,344	82.5	Bushels	4,465,748	4,118,737	92.2
Sweet potatoes	20	19	95.0	Bushels	2,291	2,258	98.6
Onions	754	677	89.8	Bushels	205,841	188,169	91.4
Miscellaneous vegetables	14,742	11,667	79.1				
Small fruits	2,347	1,749	74.5				
Grapes	436	408	93.6	Centals	5,713	4,921	86.1
Orchard fruits	43,528	38,957	89.4				
Other crops	3,096	2,617	84.5				
Total	1,593,962	1,300,840	81.6				

The total number of acres of irrigated crops, as given above, is 1,300,840, while the total number of acres of land irrigated is 1,611,271. The difference of 310,431 acres represents in part the area of pasture lands irrigated, but includes also a considerable acreage, which, by reason of shortage of water, was only partially irrigated and did not produce crops. On the other hand, it is probable that a portion of the area upon which crops were reported as grown without irrigation, was really irrigated at some time during the year.

Table B is a comparative exhibit, by counties, of the number of irrigators, and the acreage irrigated in 1889 and in 1899. Table C presents the corresponding figures for the six drainage divisions of the state.

TABLE B.—NUMBER OF IRRIGATORS, AND ACRES IRRIGATED, WITH PERCENTAGES OF INCREASE, BY COUNTIES: 1889 AND 1899.

COUNTIES.	NUMBER OF IRRIGATORS.			ACRES IRRIGATED.		
	1899.	1889.	Per cent of increase.	1899.	1889.	Per cent of increase.
The State	17,613	9,659	82.3	1,611,271	890,735	80.9
Arapahoe	1,153	520	121.7	81,807	35,619	129.7
Archuleta	151	45	235.6	6,529	3,084	111.7
Baca	10	2	400.0	156	60	160.0
Bent	223	83	168.7	33,039	4,221	682.7
Boulder	887	449	97.6	83,766	70,962	18.0
Chaffee	191	148	29.1	13,071	11,994	9.0
Cheyenne	14			291		
Clear Creek	9	12	[1]25.0	368	352	4.5
Conejos	603	387	55.8	98,486	46,273	112.8
Costilla	315	196	60.7	50,290	25,918	94.0
Custer	155	221	[1]29.9	11,183	20,997	[1]47.0
Delta	798	312	155.8	35,219	17,846	97.4
Dolores	23	12	91.7	855	216	295.8
Douglas	134	96	39.6	7,962	5,699	39.7
Eagle	188	176	6.8	18,486	14,250	29.7
Elbert	17	32	[1]46.9	905	2,616	[1]66.0
El Paso	180	139	29.5	13,131	10,959	19.8
Fremont	588	312	88.5	15,542	13,508	15.1
Garfield	487	314	55.1	24,937	14,637	70.4
Gilpin	16			354		
Grand	153	98	56.1	17,643	10,281	71.6
Gunnison	226	165	37.0	26,971	20,115	34.1
Hinsdale	80	19	57.9	1,339	1,389	[1]4.0
Huerfano	345	400	[1]13.8	15,329	22,294	[1]31.0
Jefferson	751	470	59.8	43,850	40,829	7.4
Kiowa	8			158		
Kit Carson	23			859		
Lake	56	36	55.6	7,380	6,591	12.0
La Plata	220	230	[1]4.3	10,771	11,785	[1]9.0
Larimer	1,256	769	63.3	169,028	103,483	63.3
Las Animas	549	353	55.5	24,661	22,891	7.7
Lincoln	17	5	240.0	1,678	334	402.4
Logan	226	73	209.6	8,913	8,970	[1]1.0
Mesa	742	310	139.4	33,223	13,798	140.8
Mineral	32			2,640		
Montezuma	240	29	727.6	12,246	2,122	477.1
Montrose	468	462	1.3	34,132	27,361	24.7
Morgan	305	97	214.4	37,012	16,443	125.1
Otero	762	139	448.2	62,268	16,431	279.0
Ouray	128	94	36.2	10,440	7,894	32.3
Park	172	136	26.5	39,861	24,015	66.0
Phillips	4			19		
Pitkin	153	115	33.0	12,088	7,041	71.7
Prowers	377	18	1,994.4	46,092	1,808	2,449.3
Pueblo	561	206	172.3	35,943	10,930	228.8
Rio Blanco	239	135	77.0	21,381	7,532	183.9
Rio Grande	351	195	80.0	71,325	21,797	227.2
Routt	552	280	97.1	44,542	16,323	172.9
Saguache	364	240	51.7	75,909	52,453	44.7
San Juan	3			9		
San Miguel	108	57	89.5	5,425	2,125	155.3
Sedgwick	81			4,779		
Summit	72	20	260.0	3,531	1,316	168.3
Teller	41			881		
Washington	25	1	2,400.0	5,099	720	608.2
Weld	1,814	1,046	73.4	226,613	112,080	102.2
Yuma	22	5	340.0	856	373	129.5

[1] Decrease.

TABLE C.—NUMBER OF IRRIGATORS, AND ACRES IRRIGATED, WITH PERCENTAGES OF INCREASE, BY WATER DIVISIONS: 1889 AND 1899.

WATER DIVISIONS.	NUMBER OF IRRIGATORS.			ACRES IRRIGATED.		
	1899.	1889.	Per cent of increase.	1899.	1889.	Per cent of increase.
The State	17,613	9,659	82.3	1,611,271	890,735	80.9
I	6,872	3,706	85.4	711,192	422,161	68.5
II	4,095	2,062	98.6	281,662	143,018	96.9
III	1,695	1,037	63.5	299,989	147,880	102.9
IV	614	304	102.0	29,555	16,991	73.9
V	3,546	2,135	66.1	222,950	136,880	62.9
VI	791	415	90.6	65,923	23,855	176.3

While the number of farms outside of the Indian reservations increased, in ten years, 50.7 per cent, the number of irrigators, as shown in the above tables, increased 82.3 per cent, and the irrigated area 80.9 per cent.

Table D is an exhibit, by counties, exclusive of Indian reservations, of the number of irrigated farms compared with the total number of farms, and of the irrigated acreage compared with the total improved acreage.

TABLE D.—COMPARISON OF IRRIGATED FARMS WITH TOTAL NUMBER OF FARMS, AND OF IRRIGATED ACREAGE WITH IMPROVED ACREAGE, JUNE 1, 1900.

COUNTIES.	NUMBER OF FARMS.			NUMBER OF IMPROVED ACRES IN FARMS.		
	Total.	Irrigated.	Per cent irrigated.	Total.	Irrigated.	Per cent irrigated.
The State	24,686	17,613	71.3	2,273,731	1,611,271	70.9
Arapahoe	2,105	1,153	54.8	202,047	81,807	40.5
Archuleta	227	151	66.5	10,372	6,529	62.9
Baca	137	10	7.3	7,832	156	2.0
Bent	274	223	81.4	38,858	33,039	85.0
Boulder	967	887	91.7	91,708	83,766	91.3
Chaffee	242	191	78.9	14,726	13,071	88.8
Cheyenne	57	14	24.6	2,740	291	10.6
Clear Creek	31	9	29.0	1,196	368	30.8
Conejos	617	603	97.7	98,960	98,486	99.5
Costilla	331	315	95.2	79,678	50,290	63.1
Custer	351	155	44.2	23,111	11,183	48.4
Delta	874	798	91.3	38,016	35,219	92.6
Dolores	36	23	63.9	942	855	90.8
Douglas	457	134	29.3	39,165	7,962	20.3
Eagle	208	188	90.4	19,709	18,486	93.8
Elbert	579	17	2.9	40,460	905	2.2
El Paso	729	180	24.7	62,408	13,131	21.0
Fremont	606	588	97.0	20,512	15,542	75.8
Garfield	507	487	96.1	29,002	24,937	86.0
Gilpin	49	16	32.7	2,110	354	16.8
Grand	179	153	85.5	18,504	17,643	95.3
Gunnison	239	226	94.6	28,163	26,971	95.8
Hinsdale	35	30	85.7	1,767	1,339	75.8
Huerfano	486	345	70.9	25,466	15,329	60.2
Jefferson	1,050	751	71.5	61,224	43,850	71.6
Kiowa	138	8	2.2	4,138	158	3.8
Kit Carson	305	23	7.5	19,581	859	4.4
Lake	71	56	78.9	7,636	7,380	96.6
La Plata	285	220	77.2	14,491	10,771	74.3
Larimer	1,412	1,256	89.0	180,353	169,028	93.7
Las Animas	1,037	549	52.9	38,441	24,661	64.2
Lincoln	138	17	12.3	8,195	1,678	20.5
Logan	413	226	54.7	57,639	8,913	15.5
Mesa	747	742	99.3	34,205	33,223	97.1
Mineral	48	32	66.7	2,929	2,640	90.1
Montezuma	261	240	92.0	15,204	12,246	80.5
Montrose	524	468	89.3	36,884	34,132	92.5
Morgan	378	305	80.7	43,282	37,012	85.5
Otero	814	762	93.6	68,036	62,268	91.5
Ouray	128	128	100.0	11,184	10,440	93.3
Park	220	172	78.2	40,258	39,861	99.0
Phillips	244	4	1.6	20,028	19	0.1
Pitkin	170	153	90.0	12,583	12,088	96.1
Prowers	478	377	78.9	58,172	46,092	79.2
Pueblo	663	561	84.6	40,821	35,943	88.1
Rio Blanco	264	239	90.5	21,846	21,381	97.9
Rio Grande	361	351	97.2	78,141	71,325	91.3
Routt	703	552	78.5	53,977	44,542	82.5
Saguache	406	364	89.6	119,587	75,909	63.5
San Juan	6	3	50.0	18	9	50.0
San Miguel	229	108	47.2	10,088	5,425	53.8
Sedgwick	156	81	51.9	9,209	4,779	51.9
Summit	77	72	93.4	4,031	3,531	87.6
Teller	148	41	28.7	4,685	881	18.8
Washington	201	25	12.4	17,961	5,099	28.4
Weld	2,002	1,814	90.6	251,307	226,613	90.2
Yuma	291	22	7.6	30,145	856	2.8

Of the 24,686 farms of the state, 17,613, or 71.3 per cent, are irrigated; and of the total number of acres in farms, 6,241,850, or 65.9 per cent, are in irrigated farms.

Of the improved land in farms, 70.9 per cent is irrigated. The average size of all farms, exclusive of those held by the Indians, is 384 acres, and the average size of irrigated farms is 354 acres. The average number of acres of improved land in all farms is 92, and in irrigated farms it is 107, of which 91 acres are actually irrigated.

Most of the water used for irrigation is surface water obtained from rivers, but in addition to this, considerable quantities of ground water, or so-called underflow, found at depths varying from 20 to 1,500 feet, have been utilized. There were 227 farms which were irrigated wholly, or in part, by pumping this underflow from wells.

Table E shows the number of ditches operated in 1899, with length and cost of construction and of maintenance, by water divisions.

TABLE E.—NUMBER OF MAIN CANALS AND DITCHES OPERATED IN 1899, WITH LENGTH IN MILES AND COST OF CONSTRUCTION, AND OF MAINTENANCE, BY DRAINAGE DIVISIONS.

WATER DIVISIONS.	MAIN CANALS AND DITCHES.					
	Number.	Length in miles.	Average number of acres irrigated per mile.	Cost of construction.		Cost of maintenance per acre irrigated in 1899.
				Total.	Per acre irrigated in 1899.	
The State	1,890	7,374	218	$11,568,137	$7.21	$0.34
I	380	2,292	310	4,131,874	5.82	0.43
II	438	1,574	179	3,816,414	11.80	0.37
III	142	758	396	1,743,369	5.89	0.13
IV	99	240	123	93,095	3.15	0.30
V	544	1,823	122	2,076,718	9.34	0.32
VI	287	687	96	206,667	3.16	0.17

The statistics presented in Table E relate only to the canals and ditches outside of the Indian reservations. The number of acres of irrigated land for each mile of ditch operated averages 218, or slightly less than double that for Arizona. The number of acres under ditch for each mile is 390, or nearly twice the area irrigated. In other words, the area rendered cultivable by irrigation would be nearly doubled if the ditches already constructed were furnished with a sufficient and properly administered water supply.

In 1899, however, the water supply in many parts of Colorado was exceptionally deficient, and in years of average precipitation the area irrigated is undoubtedly much larger.

The average cost of constructing the ditches was about $1,575 per mile, a little more than half the cost of construction in Arizona. The average construction cost, per acre of land under ditch, was $3.60, and per acre of land actually irrigated in 1899, $7.21. The average cost of maintenance per acre irrigated in 1899 was $0.34, but estimating the cost of water right upon the basis of the area irrigated in a year of short water supply, necessarily made the average cost higher than it would be in an ordinary year.

No estimates having been secured in 1889 of the cost per mile of ditches, no comparisons can be presented. In 1899 the average value of arable land under ditch, but not yet prepared for irrigation, varied from $2 to $20 per acre, while that of irrigated land is from $24 to $1,000. The difference represents the increment to the value of the land by irrigation and the improvements thereby made possible. This shows a large profit on the cost of ditch construction.

There were, in 1889, 7,055 acres irrigated from wells. The total cost of construction of the irrigation systems obtaining water from wells, was $190,566. The value of all land in irrigated farms, not including buildings, is $79,696,998, and in unirrigated farms, $10,640,465. The value of all buildings on irrigated farms is $13,178,702, and on unirrigated, $2,822,700. The land in irrigated farms, then, represents 88.2 per cent of the total value of all farm lands, although constituting but 65.8 per cent of the total acreage. The value of buildings on these farms is 82.4 per cent of the total for all farms, and the value of implements and machinery, 83.1 per cent. The irrigation systems in the state, as reported in 1899, represent a cost of $11,613,732. The value of the irrigated products grown in 1899 was $15,633,938. The irrigated area in crops, as shown in Table A, is 1,300,840 acres; the income from this land in 1899 was, therefore, slightly more than $12 per acre.

Exclusive of the Indian reservations, the average value of land, exclusive of buildings, is, for all farms, $9.54 per acre; for unirrigated farms, $3.29; and for irrigated farms, $12.77. The average value per acre of irrigated land is $40.77, while that for the best irrigated land, suitable for growing alfalfa, ranges from $50 to $150, and irrigated fruit land has, in some instances, a reported value as high as $1,000 per acre.

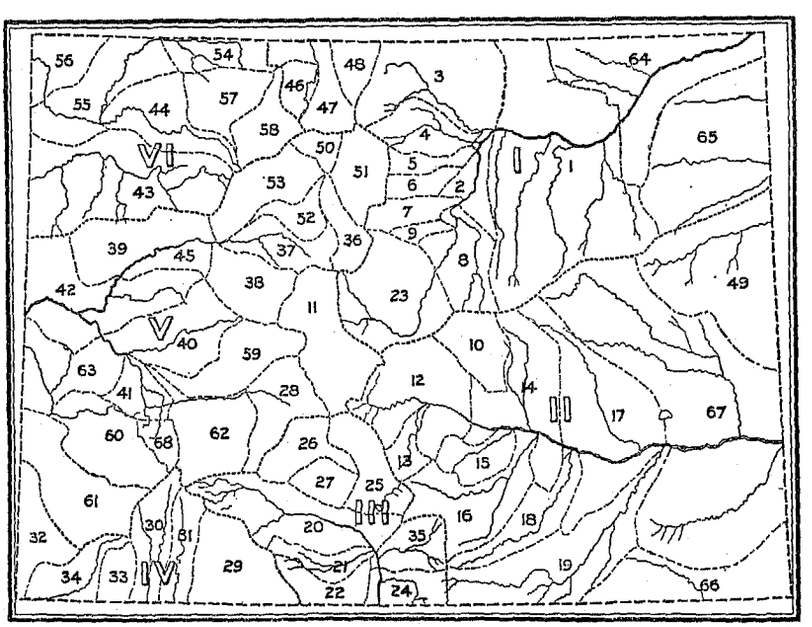
Table F presents, by counties, the average values per acre of irrigated and unirrigated farms, and of irrigated and unirrigated land under ditch.

TABLE F.—AVERAGE VALUE PER ACRE OF IRRIGATED AND UNIRRIGATED FARMS AND FARM LAND IN 1900.

COUNTIES.	AVERAGE VALUE PER ACRE.				
	Farms, exclusive of buildings.			Land under ditch.	
	All.	Irrigated.	Unirrigated.	Irrigated.	Unirrigated.
Arapahoe	$13.16	$24.03	$3.88	$65.63	$4.16
Archuleta	6.72	7.39	4.10	28.53	3.19
Baca	1.63	1.69	1.63	15.20	1.57
Bent	9.60	11.20	3.93	20.56	4.26
Boulder	22.67	24.41	5.02	62.46	5.88
Chaffee	9.76	10.39	2.97	29.24	1.90
Cheyenne	1.22	6.20	0.94	19.03	1.63
Clear Creek	6.76	8.63	4.32	17.67	2.13
Conejos	8.67	8.81	2.51	15.36	2.25
Costilla	2.64	2.66	1.11	12.87	1.94
Custer	8.83	11.59	5.50	34.31	4.88
Delta	28.47	29.45	9.96	47.27	10.07
Dolores	6.54	6.54	----------	11.67	1.39
Douglas	6.67	7.81	5.52	96.11	3.55
Eagle	15.51	15.96	5.49	38.26	2.93
Elbert	8.34	8.45	3.31	32.58	5.79
El Paso	4.17	4.58	3.80	68.16	2.74
Fremont	27.76	29.91	3.04	343.96	20.28
Garfield	18.48	18.98	5.69	50.67	2.68
Gilpin	4.22	5.28	3.54	17.88	4.67
Grand	7.55	8.07	2.60	13.64	1.57
Gunnison	10.93	11.09	3.15	19.07	3.55
Hinsdale	7.86	7.98	4.16	15.07	1.45
Huerfano	5.02	5.70	2.83	27.69	1.89
Jefferson	26.66	38.02	10.03	91.22	4.92
Kiowa	1.59	4.67	1.56	15.76	1.54
Kit Carson	1.75	3.21	1.53	21.01	1.55
Lake	21.31	22.81	6.70	31.20	7.70
La Plata	10.45	11.99	2.02	39.94	2.50
Larimer	$10.74	$11.29	$4.57	$46.94	$2.03
Las Animas	3.71	6.42	2.15	17.24	1.59
Lincoln	1.65	1.74	1.59	12.73	1.47
Logan	7.24	9.83	1.00	24.09	1.91
Mesa	34.02	34.16	4.00	69.22	1.47
Mineral	4.20	4.62	1.80	9.77	1.74
Montezuma	9.46	9.55	3.74	11.08	1.93
Montrose	18.18	19.58	3.37	27.94	5.64
Morgan	10.95	13.10	2.35	28.01	2.89
Otero	14.56	17.46	1.45	43.55	2.92
Ouray	14.43	14.43	----------	42.77	2.79
Park	5.92	6.14	3.05	14.41	1.79
Phillips	3.14	5.30	3.06	16.34	1.64
Pitkin	16.57	17.29	4.58	42.15	1.57
Prowers	11.83	17.81	2.87	30.18	1.63
Pueblo	7.33	7.85	2.65	61.72	3.21
Rio Blanco	12.98	13.38	3.34	39.51	1.37
Rio Grande	10.01	15.54	1.13	19.27	2.46
Routt	8.70	9.53	3.99	23.40	3.23
Saguache	6.49	6.69	1.24	15.52	2.09
San Juan	18.64	23.57	10.00	27.09	3.47
San Miguel	9.71	12.64	6.58	34.83	5.06
Sedgwick	5.74	7.90	2.96	16.32	1.38
Summit	11.24	11.74	2.41	21.06	1.41
Teller	6.86	8.34	6.42	29.05	3.23
Washington	2.54	9.52	1.23	24.64	1.76
Weld	16.76	23.64	2.52	39.14	8.44
Yuma	3.51	6.53	3.03	18.06	1.67

IRRIGATION BY DRAINAGE DIVISIONS.

The principal rivers of the state are the South Platte, Arkansas, Rio Grande, San Juan, Grand, and Green. The three last mentioned are tributaries of the Colorado of the West. The state has been divided by law into six large drainage divisions, corresponding with the natural hydrographic basins of the above named six principal rivers. For administrative purposes, these divisions are subdivided into water districts, the relative locations of which are shown on the accompanying map.



MAP OF WATER DIVISIONS.

THE SOUTH PLATTE RIVER.

The most important drainage basin in Colorado is that of the South Platte River, which includes the following counties: Arapahoe, Boulder, Douglas, Elbert, Jefferson, Larimer, Logan, Morgan, Park, Phillips, Sedgwick, Washington, Weld, and Yuma. The headwaters of the South Platte are in South Park in Park county. In the mountains the stream has a considerable fall, which gradually

diminishes as it enters the plains. Like most streams in this region, it is subject to great fluctuations in volume. During the spring floods its channel is nearly a mile wide, and the discharge is very great, while at other seasons, it sinks into its sandy bed and becomes almost dry. The area comprised in the drainage basin of this stream and its branches is 90,011 square miles.

On no river in the United States has irrigation been more largely developed or extended to a larger area than on the South Platte and its tributaries. Embraced in its drainage system are many populous cities and towns, and the richest farming communities in the state. The area under ditches and canals diverting water from the main Platte and its tributaries in Colorado, Wyoming, and Nebraska, is approximately 2,000,000 acres. In Colorado the area irrigated in 1899 was 711,192 acres, an increase since 1889 of 68.4 per cent. In this section are 38.9 per cent of the total number of irrigated farms, 44.1 per cent of the total irrigated area, and 43.4 per cent of the total population of the state. The total value of the farm land and buildings is 51.5 per cent of that of the whole state.

The first large irrigation enterprise of the state was founded at Greeley on this stream. The summer flow has been increased by the diversion of some of the headwaters of the western side of the range, and also by the building of reservoirs, both in the mountains and out on the plains. The great problem before the irrigators in this division is that of water storage and conservation of the floods which run to waste. There is already under ditch more land than can be supplied during times of drouth, but if the present supply of water were used with greater skill and economy, much larger areas could be cultivated. The acreage of fertile land to which water could be carried by canals and ditches already constructed can not be definitely ascertained, but unquestionably it far exceeds the area actually watered. The system of water storage is, however, being eagerly adopted by irrigators and others interested in such matters, as a relief from the trials and uncertainties of the chance supply. Reservoirs are being built by individuals and corporations. Some of these are among the high mountains, but the greater number are near the foothills in the vicinity of the land to be irrigated. The largest and best reservoir sites, however, have not been taken, their very magnitude and importance necessitating some form of public action in which other states may be concerned. The most completely developed of the reservoir systems is probably that on the Cache la Poudre River, a tributary of the South Platte. Among the important canals are Cache la Poudre; Larimer county; Larimer County Canal No. 2; Larimer and Weld Canal; Pleasant Valley and Lake Canal; and the Mercer Ditch. The combined length of these canals is more than 220 miles, and the area irrigated by them in 1899 was approximately 100,000 acres.

Water is held in the layers of sand and gravel which have been deposited at various depths beneath the surface of the plains. Investigations indicate that this supply is large, and that considerable areas of valuable land, located at too great an elevation to be irrigated by gravity diversion of water, will ultimately be reclaimed by utilizing the underflow.

THE ARKANSAS RIVER.

The Arkansas River rises in the vicinity of Leadville, in central Colorado, at an altitude of 10,000 feet, and receives some of its waters from the region of perpetual snow. It first flows south, through mountains covered with valuable forests, then east to Canyon, where it leaves the mountains. Within the mountains the slope is extremely steep, averaging 40 feet to the mile, but the fall gradually diminishes after the river enters the plains, where, for a distance of 500 miles, it averages 7 feet per mile. The drainage basin of the Arkansas contains 185,671 square miles, and its total length is 1,497 miles.

At the point where the Arkansas River enters the Great Plains of eastern Colorado its waters are largely drawn upon for irrigation, even the floods being stored and used; as a result, very little water flows into Kansas except when the stream is highest. In many respects the river has the same characteristic features as the South Platte. The tributaries are of two classes—those from the mountains, having a perennial flow, and those which drain the Great Plains and receive water only in time of rain or in the early spring. The largest of these mountain tributaries are Lake, Badger, and Grape creeks. Fountain Creek and St. Charles, Huerfano, Purgatoire; and Apishapa rivers receive their supply from the plains, as well as from the mountains. The Huerfano, Apishapa, and Purgatoire rivers come from the south, where they rise in the Sangre de Cristo Range. In their upper courses they carry considerable water, especially in the spring, but as the major portion of the supply is taken for irrigation, they contribute little or no water to the Arkansas during the irrigation season. These streams are subject to sudden rises during storms or local cloud-bursts, and at such times discharge great volumes of water into the main stream, much damage often resulting. Among the tributaries of the second class, which drain the plains, are such streams as Horse, Adobe, Big Sandy, and Timpas creeks, and many others of lesser note. The volume of water received by these streams is at times enormous, but for the greater portion of the year their channels are dry. During the flood season their flow has been estimated to be 10,000 cubic feet per second.

The average size of the farms in the upper Arkansas Valley is very small, the majority of them ranging from five to twenty acres. As a natural consequence, the average value per acre is the highest in the state. Where the valley broadens, the canals become more extensive and important, and the farms increase in size. Vast fields of alfalfa stretch for miles along the big ditches, producing winter forage and affording late fall pasturage for herds of cattle and sheep that graze on the free range in the spring and summer. The acreage in wheat, oats, and corn is large and the yields are uniformly good. This valley is especially adapted to the raising of sugar beets, and the industry is a growing one.

During a great part of the irrigation season the entire flow of the Arkansas River is exhausted by the canals and ditches in Colorado and the supply is insufficient for the land under ditch. The deficiency occurs when the water is most needed, and in many districts a shortage of crops is reported each year. The further development of irrigation is impracticable without recourse to artificial storage. Opportunities for this are afforded in the mountainous region of this basin and a number of excellent reservoir sites have been found and reported. The system of reservoirs constructed by the Great Plains Water Company, near Lamar, has proved very beneficial in preventing loss of crops.

THE RIO GRANDE DRAINAGE BASIN.

The Rio Grande, rising in the San Juan Range, drains the mountain area to the south and east of the Continental Divide in the southwestern part of the state. Its total drainage area in Colorado is 7,527 square miles. For 80 miles of its course it flows easterly as a mountain stream, until it enters the San Luis Valley, a fertile, level plain, having an area about equal to that of Connecticut, and lying between ranges of the Rocky Mountains. This valley has a general elevation of 7,500 feet, the mountains surrounding it rising from 4,000 to 6,000 feet higher. The Rio Grande cuts through it diagonally from northwest to southeast, and receives from the adjacent mountains the waters of nearly thirty streams. The principal tributary is the Conejos River, coming in from the west near the lower end of the valley. The Rio Grande receives from the west also the waters of the Alamosa, La Jara, and San Antonio rivers; and from the east, those of the Trinchera, Culebra, and Rio Costilla. About four miles north of the New Mexico state line, the river enters the long Rio Grande Canyon, through which it continues into that state. The Rio Grande receives but little water from any of its tributaries, as the supply of these streams is practically all utilized during the summer time, and most of the supply of the Rio Grande itself is used in the upper part of the valley, so that near the state line there is little water left in the channel. The drainage of the mountains surrounding the northern part of the San Luis Valley is received by the San Luis River, which terminates in the center of the valley in a number of saline lakes having no visible outlets.

The structure of the soil of the greater part of the Rio Grande Valley is such that it readily transmits water, or subirrigates, and its adaptability for holding moisture has enabled the farmers to extend cultivation over a much larger area than could be done without this aid. The soil is generally rich, and farming by irrigation is profitable throughout the valley. Extensive experiments have been made with artesian wells, especially in Rio Grande and Saguache counties, but have not been altogether successful.

THE GRAND RIVER.

The Grand River, draining a considerable portion of western Colorado, rises in the eastern part of Middle Park, among some of the highest mountains of the Continental Divide, and is the most important tributary of the Colorado River. The river runs for the greater part of its course through a region of plateaus, flowing mostly in steep-walled canyons. The courses of the Eagle, Roaring Fork, Gunnison, and Dolores rivers, tributaries of the Grand, are marked by similar characteristics. The valley lands are limited in area and the water supply for irrigation generally far exceeds the requirements. Shortages sometimes occur, however, on some of the branches and small creeks, where irrigation works are extensive and considerable areas are under ditch. This is the case on Uncompahgre River and its tributaries, and a large diversion canal from Gunnison River is planned.

The water is furnished to bench lands along the Grand River by a number of pumping plants. These benches, terrace like, rise above the valley of the stream and lie between the valley and the plateau. Several pumping plants now in successful operation at Grand Junction are operated by waterpower. Numerous steam-power plants have been abandoned, as the cost of operating them was found to be greater than the returns from the products. There are a number of large irrigating ditches in this part of Colorado, and nearly all farm crops are grown that can be raised in this latitude. Orchard fruits, including apples, peaches, apricots, etc., and small fruits, are produced in considerable quantities. Alfalfa is a staple product, and in 1899 in the basin of the Grand, the area devoted to this forage crop was approximately 75,000 acres, with a production of about 210,000 tons.

The establishment of a large beet-sugar factory at Grand Junction has given an impetus to the cultivation of beets, and the acreage devoted to this crop is growing larger each year.

Dolores River is the least important tributary of the Grand River in Colorado, and has its sources in La Plata and San Miguel Mountains. The ditches are generally small, the most notable being that which irrigates about 8,000 acres in the vicinity of Cortez.

THE SAN JUAN RIVER.

Flowing south from the San Juan Mountains are a number of streams, uniting at the base of the range into the San Juan, which flows westward through a plateau region to the junction with the Colorado. In the mountains these streams have a rapid fall which becomes greatly lessened in the channel across the plateau, the grade of the river towards its mouth being very much less than that of the Colorado.

The San Juan, while an important tributary of the Colorado, is but little utilized for irrigation in Colorado. Three of its affluents, the Rio de los Pinos, La Plata, and Las Animas rivers, and their small branches, supply almost all of the water which is diverted into ditches in this drainage basin. The valleys through which they flow are comparatively narrow, and the area irrigated is not large.

THE GREEN RIVER.

Very little land is irrigated in Colorado in the valley of the main stream of this river, irrigation being confined to

the basin of the Yampa or Bear River, in Routt county, and to the White River in Rio Blanco county.

The Yampa or Bear River, which drains Routt county, in the extreme northwestern part of the state, has its sources in Egeria Park, with branches rising in the Elk Head range on the north, and the White River divide on the south. Its valley varies in width from one-fourth of a mile to five miles, and is inclosed in canyons at only a few points in its course of 150 miles. The entire valley was formerly covered with a luxuriant growth of native grasses, which extended to the summits of the low ranges, but of late, the ranges have been overstocked, and the former rank growth of forage has been partially destroyed. The open prairie country extends back from the river for a considerable distance, until it reaches an altitude of 7,000 or 8,000 feet, where there is a belt of quaking-aspen timber, and above this, a heavy growth of red and white spruce. Croppings of coal, mostly bituminous, are found throughout the valley.

In this valley the chief industry is cattle raising, and the principal crops are hay and forage. The development of agriculture on any large scale has been greatly retarded by the isolation of the valley and the lack of transportation facilities.

The irrigation ditches are, for the most part, owned by the farmers or ranchmen, either individually or coöperatively, and are simply constructed and comparatively inexpensive.

The total area of all farms in the valley of the Bear River is 190,503 acres, of which 53,977 acres were improved, and 44,542 acres were irrigated in 1899.

THE WHITE RIVER.

The White River rises in the timber reserve in the mountains on the eastern side of the White River plateau. North and South Forks are fed by the snows on the same high peaks, though they flow in widely separated channels for a long distance before joining at Buford. The White River carries a large amount of water, its capacity at Meeker averaging 300 second feet at normal stage. This stream and its tributaries drain all of Rio Blanco county. The drainage basin is rough, and of little value except for stock raising. The valley is broad, and the cultivated areas are devoted to hay and forage crops, which are fed to the range stock.

The area irrigated in 1899 was 21,381 acres. This district is subject to early frosts which sometimes ruin almost the entire grain crop. Coal is found in great abundance in this region.

Twelfth Census of the United States.

CENSUS BULLETIN.

No. 178. WASHINGTON, D. C. June 3, 1902.

AGRICULTURE.

NORTH CAROLINA.

Hon. WILLIAM R. MERRIAM,
Director of the Census.

SIR: I have the honor to transmit herewith, for publication in bulletin form, the statistics of agriculture in the state of North Carolina, taken in accordance with the provisions of section 7 of the act of March 3, 1899. This section requires that—

> The schedules relating to agriculture shall comprehend the following topics: Name of occupant of each farm, color of occupant, tenure, acreage, value of farm and improvements, acreage of different products, quantity and value of products, and number and value of live stock. All questions as to quantity and value of crops shall relate to the year ending December thirty-first next preceding the enumeration.

A "farm," as defined by the Twelfth Census, includes all the land, under one management, used for raising crops and pasturing live stock, with the wood lots, swamps, meadows, etc., connected therewith. It includes also the house in which the farmer resides, and all other buildings used by him in connection with his farming operations.

The farms of North Carolina, June 1, 1900, numbered 224,637, and had a value of $194,655,920. Of this amount $52,700,080, or 27.1 per cent, represents the value of buildings, and $141,955,840, or 72.9 per cent, the value of land and improvements other than buildings. On the same date the value of farm implements and machinery was $9,072,600, and that of live stock, $30,106,173. These values, added to that of farms, give $233,834,693, the "total value of farm property."

The products derived from domestic animals, poultry, and bees, including animals sold and animals slaughtered on farms, are referred to in this bulletin as "animal products." The total value of all such products, together with the value of all crops, is termed "total value of farm products." This value for 1899 was $89,309,638, of which amount $20,684,727, or 23.2 per cent, represents the value of animal products, and $68,624,911, or 76.8 per cent, the value of crops, including forest products cut or produced on farms. The "total value of farm products" for 1899 exceeds that reported for 1889 by $39,239,108, or 78.4 per cent.

The value of "net farm products," or the "gross farm income," is obtained by deducting from the total value of farm products the value of the products fed to live stock on the farms of the producers. In 1899 the reported value of products fed was $10,108,890, leaving $79,200,748 as the gross farm income for that year. The ratio which this latter amount bears to the "total value of farm property" is referred to as the "percentage of gross income upon investment." For North Carolina in 1899 it was 33.9 per cent.

As no reports of expenditures for taxes, interest, insurance, feed for stock, and similar items have been obtained by any census, no statement of net farm income can be given.

The statistics presented in this bulletin will be treated in greater detail in the final report on agriculture in the United States. The present publication is designed to present a summarized advance statement for North Carolina.

Very respectfully,

L. G. Powers.

Chief Statistician for Agriculture.

CP 15M

AGRICULTURE IN NORTH CAROLINA.

GENERAL STATISTICS.

The total land surface of North Carolina is 48,580 square miles, or 31,091,200 acres, of which 22,749,356 acres, or 73.2 per cent, are included in farms.

Topographically, the state has three natural divisions: the eastern, middle, and western.

Eastern North Carolina is low, and its coast line is deeply indented by Albemarle Sound, the broad estuaries of the Neuse and Pamlico rivers, and by many creeks. In the northeast are the Great and Little Dismal swamps, which, together with the chain of swamps and peat bogs extending southward through the counties bordering on the ocean and the sound, embrace an area of nearly 3,000,000 acres. Although a large part of this swamp area is at present of little value, much of it may be rendered available for agricultural purposes, by the introduction of drainage-canal systems. In some sections large tracts have already been reclaimed in this manner. The soil in the eastern division is, to a large extent, sandy and barren, although along the courses of the numerous streams the land is remarkably productive.

The middle division of the state, extending back to the mountains, is watered by numerous rivers and is either cultivated or covered with deciduous trees. The surface is undulating, and the soil rich and arable. This division is especially suited for orchards and vineyards.

Western North Carolina includes the mountains and high table-lands, none of which are less than 1,500 feet above tide water. The Appalachian system here reaches its greatest height, and includes the Blue Ridge, the Black, the Smoky, the Iron, and the Unaka mountains. These are all fertile to their summits, and are covered for the most part with magnificent forests. The valleys between the ranges are well watered and very productive. This division is well adapted to grazing, and to the raising of cereals, vegetables, and fruits.

NUMBER AND SIZE OF FARMS.

Table 1 gives, by decades since 1850, the number of farms, the total and average acreage, and the per cent of farm land improved.

TABLE 1.—FARMS AND FARM ACREAGE: 1850 TO 1900.

YEAR.	Number of farms.	NUMBER OF ACRES IN FARMS.				Per cent of farm land improved.
		Total.	Improved.	Unimproved.	Average.	
1900	224,637	22,749,356	8,327,106	14,422,250	101.3	36.6
1890	178,359	22,651,896	7,828,569	14,823,327	127.0	34.6
1880	157,609	22,363,558	6,481,191	15,882,367	141.9	29.0
1870	93,565	19,835,410	5,258,742	14,576,668	212.0	26.5
1860	75,208	23,762,969	6,517,284	17,245,685	316.0	27.4
1850	56,963	20,996,983	5,453,975	15,543,008	368.6	26.0

The number of farms reported in 1900 was nearly four times as great as the number reported in 1850, and 25.9 per cent greater than in 1890. The total and improved acreages, however, show decreases for the Civil War decade, the loss in the former not having been entirely recovered as yet, though gains are shown for each decade since 1870. The improved acreage recovered more rapidly, having increased 58.3 per cent since 1870, and 6.4 per cent in the last decade. The average size of farms shows a marked decrease for each decade, the number of farms having increased much faster since 1850 than the total acreage. This movement indicates a progressive division of farm holdings, and is in keeping with the steady increase since 1870 in the percentage of improved farm land.

FARM PROPERTY AND PRODUCTS.

Table 2 presents a summary of the principal statistics relating to farm property and products for each census year beginning with 1850.

TABLE 2.—VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND OF FARM PRODUCTS: 1850 TO 1900.

YEAR.	Total value of farm property.	Land, improvements, and buildings.	Implements and machinery.	Live stock.	Farm products.[1]
1900	$283,884,693	$194,655,920	$9,072,600	$80,106,173	$89,309,638
1890	216,707,500	188,977,010	7,183,210	25,547,280	50,070,530
1880	164,286,737	135,793,602	6,078,476	22,414,659	51,729,611
1870[2]	104,287,161	78,211,083	4,082,111	21,993,967	[3]57,845,940
1860	180,305,812	143,301,065	5,873,942	31,130,805	----------
1850	89,540,945	67,891,766	3,931,532	17,717,647	----------

[1] For the year preceding that designated.
[2] Values for 1870 were reported in depreciated currency. To reduce to specie basis of other years they must be diminished one-fifth.
[3] Includes betterments and additions to live stock.

The rapid development of agriculture in the decade from 1850 to 1860; the disastrous effects of the Civil War, from which the state did not entirely recover until between 1880 and 1890; and the steady increase in values since that period, are the most interesting features of the statistics given in the above table.

The increase in the total value of farm property in the last decade was $17,127,193, or 7.9 per cent. Of this amount, $10,678,910, or 62.4 per cent, represents the increase in the value of farms; $4,558,893, or 26.6 per cent, in that of live stock; and $1,889,390, or 11.0 per cent, in that of implements and machinery. The value of farm products for 1899 exceeds that for 1889 by $39,239,108, or 78.4 per cent. A part of this gain, and of that in implements and machinery, and in live stock, is doubtless the result of a more detailed enumeration in 1900 than in previous census years.

COUNTY STATISTICS.

Table 3 presents the general agricultural statistics by counties.

TABLE 3.—NUMBER AND ACREAGE OF FARMS, AND VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, JUNE 1, 1900, WITH VALUE OF PRODUCTS OF 1899 NOT FED TO LIVE STOCK, AND EXPENDITURES IN 1899 FOR LABOR AND FERTILIZERS, BY COUNTIES.

COUNTIES.	NUMBER OF FARMS.		ACRES IN FARMS.		VALUES OF FARM PROPERTY.				Value of products not fed to live stock.	EXPENDITURES.	
	Total.	With buildings.	Total.	Improved.	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		Labor.	Fertilizers.
The State	224,637	217,744	22,749,356	8,327,106	$141,955,840	$52,700,080	$9,072,600	$30,106,178	$79,200,748	$5,444,950	$1,479,030
Alamance	2,296	2,258	244,178	97,229	1,449,050	720,330	133,640	368,947	782,507	33,440	36,380
Alexander	1,880	1,848	157,619	65,576	1,071,120	283,760	67,680	217,936	504,448	12,530	18,090
Alleghany	1,367	1,341	145,200	84,996	1,416,710	331,250	70,060	354,385	401,998	22,190	5,360
Anson	2,940	2,844	309,986	116,084	1,515,990	535,870	119,240	328,026	1,134,061	81,120	76,110
Ashe	3,099	3,034	272,137	154,575	3,021,440	692,240	100,320	728,767	840,978	45,130	4,020
Beaufort	2,431	2,322	248,104	65,823	1,273,480	575,930	86,770	303,765	844,673	67,810	57,990
Bertie	2,663	2,591	341,428	109,289	1,153,570	498,400	102,160	302,510	1,023,790	155,150	49,050
Bladen	2,488	2,426	364,103	68,738	920,720	402,260	66,270	247,621	579,541	29,040	25,180
Brunswick	1,373	1,366	252,117	31,243	500,240	253,160	45,400	160,076	430,681	35,840	26,120
Buncombe	4,140	4,015	348,644	142,283	4,284,110	1,608,040	158,970	626,353	1,102,005	72,560	12,420
Burke	2,222	2,177	222,551	65,700	1,608,920	429,390	93,800	304,723	539,203	21,590	12,590
Cabarrus	2,045	2,005	209,125	98,582	1,815,670	649,360	133,530	360,883	908,336	45,310	36,510
Caldwell	2,203	2,146	231,497	71,151	1,756,000	478,750	96,100	314,926	588,281	19,130	12,190
Camden	858	838	76,549	44,656	619,360	232,520	29,480	121,140	284,927	13,980	6,980
Carteret	754	747	74,751	18,626	314,720	168,050	20,980	80,522	162,643	9,690	10,430
Caswell	1,745	1,721	243,737	113,824	1,162,710	627,230	87,540	278,406	866,039	58,430	54,020
Catawba	2,647	2,610	239,824	116,379	2,053,150	705,440	168,080	375,660	879,456	25,320	47,800
Chatham	3,605	3,530	411,084	182,427	1,640,460	739,700	149,100	518,091	1,097,806	45,000	53,860
Cherokee	1,731	1,697	208,359	41,927	782,540	210,580	33,870	236,271	412,927	9,880	560
Chowan	883	825	72,528	34,972	493,300	233,800	40,040	115,405	373,579	46,900	15,750
Clay	817	765	97,462	23,973	451,300	123,290	20,840	136,289	233,001	7,290	430
Cleveland	3,446	3,340	258,042	126,058	2,509,240	919,400	160,270	433,386	1,172,472	33,910	67,560
Columbus	2,861	2,815	360,855	68,471	1,167,150	492,840	83,370	290,764	715,763	52,170	46,940
Craven	1,725	1,645	211,528	55,986	1,067,810	343,360	62,150	205,532	592,848	85,960	84,440
Cumberland	2,673	2,624	362,609	88,461	1,553,310	589,680	91,710	335,244	908,002	67,390	59,760
Currituck	912	888	89,273	39,063	620,890	268,980	31,430	127,780	298,961	18,300	20,510
Dare	229	226	14,937	2,619	91,210	81,030	7,850	22,766	51,765	2,890	2,180
Davidson	3,419	3,350	329,043	132,761	2,497,260	959,580	222,050	509,687	1,141,430	34,710	46,010
Davie	1,742	1,631	149,302	68,650	1,161,480	377,510	82,630	248,369	488,079	15,670	14,160
Duplin	3,303	3,168	389,366	113,365	1,626,390	731,640	98,790	353,413	1,079,204	104,360	83,780
Durham	1,548	1,486	148,281	49,303	1,018,230	423,510	56,690	189,310	491,891	32,050	21,860
Edgecombe	2,284	2,164	277,376	139,426	1,895,850	753,200	122,200	366,098	1,650,094	250,780	120,260
Forsyth	2,421	2,375	228,432	101,666	2,240,350	915,010	169,600	373,052	899,133	48,980	50,510
Franklin	3,367	3,254	267,530	117,900	1,553,760	647,660	111,340	334,002	1,204,286	99,410	97,420
Gaston	2,213	2,140	201,963	88,659	1,994,000	790,380	117,090	354,982	874,309	35,310	39,390
Gates	1,461	1,441	137,494	53,425	671,740	411,510	54,440	193,052	528,348	40,940	19,030
Graham	732	723	103,617	18,360	272,730	72,620	13,870	104,591	149,096	4,150	130
Granville	3,135	3,018	309,216	118,420	1,585,840	888,420	106,420	372,185	1,176,764	123,910	77,380
Greene	2,071	1,716	156,362	87,050	1,355,390	488,420	83,950	233,196	1,083,958	73,600	82,270
Guilford	3,497	3,380	388,940	149,223	2,693,270	1,169,180	206,280	571,976	1,216,294	73,880	58,310
Halifax	3,489	3,371	380,627	163,951	2,087,450	708,910	133,720	460,690	1,855,628	228,980	93,380
Harnett	2,316	2,258	280,859	70,179	1,059,090	399,440	81,540	279,139	686,559	38,850	46,630
Haywood	2,349	2,053	251,587	84,541	1,936,850	627,470	85,750	443,278	613,851	15,710	5,450
Henderson	1,853	1,805	165,409	61,670	1,497,350	486,850	68,760	260,054	481,680	14,350	6,700
Hertford	1,788	1,782	181,955	68,324	1,021,430	509,990	66,320	215,856	698,600	73,180	41,350
Hyde	1,061	1,040	92,682	42,677	1,084,230	342,770	46,990	130,152	255,525	26,490	15,330
Iredell	3,897	3,789	353,363	159,174	2,540,840	907,470	196,970	571,579	1,297,648	57,990	56,570
Jackson	1,935	1,888	211,056	55,773	888,930	296,910	42,510	260,162	444,815	14,280	3,170
Johnston	4,452	4,378	371,000	167,339	2,649,970	1,002,280	177,480	553,708	1,820,012	121,320	143,530
Jones	1,226	1,145	191,028	56,122	733,570	239,960	54,380	174,828	476,804	37,680	26,730
Lenoir	2,179	2,023	215,911	101,996	1,625,520	618,390	91,150	291,455	1,185,009	119,810	107,380
Lincoln	1,866	1,831	180,482	84,218	1,439,450	488,880	106,210	298,884	631,111	20,590	32,060
McDowell	1,827	1,788	189,569	47,420	1,247,160	275,670	43,420	212,078	437,162	11,810	3,000
Macon	1,888	1,841	213,637	55,585	887,910	317,050	45,410	269,776	436,144	14,350	910
Madison	3,382	3,249	228,718	100,621	1,577,210	509,090	61,680	419,048	724,266	19,210	5,320
Martin	1,689	1,624	201,719	72,643	894,910	404,400	66,940	215,929	787,747	113,020	68,680
Mecklenburg	4,190	4,099	315,414	178,204	4,150,720	1,317,490	232,690	708,286	1,859,390	152,760	108,940
Mitchell	2,287	2,230	178,972	66,562	1,341,650	409,720	47,020	323,063	598,668	11,380	410
Montgomery	1,564	1,552	227,844	51,644	754,480	303,080	57,500	196,713	498,019	30,610	23,200
Moore	2,773	2,734	369,007	88,351	1,351,020	635,310	106,560	348,105	857,258	55,250	36,430
Nash	3,237	3,116	308,317	119,988	1,668,770	691,480	124,460	364,133	1,479,929	126,810	143,960
New Hanover	379	368	49,581	9,728	346,580	138,000	15,650	49,875	148,212	30,950	11,590
Northampton	2,887	2,722	251,867	126,873	1,237,440	617,150	109,160	342,970	1,235,847	104,490	53,860
Onslow	1,632	1,581	263,326	62,864	698,650	312,910	45,790	184,825	420,888	25,970	12,170
Orange	2,044	1,985	214,346	78,539	959,160	519,680	77,660	255,727	660,866	31,340	27,110
Pamlico	813	796	78,493	22,333	386,810	165,560	26,320	92,906	282,169	18,860	28,020
Pasquotank	1,125	1,071	80,862	49,094	706,070	315,540	55,350	169,951	393,454	26,410	15,340
Pender	1,975	1,906	295,248	52,090	939,190	386,060	59,120	211,674	473,413	44,580	22,670
Perquimans	1,257	1,222	96,912	50,524	781,670	384,150	54,790	231,058	578,013	61,500	18,520
Person	1,971	1,924	228,904	86,119	967,190	471,610	70,930	234,336	768,898	58,840	55,160
Pitt	4,022	3,728	355,152	151,847	2,752,200	954,080	147,280	481,762	2,173,929	262,040	166,910
Polk	1,048	1,017	100,499	30,537	633,820	191,350	34,170	131,487	306,281	8,470	6,810
Randolph	3,789	3,691	431,754	140,507	2,252,100	923,100	231,540	638,418	1,039,355	38,000	61,390
Richmond	1,462	1,441	180,504	57,693	808,190	290,110	68,180	194,518	682,746	56,050	58,130
Robeson	4,848	4,764	498,173	174,801	3,525,900	1,116,980	190,840	563,616	2,166,431	199,620	247,280
Rockingham	3,196	3,151	336,719	115,874	2,155,400	863,460	142,710	425,208	1,358,600	85,930	97,270
Rowan	3,082	3,021	295,184	132,196	2,248,190	821,690	200,040	490,008	1,286,510	45,290	60,330
Rutherford	3,365	3,207	274,412	99,511	1,999,060	596,820	114,720	381,326	876,433	18,850	38,680
Sampson	3,783	3,699	487,864	148,886	2,200,770	886,580	146,350	484,794	1,259,255	64,840	82,840
Scotland	1,080	1,061	127,403	61,442	1,752,380	417,320	72,030	175,999	836,686	72,270	86,410

TABLE 3.—NUMBER AND ACREAGE OF FARMS, AND VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, JUNE 1, 1900, WITH VALUE OF PRODUCTS OF 1899 NOT FED TO LIVE STOCK, AND EXPENDITURES IN 1899 FOR LABOR AND FERTILIZERS, BY COUNTIES—Continued.

COUNTIES.	NUMBER OF FARMS.		ACRES IN FARMS.		VALUES OF FARM PROPERTY.				Value of products not fed to live stock.	EXPENDITURES.	
	Total.	With buildings.	Total.	Improved.	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		Labor.	Fertilizers.
Stanly	1,983	1,963	215,018	85,466	$986,280	$421,210	$113,900	$290,675	$743,885	$40,520	$36,920
Stokes	3,234	3,130	256,521	88,648	1,754,870	730,920	114,430	354,590	1,017,766	32,130	59,430
Surry	3,523	3,458	291,989	90,467	1,935,840	737,520	118,870	375,873	870,521	21,520	48,060
Swain	1,225	1,171	164,439	27,036	620,480	176,210	26,310	156,519	263,209	7,730	210
Transylvania	1,008	960	112,731	29,734	791,320	240,280	33,030	156,972	215,142	9,910	8,240
Tyrrell	657	649	62,260	19,840	225,710	125,770	23,100	68,354	163,999	11,170	7,710
Union	3,793	3,737	316,097	149,143	2,057,870	630,400	180,990	520,553	1,367,085	50,070	100,320
Vance	1,680	1,595	149,754	63,613	888,900	406,070	56,030	184,319	619,902	58,460	48,310
Wake	5,188	5,029	476,608	195,548	3,252,640	1,371,130	218,600	655,241	2,163,811	155,300	126,760
Warren	2,616	2,544	214,142	89,638	1,096,210	491,290	77,330	251,892	851,982	59,830	58,080
Washington	970	943	85,891	36,046	540,770	269,160	48,800	115,601	364,169	44,920	10,790
Watauga	2,170	2,105	208,559	88,423	1,829,830	484,070	66,980	401,127	544,793	5,710	2,310
Wayne	3,291	3,164	337,162	145,199	2,507,520	860,020	138,020	394,185	1,679,462	135,690	136,010
Wilkes	4,387	4,277	418,393	132,307	2,197,590	644,390	116,590	454,070	876,444	34,060	16,340
Wilson	2,565	2,470	212,686	99,762	1,952,600	619,280	98,910	332,691	1,520,510	120,300	134,030
Yadkin	2,242	2,207	207,294	77,907	1,533,690	489,860	98,570	279,750	588,359	22,880	20,860
Yancey	2,023	1,956	158,309	53,120	1,119,030	319,460	36,500	281,405	469,821	20,320	1,240

Aside from Richmond, in which a territorial change has been made, but three counties, Carteret, Chatham, and Currituck, report decreases in the number of farms since 1890. In the remaining counties the rates of increase were about the same as that shown in the state total—25.9 per cent. Pitt county reports the greatest relative gain, the number of its farms having almost doubled.

Increases in the total farm acreages are reported for about one-half of the counties, and almost two-thirds show increased areas of improved land. A large proportion of the counties reporting increases in improved land are in the southwestern part of the state. The average size of farms for the state is 101.3 acres, ranging in the several counties from 75 to 150 acres. The average value of the farms of the state is $866.54. In nearly one-fourth of the counties it is less than $600. More than two-thirds of the counties show gains since 1890 in the value of farms.

The increase since 1890 in the value of implements and machinery has been relatively greater and more general than that in any other item of farm property. Only six counties, Currituck, Durham, Gates, Granville, Macon, and Warren, report a decrease, and in most instances this has been accompanied by a decrease in the value of live stock. This latter value, however, has increased generally in the past ten years.

The amount paid for labor in 1899 varied greatly in different sections of the state, the lowest expenditure per farm being reported from the mountainous western border counties, and the highest from the eastern coast counties, where diversified farming prevails.

For fertilizers, the average expenditure per farm was approximately $20. The minimum of less than $1 per farm was found in a few extreme western counties, where corn was the principal crop, and the maximum of $80 per farm, in Scotland county, the average in the central counties being about $30 per farm.

FARM TENURE.

Table 4 gives a comparative exhibit of farm tenure for 1880, 1890, and 1900. The farms operated by tenants are divided into two groups, designated as farms operated by "cash tenants" and "share tenants." These groups comprise, respectively: (1) Farms operated by individuals who pay a rental in cash or a stated amount of labor or farm produce; (2) farms operated by individuals who pay as rental a stated share of the products.

In Table 5 the tenure of farms for 1900 is given by race of farmer. The farms under the classification "owner" in Table 4 are subdivided in Table 5 into groups, designated as farms operated by "owners," "part owners," "owners and tenants," and "managers." These groups comprise, respectively: (1) Farms operated by individuals who own all the land they cultivate; (2) farms operated by individuals who own a part of the land and rent the remainder from others; (3) farms operated under the joint direction and by the united labor of two or more individuals, one owning the farm or a part of it, and the other, or others, owning no part, but receiving for supervision or labor a share of the products; and (4) farms operated by individuals who receive for their supervision and other services a fixed salary from the owners.

TABLE 4.—NUMBER AND PER CENT OF FARMS OF SPECIFIED TENURES: 1880 TO 1900.

YEAR.	Total number of farms.	NUMBER OF FARMS OPERATED BY—			PER CENT OF FARMS OPERATED BY—		
		Owners.[1]	Cash tenants.	Share tenants.	Owners.[1]	Cash tenants.	Share tenants.
1900	224,637	131,629	19,916	73,092	58.6	8.9	32.5
1890	178,359	117,469	10,572	50,318	65.9	5.9	28.2
1880	157,609	104,887	8,644	44,078	66.5	5.5	28.0

[1] Including "part owners," "owners and tenants," and "managers."

TABLE 5.—NUMBER AND PER CENT OF FARMS OF SPECIFIED TENURES, JUNE 1, 1900, CLASSIFIED BY RACE OF FARMER.

PART 1.—NUMBER OF FARMS OF SPECIFIED TENURES.

RACE.	Total number of farms.	Owners.	Part owners.	Owners and tenants.	Managers.	Cash tenants.	Share tenants.
The State	224,637	113,524	15,454	1,594	1,057	19,916	73,092
White	169,773	100,320	11,224	1,508	936	9,585	46,200
Colored	54,864	13,204	4,230	86	121	10,331	26,892
Indian	868	642	33	2	2	63	126
Negro	53,996	12,562	4,197	84	119	10,268	26,766

PART 2.—PER CENT OF FARMS OF SPECIFIED TENURES.

The State	100.0	50.5	6.9	0.7	0.5	8.9	32.5
White	100.0	59.1	6.6	0.9	0.6	5.6	27.2
Colored	100.0	24.1	7.7	0.2	0.2	18.8	49.0
Indian	100.0	74.0	3.8	0.2	0.2	7.3	14.5
Negro	100.0	23.3	7.8	0.1	0.2	19.0	49.6

In the period from 1880 to 1900 the total number of farms increased 42.5 per cent, the greater part of the increase taking place in the last decade. The number of farms operated by owners has increased 25.5 per cent since 1880; by cash tenants, 130.4 per cent; and by share tenants, 65.8 per cent. The percentages shown in Table 4 indicate that the number of farms operated by owners has not increased so rapidly since 1880 as the number operated by tenants.

Of the farms of the state, 75.6 per cent are operated by white farmers and 24.4 per cent by colored farmers. Of the white farmers, 66.6 per cent own all or a part of the farms they operate, and 33.4 per cent operate farms owned by others. For the colored farmers, the corresponding percentages are 32.0 and 68.0. Of the colored farmers, 98.4 per cent are negroes, of whom nearly one-third own all or a part of their farms, and the remainder are Indians, more than three-fourths of whom are owners.

The ratio which the number of farms rented for cash bears to the total number of tenant farms, varies with the race of the tenants and the kind of crops grown. In the western counties, where diversified farming prevails and practically all the farmers are white, share tenants greatly outnumber cash tenants; but in the leading cotton-growing counties, where approximately one-half of the farmers are colored, the number of cash and share tenants are about equal. The greater number of colored farmers in the cotton counties are classed as cash tenants, but where the local contract system prevails the distinguishing line between cash and share tenure is hard to draw.

No previous census has reported the number of farms operated by "part owners," "owners and tenants," or "managers," but it is believed that the number conducted by the last-named class is constantly increasing.

FARMS CLASSIFIED BY RACE OF FARMER AND BY TENURE.

Tables 6 and 7 present the principal statistics for farms classified by race of farmer and by tenure.

TABLE 6.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY RACE OF FARMER, AND BY TENURE, WITH PERCENTAGES.

RACE OF FARMER, AND TENURE.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	224,637	101.3	22,749,356	100.0	$233,834,693	100.0
White farmers	169,773	116.6	19,794,218	87.0	204,866,528	87.6
Negro farmers	53,996	53.6	2,894,210	12.7	28,458,176	12.2
Indian farmers	868	70.2	60,928	0.3	509,989	0.2
Owners	113,524	126.4	14,345,746	63.1	144,032,808	61.6
Part owners	15,454	95.2	1,471,445	6.5	15,467,836	6.6
Owners and tenants	1,594	158.6	244,839	1.1	2,489,429	1.1
Managers	1,057	397.8	420,450	1.8	6,099,326	2.6
Cash tenants	19,916	80.5	1,602,859	7.0	15,748,869	6.7
Share tenants	73,092	63.8	4,664,017	20.5	49,996,425	21.4

TABLE 7.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY RACE OF FARMER AND BY TENURE.

RACE OF FARMER, AND TENURE.	AVERAGE VALUES PER FARM OF—					
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	Per cent of gross income on total investment in farm property.
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$632	$235	$40	$134	$353	33.9
White farmers	723	281	48	155	386	32.0
Negro farmers	349	92	17	68	274	52.0
Indian farmers	393	94	19	81	233	39.7
Owners	739	308	54	168	389	30.7
Part owners	604	220	41	136	348	34.8
Owners and tenants	912	377	69	204	443	28.3
Managers	3,451	1,661	196	459	1,310	22.7
Cash tenants	508	147	27	109	320	40.5
Share tenants	458	124	21	81	290	42.4

Approximately, one-fourth of the farms of the state are operated by negro farmers. Their farms, however, comprise slightly more than one-eighth of the total farm acreage of the state, and represent, in value, less than one-eighth of the total farm property. This indicates that the holdings of colored farmers are small, the average size of their farms being but 53.6 acres compared with 116.6 acres for white farmers. The average values per farm of their land, buildings, implements and machinery, and live stock, are correspondingly low. On the other hand it appears from Table 7 that they obtained in 1899 a higher per cent of gross income on their investments in farm property than did white farmers.

This apparent anomaly is traceable, in general, to certain distinguishing racial characteristics, and, in particular, to the contract system under which nearly all negro tenants lease their lands. The first point relates to the recognized tendency on the part of the more progressive white farmer to constantly improve his property, especially

his buildings and fences, thus adding to its market value, although not materially increasing its productive capacity per acre. The colored farmer, on the other hand, adds comparatively little to his fixed capital in the way of improvements, and his income per acre naturally represents a higher percentage of the capital invested than in the case of the white farmer. In addition, under the prevailing contract system, the negroes lease small tracts of the best and most highly improved land of the plantations, which they cultivate under the supervision of the land owner or his hired manager. This land appears in the census reports as farms of negro tenant farmers. Unimproved and less productive tracts of land constitute the greater part of the farms of the white plantation owners as reported by the census. The white landlord commonly owns the greater number of the working animals and most of the implements and machinery used by his colored tenants. These being kept for the most part on the farm where the landlord resides, were reported as part of his property, while the products obtained through their use were reported under the names of the tenants.

The above considerations, it is believed, not only explain the high per cent of gross income shown for the negro farmers, but also the low rates shown for managers and owners as compared with those given for cash and share tenants. It is evident, therefore, that a high rate of gross income on investment can not properly be construed as proof of superior farm management.

FARMS CLASSIFIED BY AREA.

Tables 8 and 9 present the principal statistics for farms classified by area.

TABLE 8.—NUMBER AND ACREAGE OF FARMS, AND VALUES OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY AREA, WITH PERCENTAGES.

AREA.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	224,637	101.3	22,749,356	100.0	$233,834,693	100.0
Under 3 acres	1,202	1.9	2,252	(1)	318,525	0.1
3 to 9 acres	11,323	6.1	69,345	0.3	2,758,498	1.2
10 to 19 acres	20,659	13.8	285,943	1.3	6,170,124	2.6
20 to 49 acres	59,913	31.4	1,880,512	8.3	29,158,570	12.5
50 to 99 acres	55,028	68.0	3,742,478	16.5	46,605,601	19.9
100 to 174 acres	44,052	125.2	5,514,229	24.2	58,043,386	24.8
175 to 259 acres	17,012	207.6	3,531,378	15.5	33,714,851	14.4
260 to 499 acres	11,224	341.4	3,832,180	16.8	32,494,046	13.9
500 to 999 acres	3,275	640.9	2,098,813	9.2	14,859,701	6.4
1,000 acres and over	949	1,888.5	1,792,226	7.9	9,711,391	4.2

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

TABLE 9.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY AREA.

AREA.	AVERAGE VALUES PER FARM OF—					
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	Per cent of gross income on total investment in farm property.
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$632	$235	$40	$134	$353	33.9
Under 3 acres	92	137	8	28	75	28.2
3 to 9 acres	105	94	10	35	88	36.4
10 to 19 acres	154	84	12	49	138	46.2
20 to 49 acres	281	109	20	77	248	50.9
50 to 99 acres	501	189	34	123	327	38.7
100 to 174 acres	799	293	53	178	427	32.4
175 to 259 acres	1,226	439	80	237	566	28.5
260 to 499 acres	1,834	641	108	312	755	26.1
500 to 999 acres	2,984	965	158	430	1,115	24.6
1,000 acres and over	6,998	2,186	303	746	1,950	19.1

The group of medium-sized farms, containing from 100 to 174 acres each, comprises nearly one-fourth of the total farm acreage, and the same proportion of the total value of farm property.

In general, the average values of the different forms of farm property shown in Table 9 rise in unbroken series as the farms increase in size. The relatively high value of buildings on farms under 3 acres, forms the only striking exception to this rule. For this group of farms values are disproportionately high, as it contains nearly half of the florists' establishments of the state and a number of city dairies. The incomes from these industries depend less upon the acreage of land used, than upon the amount of capital invested in buildings and implements and the amounts expended for labor and fertilizers.

The average gross incomes per acre for the various groups classified by area are as follows: Farms under 3 acres, $39.89; 3 to 9 acres, $14.46; 10 to 19 acres, $9.97; 20 to 49 acres, $7.89; 50 to 99 acres, $4.82; 100 to 174 acres, $3.41; 175 to 259 acres, $2.72; 260 to 499 acres, $2.21; 500 to 999 acres, $1.74; and 1,000 acres and over, $1.03.

FARMS CLASSIFIED BY PRINCIPAL SOURCE OF INCOME.

In Tables 10 and 11 farms are classified by principal source of income. If the value of the hay and grain raised on any farm exceeds that of any other crop and constitutes at least 40 per cent of the total value of products

not fed to live stock, the farm is classified as a "hay and grain" farm. If vegetables are the leading crop, constituting 40 per cent of the value of the products, it is a "vegetable" farm. The farms of the other groups are classified in accordance with the same general principle. "Miscellaneous" farms are those whose operators do not derive 40 per cent of their income from any one class of farm products. Farms with no income in 1899 are classified according to the agricultural operations upon other farms in the same locality.

TABLE 10.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY PRINCIPAL SOURCE OF INCOME, WITH PERCENTAGES.

PRINCIPAL SOURCE OF INCOME.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	224,637	101.3	22,749,356	100.0	$233,834,693	100.0
Hay and grain	44,648	97.8	4,368,214	19.2	48,643,280	20.8
Vegetables	3,944	75.8	299,039	1.3	3,790,823	1.6
Fruit	2,191	107.4	235,258	1.0	2,755,371	1.2
Live stock	23,607	116.8	2,756,147	12.1	27,621,676	11.8
Dairy produce	917	115.5	105,893	0.5	1,994,126	0.9
Tobacco	22,626	94.2	2,131,693	9.4	21,902,127	9.4
Cotton	48,896	87.1	4,260,431	18.7	48,522,433	20.8
Rice	412	111.8	46,063	0.2	568,507	0.2
Sugar	23	59.5	1,368	(1)	12,578	(1)
Flowers and plants	15	7.9	119	(1)	67,095	(1)
Nursery products	25	97.6	2,441	(1)	100,585	(1)
Miscellaneous	77,333	110.5	8,542,690	37.6	77,856,092	33.3

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

TABLE 11.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY PRINCIPAL SOURCE OF INCOME.

PRINCIPAL SOURCE OF INCOME.	AVERAGE VALUES PER FARM OF—					
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	Per cent of gross income on total investment in farm property.
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$632	$235	$40	$134	$353	33.9
Hay and grain	696	227	44	122	292	26.8
Vegetables	556	260	37	108	364	37.8
Fruit	765	312	41	140	461	36.6
Live stock	681	258	42	189	273	23.4
Dairy produce	1,124	635	87	329	564	25.9
Tobacco	566	245	38	119	486	50.2
Cotton	632	200	39	121	405	40.8
Rice	944	289	46	101	276	20.0
Sugar	289	155	35	68	162	29.7
Flowers and plants	2,639	1,750	41	43	1,682	37.6
Nursery products	2,552	1,122	197	152	5,188	129.0
Miscellaneous	591	242	39	135	332	33.0

For the several classes of farms, the average values per acre of products not fed to live stock are as follows: Farms whose operators derive their principal income from flowers and plants, $212.05; nursery products, $53.14; tobacco, $5.16; dairy produce, $4.88; vegetables, $4.80; cotton, $4.64; fruit, $4.29; hay and grain, $2.99; sugar, $2.73; rice, $2.47; and live stock, $2.34. In computing these averages, the total area of the farms is used, and not the acreage devoted to the crop from which the principal income is derived.

The wide variations shown in the averages and percentages of gross income are largely due to the fact that, in computing gross income no deductions are made for expenditures. For florists' establishments and nurseries, the average expenditure for such items as labor and fertilizers represents a far greater percentage of the gross income than in the case of "live-stock" and "hay and grain" farms. If it were possible to present the average net income, the variations shown would be comparatively slight.

FARMS CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK.

Tables 12 and 13 present data relating to farms classified by the reported value of products not fed to live stock.

TABLE 12.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK, WITH PERCENTAGES.

VALUE OF PRODUCTS NOT FED TO LIVE STOCK.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	224,637	101.3	22,749,356	100.0	$233,834,693	100.0
$0	1,263	49.8	62,886	0.3	533,050	0.2
$1 to $49	12,590	31.6	397,850	1.7	3,296,660	1.4
$50 to $99	21,855	43.2	944,760	4.2	7,710,840	3.3
$100 to $249	74,896	66.3	4,967,125	21.8	44,688,610	19.1
$250 to $499	72,939	105.7	7,706,640	33.9	76,534,713	32.7
$500 to $999	32,600	170.9	5,571,414	24.5	62,449,580	26.7
$1,000 to $2,499	7,470	314.8	2,351,842	10.3	28,467,030	12.2
$2,500 and over	1,024	729.3	746,839	3.3	10,154,260	4.4

TABLE 13.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK.

VALUE OF PRODUCTS NOT FED TO LIVE STOCK.	AVERAGE VALUES PER FARM OF—					
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	Per cent of gross income on total investment in farm property.
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$632	$235	$40	$134	$353	33.9
$0	289	88	10	35		
$1 to $49	167	60	7	28	27	10.4
$50 to $99	218	79	11	45	79	22.5
$100 to $249	368	126	20	83	177	29.7
$250 to $499	634	232	40	143	361	34.4
$500 to $999	1,155	442	80	289	684	35.7
$1,000 to $2,499	2,298	913	161	439	1,412	43.1
$2,500 and over	5,932	2,505	484	995	4,581	46.2

Some of the farms reporting no income for 1899 were fruit farms with trees or vines too young to bear, and others were the country homes of business and professional men. There were some cases, too, in which a report of the products of the farm could not be secured,

because the person in possession on June 1, 1900, was not the one who conducted the farm in 1899. To this extent the reports fall short of giving a complete statement of farm income in 1899.

LIVE STOCK.

At the request of the various live-stock associations of the country, a new classification of domestic animals was adopted for the Twelfth Census. The age grouping for neat cattle was determined by their present and prospective relations to the dairy industry and to the supply of meat products. Horses and mules are classified by age, and neat cattle and sheep, by age and sex. The new classification permits a very close comparison with previous census reports.

Table 14 presents a summary of live-stock statistics.

TABLE 14.—NUMBER OF DOMESTIC ANIMALS, FOWLS, AND BEES ON FARMS, JUNE 1, 1900, WITH TOTAL AND AVERAGE VALUES, AND NUMBER OF DOMESTIC ANIMALS NOT ON FARMS.

LIVE STOCK.	Age in years.	ON FARMS.			NOT ON FARMS.
		Number.	Value.	Average value.	Number.
Calves	Under 1	142,686	$549,814	$3.85	3,328
Steers	1 and under 2	43,828	363,652	8.30	795
Steers	2 and under 3	26,579	329,944	12.41	422
Steers	3 and over	30,692	572,244	18.64	688
Bulls	1 and over	17,741	188,507	10.63	240
Heifers	*1 and under 2*	*68,732*	*561,321*	*8.17*	*975*
Cows kept for milk	2 and over	233,178	4,426,709	18.98	13,577
Cows and heifers not kept for milk.	2 and over	61,082	675,729	11.06	874
Colts	Under 1	5,807	131,675	22.68	128
Horses	1 and under 2	5,927	233,882	39.46	203
Horses	2 and over	147,419	8,430,054	57.18	15,449
Mule colts	Under 1	3,076	81,927	26.63	40
Mules	1 and under 2	5,600	256,401	45.79	75
Mules	2 and over	126,934	8,338,970	65.70	3,061
Asses and burros	All ages	825	69,460	84.19	92
Lambs	Under 1	93,129	121,923	1.34	287
Sheep (ewes)	1 and over	164,105	276,389	1.68	616
Sheep (rams and wethers).	1 and over	44,707	76,109	1.70	219
Swine	All ages	1,800,469	2,516,410	1.94	40,009
Goats	All ages	42,901	37,997	0.89	1,124
Fowls:[1]					
Chickens[2]		3,871,858	1,434,158		
Turkeys		120,737			
Geese		284,424			
Ducks		102,942			
Bees (swarms of)		244,539	429,868	1.76	
Value of all livestock			30,106,173		

[1] The number reported is of fowls over 3 months old. The value is of all, old and young.
[2] Including Guinea fowls.

The total value of all live stock on farms, June 1, 1900, was $30,106,173, of which amount 29.2 per cent represents the value of horses; 28.8 per cent, that of mules; 14.7 per cent, that of dairy cows; 10.8 per cent, that of other neat cattle; 8.3 per cent, that of swine; 4.8 per cent, that of poultry; and 3.4 per cent, that of all other live stock.

No reports were secured of the value of live stock not on farms, but it is probable that such animals have higher average values than those on farms. Allowing the same averages, the value of domestic animals not on farms would be $1,503,397, which would make the value of all live stock in the state, exclusive of poultry and bees not on farms, approximately $31,609,570.

CHANGES IN LIVE STOCK ON FARMS.

The following table shows the changes since 1850 in the number of the most important domestic animals.

TABLE 15.—NUMBER OF SPECIFIED DOMESTIC ANIMALS ON FARMS: 1850 TO 1900.

YEAR.	Dairy cows.	Other neat cattle.	Horses.	Mules and asses.	Sheep.[1]	Swine.
1900	233,178	391,340	159,153	136,435	208,812	1,300,469
1890	223,416	407,487	131,451	100,011	402,247	1,251,006
1880	232,133	425,293	133,686	81,871	461,638	1,458,541
1870	196,731	324,431	102,763	50,684	463,435	1,075,215
1860	228,623	465,187	150,661	61,388	546,749	1,883,214
1850	221,799	471,711	148,693	25,259	595,249	1,812,818

[1] Lambs not included.

The numbers of domestic animals of all classes have fluctuated from decade to decade. During the Civil War period there was a marked decrease in every class, except that of mules and asses. Since then the number of all kinds of domestic animals, except sheep, has increased. Taking the half century as a whole, the numbers of dairy cows and horses have undergone no material change. Neat cattle other than dairy cows have decreased about 17 per cent. There are only about two-thirds as many swine as were reported in 1850, and not much more than one-third as many sheep. Mules and asses are more than five times as numerous as they were fifty years ago, and are the only class of domestic animals showing a marked increase.

For the decade 1890 to 1900, increases are shown as follows: Mules and asses, 36.4 per cent; horses, 21.1 per cent; dairy cows, 4.4 per cent; and swine, 4.0 per cent. Sheep and neat cattle other than dairy cows decreased in number 48.1 per cent and 4.0 per cent, respectively.

In comparing the poultry report of 1900 (see Table 14) with that of 1890 it should be borne in mind that in 1900 the enumerators were instructed to report no fowls under 3 months old, while no such restriction was made in 1890. This fact, considered in connection with the increase of 50.6 per cent in the number of eggs produced, indicates that the decreases in numbers of all kinds of fowls, as reported by the census, are more apparent than real. Compared with the figures for 1890, those of 1900 show decreases as follows: Chickens, 48.4 per cent; ducks, 39.2 per cent; turkeys, 38.8 per cent; and geese, 24.4 per cent.

ANIMAL PRODUCTS.

Table 16 is a summarized exhibit of the animal products of 1899.

TABLE 16.—QUANTITIES AND VALUES OF SPECIFIED ANIMAL PRODUCTS, AND VALUES OF POULTRY RAISED, ANIMALS SOLD, AND ANIMALS SLAUGHTERED ON FARMS, IN 1899.

PRODUCTS.	Unit of measure.	Quantity.	Value.
Wool	Pounds	797,176	$150,510
Mohair and goat hair	Pounds	416	97
Milk	Gallons	[1] 89,525,749	
Butter	Pounds	16,913,802	[2] 6,175,397
Cheese	Pounds	28,883	
Eggs	Dozens	17,704,020	1,810,116
Poultry			2,689,970
Honey	Pounds	2,477,800	
Wax	Pounds	135,920	263,780
Animals sold			2,485,252
Animals slaughtered			7,109,655
Total			20,684,727

[1] Comprises all milk produced, whether sold, consumed, or made into butter or cheese.
[2] Comprises the value of butter and cheese and of all milk sold or consumed.

The total value of animal products for the state in 1899 was $20,684,727, or 23.2 per cent of the value of all farm products, and 26.1 per cent of the gross farm income. The value of animal products for 1899 was more than two-thirds as great as that of all live stock on farms, June 1, 1900. Of the above amount, 46.4 per cent represents the value of animals sold and animals slaughtered on farms; 29.8 per cent, that of dairy products; 21.8 per cent, that of poultry and eggs; 1.3 per cent, that of honey and wax; and 0.7 per cent, that of wool, mohair, and goat hair.

ANIMALS SOLD AND ANIMALS SLAUGHTERED.

The value of animals sold and animals slaughtered on farms in 1899 was $9,594,907, or 12.1 per cent of the gross farm income. Of all farms in the state reporting live stock, 68,473, or 32.2 per cent, report sales of live animals, the average receipts per farm being $36.30. Animals slaughtered on farms are reported by 176,803 farmers, or 83.2 per cent of those reporting live stock, the average value per farm being $40.21.

In obtaining these reports, the enumerators were instructed to secure from each farm operator a statement of the amount received from sales in 1899, less the amount paid for animals purchased during the same year.

DAIRY PRODUCE.

Of the $6,175,397 given in Table 16 as the value of dairy products in 1899, $5,447,873, or 88.2 per cent, represents the value of such products consumed on farms, and $727,524, or 11.8 per cent, the amount received from sales. Of the latter amount, $478,762 was received from the sale of 2,782,905 pounds of butter; $242,968, from 1,826,631 gallons of milk; $4,162, from 4,525 gallons of cream; and $1,632, from 19,200 pounds of cheese.

In 1899, 34,275,084 more gallons of milk were reported than in 1889, a gain of 62.0 per cent. The quantity of butter made on farms increased 28.8 per cent in the same time, while the quantity of cheese made in 1899 was less than one-half as great as in 1889.

POULTRY AND EGGS.

There were 17,704,020 dozens of eggs reported in 1899, or 50.6 per cent more than in 1889. Of the $4,500,086 given in Table 16 as the value of poultry and eggs, 59.8 per cent represents the value of poultry raised in 1899, and 40.2 per cent, that of eggs produced.

HONEY AND WAX.

The production of honey for 1899 was 2,477,800 pounds, and that of wax, 135,920 pounds, a gain of 4.4 per cent in honey and 7.5 per cent in wax, since 1889.

WOOL.

The production of wool has fluctuated from decade to decade, the report for 1900 showing an increase of 8.6 per cent since 1890. This increase is more apparent than real owing to the fact that the fleeces from at least 79,674 sheep were omitted from the table in 1890, but included in a general estimate of wool shorn after the census enumeration.

HORSES, MULES, AND DAIRY COWS ON SPECIFIED CLASSES OF FARMS.

Table 17 presents, for the specified classes of farms, the number reporting horses, mules, and dairy cows, and the average number of these animals per farm. In computing the averages presented, only those farms which report the kind of stock under consideration are included.

TABLE 17.—HORSES, MULES, AND DAIRY COWS ON SPECIFIED CLASSES OF FARMS, JUNE 1, 1900.

CLASSES.	HORSES.		MULES.		DAIRY COWS.	
	Farms reporting.	Average per farm.	Farms reporting.	Average per farm.	Farms reporting.	Average per farm.
Total	108,160	1.5	88,591	1.5	144,553	1.6
White farmers	89,944	1.5	69,864	1.6	124,054	1.7
Colored farmers	18,216	1.2	18,727	1.2	20,499	1.3
Owners[1]	72,837	1.5	55,587	1.6	97,599	1.7
Managers	669	2.4	616	3.8	694	3.5
Cash tenants	10,188	1.3	9,365	1.4	9,116	1.4
Share tenants	24,466	1.3	23,023	1.3	37,145	1.3
Under 20 acres	7,448	1.2	4,610	1.1	12,223	1.2
20 to 99 acres	51,549	1.3	42,524	1.3	69,886	1.4
100 to 174 acres	26,457	1.6	21,871	1.6	35,155	1.7
175 to 259 acres	11,335	1.8	9,578	1.8	14,213	2.0
260 acres and over	11,371	2.1	10,008	2.5	13,126	2.6
Hay and grain	20,430	1.6	14,973	1.6	29,090	1.4
Vegetables	1,731	1.4	958	1.6	1,374	1.8
Fruit	1,112	1.4	805	1.5	1,241	1.7
Live stock	13,450	1.7	7,881	1.6	19,203	1.9
Dairy	618	2.0	326	1.9	917	5.3
Tobacco	11,745	1.4	9,089	1.4	11,490	1.4
Cotton	20,024	1.4	25,293	1.5	25,660	1.4
Rice	232	1.7	78	1.6	174	2.1
Miscellaneous[2]	38,823	1.4	29,188	1.5	55,404	1.7

[1] Including "part owners" and "owners and tenants."
[2] Including sugar farms, florists' establishments, and nurseries.

In North Carolina, as in other states where cotton is a staple crop and much of the farm labor is performed by negroes, large numbers of mules are used as work animals. For most classes of farms the average numbers of mules and horses are about equal, but on farms operated by managers, and on farms of the largest area, more mules than horses are reported. This is due to the fact that these two classes of farms include a relatively large number of cotton plantations.

If the numbers of horses and mules be combined, the average number of work animals per farm compares favorably with the corresponding figures for the more intensively cultivated farms of New England.

CROPS.

The following table gives the statistics of the principal crops of 1899.

TABLE 18.—ACREAGES, QUANTITIES, AND VALUES OF PRINCIPAL FARM CROPS IN 1899.

CROPS.	Acres.	Unit of measure.	Quantity.	Value.
Corn	2,720,206	Bushels	34,818,860	$17,804,407
Wheat	746,984	Bushels	4,342,351	3,463,726
Oats	270,876	Bushels	2,454,768	991,516
Barley	475	Bushels	4,237	2,335
Rye	28,074	Bushels	133,730	86,228
Buckwheat	5,168	Bushels	52,572	25,482
Broom corn	67	Pounds	80,490	1,501
Rice	22,279	Pounds	7,838,580	203,075
Kafir corn	2	Bushels	8	6
Flaxseed	2	Bushels	9	9
Clover seed		Bushels	331	1,847
Grass seed		Bushels	1,315	2,574
Hay and forage	229,998	Tons	429,824	4,242,561
Cottonseed		Tons	[1] 205,999	2,290,771
Cotton	1,007,020	Bales	459,707	15,696,952
Tobacco	203,023	Pounds	127,503,400	8,038,691
Hops	[2]	Pounds	85	12
Peanuts	95,856	Bushels	3,460,489	1,852,110
Dry beans	5,381	Bushels	49,518	50,703
Dry pease	88,407	Bushels	876,167	649,194
Potatoes	23,619	Bushels	1,636,445	862,509
Sweet potatoes	68,730	Bushels	5,781,587	2,119,956
Onions	836	Bushels	116,341	86,597
Miscellaneous vegetables	63,762			3,034,895
Maple sugar		Pounds	1,180	117
Maple sirup		Gallons	129	117
Sugar cane	25	Tons	[3] 11	54
Sugar cane sirup		Gallons	1,957	1,008
Sorghum cane	20,227	Tons	[3] 5,980	17,083
Sorghum sirup		Gallons	1,419,570	428,814
Small fruits	6,337			599,963
Grapes	[4] 1,734	Centals	123,440	[5] 197,262
Orchard fruits	[4] 158,937	Bushels	5,124,959	[6] 1,269,614
Tropical fruits				446
Nuts				3,413
Forest products				4,921,740
Flowers and plants	61			31,163
Seeds	139			8,382
Nursery products	1,149			135,084
Miscellaneous	80			2,494
Total	5,769,954			68,624,911

[1] Exclusive of 10,510 tons, valued at $116,871, sold in seed cotton and included with the cotton.
[2] Less than 1 acre.
[3] Sold as cane.
[4] Estimated from number of vines or trees.
[5] Including value of raisins, wine, etc.
[6] Including value of cider, vinegar, etc.

Of the total value of crops in 1899, cotton, including seed, constituted 26.2 per cent; corn, 25.2 per cent; other cereals, including rice, 7.0 per cent; vegetables, including potatoes, sweet potatoes, and onions, 8.9 per cent; forest products, 7.2 per cent; fruits and nuts, 3.0 per cent; hay and forage, 6.2 per cent; and all other products, 16.3 per cent.

The acreage devoted to corn constituted 47.1 per cent of the total area in crops and yielded 25.2 per cent of the total receipts, while cotton, occupying but 17.5 per cent of the total acreage, yielded 26.2 per cent of the total receipts.

The average values per acre of crops were as follows: Flowers and plants, $510.87; nursery products, $117.57; onions, $103.58; tobacco, $39.59; potatoes, $36.52; sweet potatoes, $30.84; hay and forage, $18.45; cotton, including seed, $17.86; peanuts, $19.32; orchard fruits, $7.99; dry beans and dry pease, $7.46; and cereals, including rice, $5.82. The crops yielding the greatest returns were grown upon highly improved land and their production required relatively large expenditures for labor and fertilizers.

CEREALS.

Table 19 is an exhibit of the changes in cereal production since 1849.

TABLE 19.—ACREAGE AND PRODUCTION OF CEREALS: 1849 TO 1899.

PART 1.—ACREAGE.

YEAR.[1]	Barley.	Buckwheat.	Corn.	Oats.	Rye.	Wheat.
1899	475	5,168	2,720,206	270,876	28,074	746,984
1889	302	1,800	2,360,627	541,851	56,496	666,509
1879	230	5,725	2,305,419	500,415	61,953	646,829

[1] No statistics of acreage were secured prior to 1879.

PART 2.—BUSHELS PRODUCED.

1899	4,237	52,572	34,818,860	2,454,768	133,730	4,342,351
1889	3,521	12,621	25,783,623	4,512,762	276,339	4,292,035
1879	2,421	44,668	28,019,839	3,838,068	285,160	3,397,393
1869	3,186	20,109	18,454,215	3,220,105	352,006	2,859,879
1859	3,445	35,924	30,078,564	2,781,860	436,856	4,743,706
1849	2,735	16,704	27,941,051	4,052,078	229,563	2,180,102

The total area devoted to cereals in 1879 was 3,520,571 acres; in 1889, 3,627,585 acres; and in 1899, 3,771,783 acres. Of the total area in 1899, 72.1 per cent was devoted to corn; 19.8 per cent, to wheat; 7.2 per cent, to oats; and 0.9 per cent, to rye, buckwheat, and barley. The percentages of increase in the acreages devoted to the several cereals in the last decade were as follows: Corn, 15.2 per cent; wheat, 12.1 per cent; buckwheat, 187.1 per cent; and barley, 57.3 per cent. The acreage of oats and rye decreased 50.0 per cent and 50.3 per cent, respectively.

A comparison by counties shows that the acreage in corn increased between 1889 and 1899 in nearly every county. The largest acreages were reported by Robeson, Johnston, and Sampson counties. About one-third of the wheat was grown in the counties of the Yadkin River Valley. The production of this cereal has increased steadily since 1869 but the average yield per acre remains comparatively low. The acreage devoted to oats in 1899 was less than one-half as great as that reported for 1889. While this marked decrease was doubtless due, in a large measure, to severe drought in the spring of 1899, it is believed that the crop is not so generally cultivated as it was ten years ago. Rye has decreased steadily in importance since 1859. Neither barley nor buckwheat is grown extensively; the acreages and productions of both have fluctuated widely from decade to decade with a general upward tendency.

The total number of bushels of grain produced in 1849 was 34,372,233; in 1889, 34,880,901, and in 1899, 41,806,518. Comparisons between the crops of the different years have little significance, however, as the production depends to a great extent upon the nature of the season.

RICE.

In addition to the cereals given in Table 19, rice was grown in 1899 by 5,248 farmers, who reported 22,279 acres of land, and a yield of 7,838,580 pounds, valued at $203,075. There was an increase in ten years of 82.0 per cent in acreage, and of 34.9 per cent in production, the crop being the largest ever reported.

The average yield per acre was 352 pounds, and the average value for each farm reporting was $39.

The crop was grown in 45 counties, but 76.4 per cent of the acreage was furnished by the 7 counties of Beaufort, Brunswick, Camden, Hyde, Pasquotank, Perquimans, and Tyrrell, lying on the coast, and on the Albemarle and Pamlico sounds.

COTTON.

The following table shows the changes in cotton production since 1849.

TABLE 20.—ACREAGE AND PRODUCTION OF COTTON: 1849 TO 1899.

YEAR.	ACREAGE.		PRODUCTION.		
	Total.	Per cent of increase.	Commercial bales.	Pounds.	Per cent of increase.
1899	1,007,020	[1] 12.2	459,707	216,506,980	35.0
1889	1,147,136	28.4	336,261	160,396,497	[1] 9.1
1879	893,158	----------	389,598	176,487,894	180.6
1869	----------	----------	----------	62,901,790	[1] 2.9
1859	----------	----------	----------	64,753,780	119.2
1849	----------	----------	----------	29,538,000	----------

[1] Decrease.

The production of cotton in North Carolina has fluctuated greatly since 1849. In 1859 the quantity reported was more than twice that produced in 1849, while during the next decade, when the Civil War affected all industries, there was a decrease of 2.9 per cent. The reports for 1879 showed a great increase in production. This was followed in the next decade by a slight decrease, notwithstanding an increase of 28.4 per cent in acreage. But in the decade just completed, the production increased 35.0 per cent, while the acreage decreased 12.2 per cent.

In 1899, 105,766 farmers devoted to the cultivation of cotton a total area of 1,007,020 acres, or 12.1 per cent of the total improved farm land, and an average of 9.5 acres per farm reporting. The total production was 216,506,980 pounds, an average of 215 pounds per acre and 114 pounds per capita.

The counties reporting the greatest area under cotton are Mecklenburg, Robeson, Wake, Union, Johnston, Anson, Halifax, Wayne, Cleveland, and Edgecombe, ranking in the order named, and reporting in the aggregate 42.6 per cent of the total acreage. These counties are located in the central and southwestern parts of the state.

HAY AND FORAGE.

In 1900, 141,532 farmers, or 63.0 per cent of the total number, reported hay or forage crops. Exclusive of cornstalks and corn strippings, an average yield of 1.07 tons per acre was obtained. The total number of acres devoted to hay and forage in 1899 was 229,998, or 20.6 per cent more than ten years before.

In 1899 the acreages and yields of the various kinds of hay and forage were as follows: Wild, salt, and prairie grasses, 17,462 acres and 21,236 tons; millet and Hungarian grasses, 1,959 acres and 2,705 tons; alfalfa or lucern, 243 acres and 392 tons; clover, 27,238 acres and 28,290 tons; other tame and cultivated grasses, 122,879 acres and 122,411 tons; grains cut green for hay, 51,772 acres and 56,780 tons; crops grown for forage, 8,445 acres and 15,006 tons; cornstalks and corn strippings, 843,557 acres and 183,004 tons.

In Table 18 the production of cornstalks and corn strippings is included under "hay and forage," but the acreage is included under "corn," as the forage secured was an incidental product of the corn crop.

ORCHARD FRUITS.

The changes in orchard fruits since 1890 are shown in the following table.

TABLE 21.—ORCHARD TREES AND FRUITS: 1890 AND 1900.

FRUITS.	NUMBER OF TREES.		BUSHELS OF FRUIT.	
	1900.	1890.	1899.	1889.
Apples	6,438,871	4,249,468	4,662,751	7,591,541
Apricots	2,549	5,096	245	1,915
Cherries	174,295	111,774	33,899	45,918
Peaches	2,773,788	2,133,004	373,663	2,740,915
Pears	138,886	44,002	25,521	33,910
Plums and prunes	183,451	51,341	22,074	15,516

Increases are shown for the decade in numbers of trees as follows: Apple, 51.5 per cent; peach, 30.0 per cent; cherry, 55.9 per cent. Plum and prune and pear have increased more than threefold. The number of apricot trees decreased about one-half.

Of all trees reported in 1900, 66.1 per cent were apple trees; 28.5 per cent, peach trees; and the remainder, 5.4 per cent, plum, prune, pear, cherry, apricot, and unclassified trees; the latter class, which is not included in the table, numbering 22,389 trees and yielding 6,806 bushels of fruit.

Most of the fruit trees are reported from the western part of the state, Guilford ranking among the leading counties in all varieties. Moore, Burke, and Guilford counties reported about one-eighth of the peach trees, and Wilkes, Buncombe, Surry, Guilford, and Haywood reported about one-sixth of the apple trees.

The value of the orchard products given in Table 18 includes the value of 7,651 barrels of cider, 3,298 barrels of vinegar, and 2,744,450 pounds of dried and evaporated fruits.

SEMITROPICAL FRUITS.

In 1900, 1,019 farms representing 66 counties reported 5,057 fig trees. The total amount of fruit produced was 14,510 pounds, valued at $446. Although fig trees are grown generally throughout the state, those yielding fruit in 1899 were located in 36 counties, principally in the eastern half of the state. Halifax county reported one-fourth of the trees and fruit produced.

SMALL FRUITS.

The total area used in the growing of small fruits was 6,837 acres, distributed among 10,873 farms. The value of the fruit produced was $599,963, an average of $55.18 per farm. Of the total area, 5,616 acres, or 82.1 per cent,

were devoted to strawberries, of which the total production was 10,674,610 quarts. Over three-fourths of the acreage in this fruit was in the adjoining counties of Duplin, Pender, Sampson, and Wayne. The acreage and production of other berries were as follows: Blackberries and dewberries, 1,073 acres and 1,089,290 quarts; raspberries and Logan berries, 69 acres and 78,050 quarts; currants, 28 acres and 32,360 quarts; gooseberries, 25 acres and 30,340 quarts; and other berries, 26 acres and 29,410 quarts.

VEGETABLES.

The value of the vegetables grown in 1899, including potatoes, sweet potatoes, and onions, was $6,103,957, or 7.7 per cent of the gross farm income. Of this amount 49.7 per cent represents the value of miscellaneous vegetables; 34.8 per cent, that of sweet potatoes; 14.1 per cent, that of Irish potatoes; and 1.4 per cent, that of onions.

Sweet potatoes were grown in 1899 by 112,951 farmers, or approximately one-half the total number in the state. The area devoted to this crop in 1889 was 71,752 acres, and in 1899, 68,730 acres, a decrease of 4.2 per cent. The total crop was 5,781,587 bushels, an average of 84.1 bushels per acre. The leading counties are Columbus, Sampson, Johnston, Beaufort, Brunswick, Duplin, and Robeson, ranking in the order named.

Aside from the land devoted to potatoes, sweet potatoes, and onions, 63,762 acres were used in the growing of miscellaneous vegetables. The products of 38,566 acres were not reported in detail; of the remaining area, 9,814 acres were devoted to watermelons; 9,747, to cabbages; 1,729, to muskmelons; 1,166, to tomatoes; 626, to beans; 611, to cucumbers; 610, to sweet corn; and 893 acres to other vegetables.

PEANUTS.

Peanuts were grown in 1899 by 19,685 farmers, who devoted 95,856 acres to their cultivation. The total production was 3,460,439 bushels, an average of 36.1 bushels per acre. In the last decade the gain in acreage was fourfold, and that in production sevenfold. Of the total acreage, 66.6 per cent was reported from the 6 northeastern counties of Bertie, Halifax, Northampton, Hertford, Martin, and Edgecombe, ranking in the order named. The area devoted to peanut growing has increased at least tenfold since 1889 in each of these counties, while Bertie county shows a gain from 528 acres to 14,499 acres, or about twenty-sevenfold.

TOBACCO.

According to the census of 1850, North Carolina produced in 1849, 11,984,786 pounds of tobacco. The production in 1859 was nearly three times as great, while the crop of 1869 fell below that of 1849. In the two succeeding decades, there were large increases, amounting to 15,836,126 pounds, or 142.0 per cent, between 1870 and 1880, and to 9,389,045 pounds, or 34.8 per cent, between 1880 and 1890.

In 1899 tobacco was grown in North Carolina by 51,106 farmers, who obtained from 203,023 acres a yield of 127,503,400 pounds, valued at $8,038,691. The average value per pound was 6.3 cents. The increase in area in the last decade was 105,946 acres, or 109.1 per cent, and that in production 91,128,142 pounds, or 250.5 per cent. The average yield per acre in 1899 was 628 pounds, against 375 pounds in 1889, and 472 pounds in 1879.

Of the 86 counties reporting the cultivation of tobacco in 1899, the county having the largest acreage was Rockingham, with 16,882 acres. Pitt county reported the largest production, 10,733,010 pounds, and was closely followed by Rockingham, Nash, Wilson, Stokes, Granville, Franklin, Caswell, Greene, and Person counties in the order named. The 12 leading counties of the state contained 61.3 per cent of the entire acreage in tobacco and contributed 63.0 per cent of the total production.

SUGAR CANE AND SORGHUM CANE.

In 1899, 57 farmers raised 25 acres of sugar cane, from which they sold 11 tons of cane for $54, and manufactured from the remaining cane 1,957 gallons of sirup, valued at $1,008. The entire crop of cane reported was grown in Columbus county. Previous to the present census no cane, sugar, or sirup had been reported from the state since 1869, in which year 42,000 pounds of sugar, and 33,888 gallons of sirup were produced.

In 1899, 20,227 acres of sorghum cane were grown by 48,214 farmers, an average of 0.42 acre for each farm reporting. From this area 5,980 tons of cane were sold for $17,083, and from the remaining cane 1,419,570 gallons of sirup, valued at $429,814, were manufactured. This was a decrease since 1889 of 16.0 per cent in acreage and an increase of 150,624 gallons, or 11.9 per cent in production of sirup. The total value of sorghum cane products for 1899 was $446,897, an average of $9.27 for each farm reporting. The sorghum crop was distributed quite uniformly over 93 counties of the state.

FLOWERS AND PLANTS.

In 1899 the operators of 58 farms raised flowers and plants valued at $31,163. Of this number, 15 were commercial florists, who reported a gross income of $25,234, of which $23,909 was derived from the sale of flowers and plants, and $1,325 from other products. The capital invested was $67,095—$39,585 in land, $26,255 in buildings and other improvements, $615 in implements, and $640 in live stock. The expenditure for fertilizers was $165, and that for labor $4,060.

A total of 186,900 square feet of land under glass was reported by the operators of 139 farms, including the 15 florists, who reported 61,444 square feet.

NURSERIES.

The 25 nurserymen in the state reported a gross income of $129,714, of which amount $118,509 was derived from the sale of trees, shrubs, and plants, and $11,205 from other products. The total area of land used was 2,441 acres, making the gross income per acre $53.14. The value of

land was $63,800; that of buildings and other improvements, $28,959; that of implements and machinery, $4,935; and that of live stock, $3,800. The expenditures for labor and fertilizers were $27,549 and $3,636, respectively.

LABOR AND FERTILIZERS.

The total expenditure for labor on farms in 1899, including the value of board furnished, was $5,444,950, an average of $24 per farm. The average was highest on the most intensively cultivated farms, having been $1,102 for nurseries, $271 for florists' establishments, $70 for dairy farms, $51 for fruit farms, $48 for vegetable farms, $38 for tobacco farms, $38 for rice farms, $32 for cotton farms, $15 for live-stock farms, $14 for hay and grain farms, and $5 for sugar farms. "Managers" expended on an average, $335; "owners," $29; "cash tenants," $22; and "share tenants," $13. White farmers expended $29 per farm, and colored farmers, $9.

Fertilizers purchased in 1899 cost $4,479,030, or an average of $20 per farm, and an increase since 1890 of $1,596,792, or 55.4 per cent. The average expenditure in 1899 was greatest for nurseries, amounting to $145. For vegetable farms the average was $43; for tobacco farms, $42; for dairy farms, $15; for florists' establishments, $11; for hay and grain farms, $11; for sugar farms, $9; for live-stock farms, $7; and for rice farms, $5.

IRRIGATION STATISTICS.

Irrigation in North Carolina is practiced principally in the cultivation of rice in the tide-water districts. With the exception of a few inland basins or flats, dependent on reservoirs for water supply, the entire crop of irrigated rice is planted along the tide-water rivers, which are fresh, where there is sufficient oscillation of the tides to afford the means of flooding and draining the dike-protected lands.

The rice fields are divided by check banks into sections ranging in area from 5 to 30 acres each, which are subdivided by ditches into beds. Each section is provided with a wooden trunk or box built under the dikes, with a door at each end by means of which the ingress and egress of the water is controlled. These trunks are from 30 to 40 feet long, and from 3 to 4 feet wide, with a depth of 16 inches. In flooding the field, the outer door is hoisted, and as the tide rises the water comes in through the trunk and passes through the ditches. When the tide begins to recede, the inner door is closed and the water is securely stored. To drain the field thoroughly, it is only necessary to open the inner doors at low tide.

The average first cost per acre of preparing rice lands for irrigation, including the cost of constructing dikes, trunks, check banks, and ditches, is $34.35.

The principal rice-growing counties in 1899 were Hyde, with 2,203,606 pounds; Brunswick, with 1,215,814 pounds; Pasquotank, with 748,376 pounds; Perquimans, with 573,256 pounds; and Camden, with 556,254 pounds. The total production of the 5 counties was 5,297,306 pounds, or 67.0 per cent of the total crop of the state.

A considerable area of land in Hyde county is irrigated by pumping from Mattamuskeet Lake, situated near the center of the county. The surface of the county is low and flat, and some of the rice land is below the level of the lake, and can be irrigated simply by cutting ditches from the lake to the farms. The highest lift required to irrigate any of the contiguous land is 4 feet. Rice grown in this section is of a superior quality. Land lying below the level of the lake can be irrigated at very little expense, one rice grower reporting that the entire cost of his irrigation plant, including engine, elevator, etc., was but $500. The area irrigated by this grower was 300 acres, and the average cost per acre for labor and fuel was 75 cents.

Twelfth Census of the United States.

CENSUS BULLETIN.

No. 179. WASHINGTON, D. C. June 3, 1902.

AGRICULTURE.

NEW YORK.

Hon. WILLIAM R. MERRIAM,
Director of the Census.

SIR: I have the honor to transmit herewith, for publication in bulletin form, the statistics of agriculture in the state of New York, taken in accordance with the provisions of section 7 of the act of March 3, 1899. This section requires that—

> The schedules relating to agriculture shall comprehend the following topics: Name of occupant of each farm, color of occupant, tenure, acreage, value of farm and improvements, acreage of different products, quantity and value of products, and number and value of live stock. All questions as to quantity and value of crops shall relate to the year ending December thirty-first next preceding the enumeration.

A "farm," as defined by the Twelfth Census, includes all the land, under one management, used for raising crops and pasturing live stock, with the wood lots, swamps, meadows, etc., connected therewith. It includes also the house in which the farmer resides, and all other buildings used by him in connection with his farming operations.

The farms of New York, June 1, 1900, numbered 226,720, and were valued at $888,134,180. Of this amount, $336,959,960, or 37.9 per cent, represents the value of buildings, and $551,174,220, or 62.1 per cent, the value of land and improvements other than buildings. On the same date the value of farm implements and machinery was $56,006,000, and that of live stock, $125,583,715. *These values, added to that of farms, give $1,069,723,895,* the "total value of farm property." The products derived from domestic animals, poultry, and bees, including animals sold and animals slaughtered on farms, are referred to in this bulletin as "animal products." The total value of such products, together with the value of all crops, is termed "total value of farm products." This value for 1899 was $245,270,600, of which amount $95,352,247, or 38.9 per cent, represents the value of animal products, and $149,918,353, or 61.1 per cent, the value of crops, including forest products cut or produced on farms. The total value of farm products for 1899 exceeds that reported for 1889 by $83,677,591, or 51.8 per cent.

The "gross farm income" is obtained by deducting from the total value of farm products the value of the products fed to live stock on the farms of the producers. In 1899 the reported value of products fed was $63,429,180, leaving $181,841,420 as the gross farm income. The ratio which this latter amount bears to the "total value of farm property" is referred to in the text as the "percentage of gross income upon investment." *For New York, in 1899,* it was 17.0 per cent.

As no reports of expenditures for taxes, interest, insurance, feed for stock, and similar items have been obtained by any census, no statement of net farm income can be given.

The statistics presented in this bulletin will be treated in greater detail in the final report on agriculture in the United States. The present publication is designed to present a summarized advance statement for New York.

Very respectfully,

L. G. Powers.

Chief Statistician for Agriculture.

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AGRICULTURE IN NEW YORK.

GENERAL STATISTICS.

New York has a total land area of 47,620 square miles, or 30,476,800 acres, of which 22,648,109 acres, or 74.3 per cent, are included in farms.

The surface of the state is greatly varied. Its eastern portion is traversed by several chains of mountains, among which are the Adirondacks and the Catskills. The points of greatest elevation are in the eastern and northeastern parts of the state, the altitude of the southeastern portion being less, although the surface is mountainous, except on the comparatively level Long Island coast. To the north and west of these highlands, the surface sinks gradually by a series of terraces, toward Lake Ontario and the St. Lawrence River, where the land becomes more level and is diversified by many small lakes and rivers.

The land is for the most part arable, much of it being unusually fertile. The soil is composed mainly of the glacial drift, which lies in an irregular sheet, varying in depth from a few inches to several hundred feet. Along the shores of the lakes and rivers are found rich deposits of clay, alluvium, and marl, mixed with humus.

NUMBER AND SIZE OF FARMS.

The following table gives, by decades since 1850, the number of farms, the total and average acreage, and the percentage of farm land improved.

TABLE 1.—FARMS AND FARM ACREAGE: 1850 TO 1900.

YEAR.	Number of farms.	NUMBER OF ACRES IN FARMS.				Per cent of farm land improved.
		Total.	Improved.	Unimproved.	Average.	
1900	226,720	22,648,109	15,599,986	7,048,123	99.9	68.9
1890	226,223	21,961,562	16,389,380	5,572,182	97.1	74.6
1880	241,058	23,780,754	17,717,862	6,062,892	98.7	74.5
1870	216,253	22,190,810	15,627,206	6,563,604	102.6	70.4
1860	196,990	20,974,958	14,358,403	6,616,555	106.5	68.4
1850	170,621	19,119,084	12,408,964	6,710,120	112.1	64.9

Since 1850 the number of farms has increased 56,099, or 32.9 per cent, but in the last decade a gain of only 497 farms, or 0.2 per cent is shown. Between 1850 and 1900 the total area in farm land increased 3,529,025 acres, or 18.5 per cent. Owing to the more rapid increase in the number of farms than in the total acreage, there has been a decrease in the average size of farms in each decade, except that between 1890 and 1900. The percentage of farm land improved has increased continuously except for the last decade, the decrease in this period being doubtless the result of a more strict construction of the term "improved land" in 1900 than heretofore.

FARM PROPERTY AND PRODUCTS.

Table 2 presents a summary of the principal statistics relating to farm property and products for each census year, beginning with 1850.

TABLE 2.—VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND OF FARM PRODUCTS: 1850 TO 1900.

YEAR.	Total value of farm property.	Land, improvements, and buildings.	Implements and machinery.	Live stock.	Farm products.[1]
1900	$1,060,723,895	$888,134,180	$36,006,000	$125,583,715	$245,270,600
1890	1,139,310,716	968,127,286	46,659,465	124,523,965	161,593,009
1880	1,216,637,765	1,056,176,741	42,592,741	117,868,283	178,025,695
1870[2]	1,494,738,190	1,272,857,766	45,997,712	175,882,712	[3]253,526,153
1860	936,366,584	803,343,593	29,166,695	103,856,296	----------
1850	650,202,067	554,546,642	22,084,926	73,570,499	----------

[1] For year preceding that designated.
[2] Values for 1870 were reported in depreciated currency. To reduce to specie basis of other years they must be diminished one-fifth.
[3] Includes betterments and additions to live stock.

The total value of farm property shows a gain since 1850 of $419,521,828, but in the last decade there was a loss of $69,586,821. This decrease is in the value of land, improvements, and buildings only, where the loss is $79,993,106, or 8.3 per cent. The value of implements and machinery shows an increase since 1890 of $9,346,535, or 20.0 per cent, and that of live stock a gain of $1,059,750, or 0.9 per cent. The value of farm products for 1899 exceeds that reported for 1889 by $83,677,591, or 51.8 per cent. Part of this increase, and of that in implements and machinery is doubtless the result of a more detailed enumeration in 1900 than heretofore.

COUNTY STATISTICS.

Table 3 gives an exhibit of general agricultural statistics by counties.

TABLE 3.—NUMBER AND ACREAGE OF FARMS, AND VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, JUNE 1, 1900, WITH VALUE OF PRODUCTS OF 1899 NOT FED TO LIVE STOCK, AND EXPENDITURES IN 1899 FOR LABOR AND FERTILIZERS, BY COUNTIES.

COUNTIES.	NUMBER OF FARMS.		ACRES IN FARMS.		VALUES OF FARM PROPERTY.				Value of products not fed to live stock.	EXPENDITURES.	
	Total.	With buildings.	Total.	Improved.	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		Labor.	Fertilizers.
The State	226,720	223,836	22,648,109	15,599,986	$551,174,220	$336,959,960	$56,006,000	$125,583,715	$181,841,420	$27,102,130	$4,493,050
Albany	3,281	3,251	298,656	245,969	6,782,350	6,428,530	1,080,910	1,575,077	2,806,275	486,300	55,090
Allegany	5,082	5,019	593,888	408,252	10,631,560	5,612,520	1,182,640	2,991,954	3,425,285	322,100	34,830
Broome	4,410	4,363	417,022	308,758	7,375,650	4,883,280	784,340	2,116,021	2,629,531	249,870	29,750
Cattaraugus	5,976	5,904	672,561	417,123	11,675,400	6,237,990	1,226,200	3,721,058	4,286,867	369,070	49,990
Cayuga	5,039	4,998	413,924	341,950	10,757,040	7,671,590	1,394,080	2,649,102	4,218,878	630,920	131,260
Chautauqua	7,401	7,291	614,303	434,246	16,470,490	8,869,090	1,563,600	3,934,751	5,805,773	676,430	102,630
Chemung	2,438	2,398	233,976	176,328	5,487,560	3,119,540	551,460	1,093,174	1,683,254	228,250	32,920
Chenango	4,478	4,413	543,881	398,503	7,829,260	5,551,300	959,160	3,198,673	3,702,369	410,680	48,590
Clinton	3,764	3,730	435,825	214,929	6,081,670	3,508,290	700,590	1,764,482	1,968,568	265,070	17,600
Columbia	2,944	2,919	375,904	301,103	6,450,670	5,847,010	955,180	1,810,089	2,604,286	591,390	41,900
Cortland	2,754	2,717	303,254	232,647	5,228,270	3,235,980	656,070	1,889,571	2,317,596	253,290	38,570
Delaware	5,232	5,168	795,997	502,086	9,349,570	7,437,090	1,147,460	4,123,897	4,731,475	483,550	38,450
Dutchess	3,537	3,515	466,453	348,495	10,399,650	10,316,300	1,380,880	2,927,062	3,881,586	901,600	55,600
Erie	7,929	7,782	571,084	428,024	34,212,480	11,026,460	2,247,420	4,111,360	5,801,603	752,860	186,370
Essex	2,412	2,387	401,912	152,255	3,571,120	2,673,670	441,560	1,195,881	1,125,008	188,860	13,440
Franklin	3,721	3,667	429,452	201,981	6,473,470	3,789,840	692,920	1,957,296	2,201,192	274,020	34,230
Fulton	2,234	2,193	208,687	115,213	2,603,800	2,066,850	331,420	832,680	1,027,283	135,020	35,130
Genesee	3,286	3,219	294,316	242,307	9,438,320	5,217,350	897,270	1,745,779	2,956,806	453,620	82,620
Greene	2,746	2,708	337,909	215,694	4,862,580	4,419,130	718,290	1,316,125	1,845,310	308,450	36,170
Hamilton	510	504	63,832	22,917	388,460	337,420	63,990	160,408	162,725	25,960	1,950
Herkimer	3,227	3,199	383,180	272,158	6,873,680	4,879,640	810,320	2,477,406	2,721,867	390,020	30,400
Jefferson	6,052	5,982	745,093	526,288	16,945,020	8,839,550	1,481,840	4,166,325	5,205,633	625,830	34,350
Kings	360	338	6,480	5,989	8,966,760	1,185,150	338,620	213,693	1,099,305	254,560	85,730
Lewis	3,838	3,747	494,165	272,866	6,455,090	3,748,190	702,640	2,160,460	2,240,523	252,010	35,290
Livingston	3,267	3,191	378,660	301,860	12,851,960	5,516,100	1,078,260	2,282,382	2,870,280	548,070	89,420
Madison	4,144	4,098	388,866	299,251	6,754,610	5,462,560	940,600	2,523,252	3,510,532	573,690	66,120
Monroe	5,889	5,823	381,941	339,870	23,724,770	11,597,480	1,894,660	2,823,543	6,454,975	1,091,660	214,080
Montgomery	2,407	2,387	236,934	202,394	5,941,600	4,608,840	769,990	1,608,651	2,064,886	358,780	17,810
Nassau	1,658	1,642	88,452	69,357	10,972,640	5,746,490	906,010	988,288	2,645,652	612,870	441,490
New York	184	180	3,461	2,599	7,064,600	688,650	96,130	110,824	447,923	95,490	29,260
Niagara	4,356	4,293	305,456	279,807	13,959,900	6,636,980	786,065	2,089,585	4,006,059	539,440	72,260
Oneida	7,232	7,146	657,748	447,359	12,560,500	8,687,940	1,435,730	3,987,463	4,950,013	818,890	112,630
Onondaga	6,305	6,231	453,934	388,621	16,474,420	10,149,940	1,679,100	3,480,038	5,332,363	825,190	110,030
Ontario	4,328	4,287	405,003	318,948	12,670,520	7,990,580	744,055	2,821,845	5,206,447	810,660	108,540
Orange	3,966	3,918	402,519	284,093	10,426,180	9,462,550	1,180,400	3,486,031	4,993,307	811,430	63,150
Orleans	2,964	2,924	237,600	205,279	8,315,300	4,833,770	935,270	1,507,141	3,081,832	381,110	93,840
Oswego	6,914	6,819	492,985	319,431	9,482,900	6,062,710	1,167,000	2,875,538	3,570,138	322,840	45,330
Otsego	5,634	5,586	612,224	470,787	9,487,540	7,850,970	1,223,000	3,414,454	4,261,749	635,020	84,190
Putnam	1,141	1,122	133,899	70,263	3,763,920	2,895,990	273,800	793,584	1,074,574	279,720	4,970
Queens	1,188	1,162	25,649	21,865	11,827,740	2,918,020	754,540	550,660	3,018,604	749,800	323,740
Rensselaer	3,668	3,639	365,007	256,584	6,122,330	6,266,440	1,048,920	1,852,146	3,128,532	564,830	52,170
Richmond	290	288	11,724	8,048	3,228,000	767,800	258,670	140,902	479,572	117,100	28,290
Rockland	939	923	62,050	32,649	2,764,650	2,274,090	223,810	366,633	604,243	169,870	19,390
St. Lawrence	3,353	3,273	1,068,798	550,010	18,732,620	10,082,490	1,743,080	5,952,795	6,481,416	662,030	49,610
Saratoga	3,805	3,747	406,079	271,185	5,335,210	4,943,790	817,530	1,522,720	2,324,751	345,360	48,980
Schenectady	1,194	1,178	119,577	95,396	2,623,370	2,016,150	377,260	575,180	927,340	147,050	21,310
Schoharie	3,487	3,400	367,023	283,225	5,381,490	4,515,620	789,820	1,774,038	2,458,156	374,950	29,590
Schuyler	2,103	2,078	196,718	158,991	3,964,810	2,903,990	538,950	969,863	1,313,853	157,760	15,690
Seneca	2,303	2,277	194,591	169,186	5,454,960	3,778,430	679,290	1,136,267	1,999,248	335,920	52,460
Steuben	8,179	8,009	825,334	610,181	17,863,180	9,303,860	1,942,310	3,661,234	5,432,426	637,990	47,970
Suffolk	3,277	3,231	276,860	130,144	12,684,600	8,597,670	943,850	1,462,775	2,918,071	637,540	476,050
Sullivan	3,887	3,848	478,783	201,032	4,922,860	5,032,350	748,800	1,775,134	1,814,060	190,020	16,780
Tioga	3,134	3,105	305,061	233,907	4,303,680	3,398,560	621,440	1,520,675	1,981,403	194,840	24,960
Tompkins	3,270	3,217	285,721	230,543	5,973,890	4,351,570	820,790	1,589,148	2,284,694	284,780	45,020
Ulster	5,181	5,125	522,113	254,310	7,854,510	7,278,590	1,121,880	2,059,818	3,361,315	655,440	102,260
Warren	2,121	2,098	286,945	127,768	1,829,780	1,578,950	278,520	654,339	825,523	88,340	10,780
Washington	3,715	3,693	454,502	314,993	6,411,260	5,572,510	880,710	2,099,958	2,727,680	449,850	29,960
Wayne	5,286	5,230	363,211	305,299	12,167,630	7,782,750	1,377,090	2,344,327	4,700,730	603,420	107,300
Westchester	2,326	2,301	184,512	124,916	16,884,890	10,606,110	981,070	1,956,578	2,568,955	891,090	63,610
Wyoming	3,519	3,490	367,894	270,374	8,608,380	4,626,840	908,550	2,144,329	3,093,091	284,110	72,880
Yates	2,504	2,465	203,568	168,485	6,523,200	3,770,120	740,690	1,099,258	2,225,029	336,080	49,070

Increases in the total number of farms in the last decade are reported for nearly half of the counties in the state. The remaining counties show slight decreases.

Three-fourths of the counties report increases in the total farm acreage since 1890. The decreases are reported from the counties in the eastern part of the state. The decrease in improved acreage reported in nearly all counties, is due to a more intensive cultivation of the soil, and to a more strict construction of the term "improved land" by the Twelfth than by preceding censuses. The counties containing the largest farms, are those having a number of hay and grain and dairy farms, while the smallest average farm areas are shown for the counties containing a number of florists' establishments and market gardens. The average size for the state is 99.9 acres and ranges from 18.0 acres in Kings county to 166.6 acres in Essex county.

In only a few of the extreme northern and southern counties is an increase in the value of farms reported for the last ten years. The average value for the state is $3,917, being highest in the southeastern counties, in several of which the average is over $10,000 per farm.

Fulton, Niagara, Ontario, and Queens counties alone report decreases in the value of implements and machinery. Most counties, except those on the northern and southern borders of the state, report decreases in the value of live stock.

The average expenditure for labor in 1899 was $119.54 per farm. It varied greatly in different sections of the state, being largest in the counties where floriculture and market gardening were the chief occupations. For fertilizers, the average expenditure per farm for the state was $20. Nearly all counties reported an increase in this item since 1889.

FARM TENURE.

Table 4 gives a comparative exhibit of farm tenure for 1880, 1890, and 1900. Tenants are divided into two groups: "Cash tenants," who pay a rental in cash or a stated amount of labor or farm produce, and "share tenants," who pay as rental a stated share of the products.

In Table 5 the tenure of farms for 1900 is given by race of farmer, and farms operated by owners are subdivided into four groups designated as farms operated by "owners," "part owners," "owners and tenants," and "managers." These groups comprise, respectively: (1) Farms operated by individuals who own all the land they cultivate; (2) farms operated by individuals who own a part of the land and rent the remainder from others; (3) farms operated under the joint direction and by the united labor of two or more individuals, one owning the farm or a part of it, and the other or others owning no part but receiving for supervision or labor a share of the products; and (4) farms operated by individuals who receive for their supervision and other services a fixed salary from the owners.

TABLE 4.—NUMBER AND PER CENT OF FARMS OF SPECIFIED TENURES: 1880 TO 1900.

YEAR.	Total number of farms.	NUMBER OF FARMS OPERATED BY—			PER CENT OF FARMS OPERATED BY—		
		Owners.[1]	Cash tenants.	Share tenants.	Owners.[1]	Cash tenants.	Share tenants.
1900	226,720	172,517	24,303	29,900	76.1	10.7	13.2
1890	226,223	180,472	19,725	26,026	79.8	8.7	11.5
1880	241,058	201,186	18,124	21,748	83.5	7.5	9.0

[1] Including "part owners," "owners and tenants," and "managers."

TABLE 5.—NUMBER AND PER CENT OF FARMS OF SPECIFIED TENURES, JUNE 1, 1900, CLASSIFIED BY RACE OF FARMER.

PART 1.—NUMBER OF FARMS OF SPECIFIED TENURES.

RACE.	Total number of farms.	Owners.	Part owners.	Owners and tenants.	Managers.	Cash tenants.	Share tenants.
The State	226,720	152,956	13,497	2,245	3,819	24,303	29,900
White	225,935	152,399	13,419	2,241	3,806	24,242	29,828
Colored	785	557	78	4	13	61	72
Chinese	11					11	
Indian	331	282	30	1	1	1	16
Negro	443	275	48	3	12	49	56

PART 2.—PER CENT OF FARMS OF SPECIFIED TENURES.

The State	100.0	67.5	5.9	1.0	1.7	10.7	13.2
White	100.0	67.5	5.9	1.0	1.7	10.7	13.2
Colored	100.0	70.9	9.9	0.5	1.7	7.8	9.2

Between 1890 and 1900, the number of farms operated by owners decreased 7,955, or 4.4 per cent. Cash tenant farms increased 4,578, or 23.2 per cent, and share tenant farms, 3,874, or 14.9 per cent. The relative number of share tenants was slightly less in 1900 than in 1890, this class contributing 56.9 per cent of the total number of tenants in the former year, and 55.2 per cent in the latter. The greatest relative numbers of cash tenants are in the southeastern counties, where the land is very valuable.

No previous census has reported the number of farms operated by "part owners," "owners and tenants," or "managers," but it is believed that the number of farms conducted by the last-named class is constantly increasing.

FARMS CLASSIFIED BY RACE OF FARMER AND BY TENURE.

Tables 6 and 7 present the principal statistics for farms classified by race of farmer and by tenure.

TABLE 6.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY RACE OF FARMER AND BY TENURE, WITH PERCENTAGES.

RACE OF FARMER, AND TENURE.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	226,720	99.9	22,648,109	100.0	$1,069,723,895	100.0
White farmers	225,935	100.0	22,600,592	99.8	1,067,898,391	99.8
Negro farmers	443	60.3	26,735	0.1	1,114,787	0.1
Indian farmers	331	62.7	20,744	0.1	601,797	0.1
Chinese farmers	11	3.5	38	(1)	108,920	(1)
Owners	152,956	90.4	13,828,567	61.1	626,707,561	58.6
Part owners	13,497	126.7	1,709,422	7.6	78,126,804	7.3
Owners and tenants	2,245	123.8	277,978	1.2	13,386,733	1.3
Managers	3,819	186.6	712,436	3.1	56,091,699	5.2
Cash tenants	24,303	95.3	2,315,789	10.2	134,567,491	12.6
Share tenants	29,900	127.2	3,803,917	16.8	160,843,607	15.0

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

TABLE 7.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY RACE OF FARMER AND BY TENURE.

RACE OF FARMER, AND TENURE.	AVERAGE VALUES PER FARM OF—					Per cent of gross income on total investment in farm property.
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$2,431	$1,486	$247	$554	$802	17.0
White farmers	2,435	1,489	248	555	804	17.0
Negro farmers	1,249	819	148	300	387	15.4
Indian farmers	1,055	450	113	201	294	16.1
Chinese farmers	9,464	286	133	19	831	8.4
Owners	1,962	1,399	233	504	732	17.9
Part owners	3,206	1,630	306	646	1,067	18.4
Owners and tenants	2,940	1,982	333	708	1,090	18.3
Managers	8,077	4,890	505	1,216	1,409	9.6
Cash tenants	3,482	1,292	231	532	802	14.5
Share tenants	2,869	1,552	271	687	942	17.5

The average values of the several forms of farm property and the per cent of gross income upon investment are con-

siderably lower for the farms of all colored farmers, except Chinese, than for those of white farmers.

Farms operated by owners have the smallest average area, 90.4 acres, and those conducted by managers the largest, 186.6 acres. A number of the farms operated by managers are adjuncts of public institutions, while others are conducted for wealthy individuals in connection with their summer homes. These farms are, as a rule, favorably located and highly improved, and their average values, shown in Table 7, are much larger than those for any other tenure group. The ratio which the gross income of these farms bears to the total value of farm property is, however, smaller than for the other groups. This is due to the high average valuation above noted and to the fact that very few of these farms are cultivated for profit.

FARMS CLASSIFIED BY AREA.

Tables 8 and 9 present the principal statistics for farms classified by area.

TABLE 8.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY AREA, WITH PERCENTAGES.

AREA.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	226,720	99.9	22,648,109	100.0	$1,069,723,895	100.0
Under 3 acres	2,971	1.7	5,109	(1)	8,367,231	0.8
3 to 9 acres	13,789	6.1	84,255	0.4	29,915,196	2.8
10 to 19 acres	15,782	13.8	218,157	1.0	39,397,835	3.7
20 to 49 acres	35,123	33.6	1,180,411	5.2	108,969,883	10.2
50 to 99 acres	63,789	71.3	4,551,108	20.1	251,348,891	23.5
100 to 174 acres	63,846	127.8	8,157,512	36.0	338,807,707	31.7
175 to 259 acres	21,335	207.0	4,416,428	19.5	162,097,992	15.1
260 to 499 acres	8,728	323.9	2,827,356	12.5	96,898,600	9.0
500 to 999 acres	1,109	622.8	690,692	3.0	23,290,139	2.2
1,000 acres and over	248	2,085.0	517,081	2.3	10,635,421	1.0

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

TABLE 9.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY AREA.

AREA.	AVERAGE VALUES PER FARM OF—					Per cent of gross income on total investment in farm property.
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$2,431	$1,486	$247	$554	$802	17.0
Under 3 acres	1,328	1,243	101	144	701	24.9
3 to 9 acres	1,025	924	100	120	321	14.8
10 to 19 acres	1,223	987	122	164	356	14.2
20 to 49 acres	1,619	1,057	165	262	458	14.8
50 to 99 acres	2,011	1,265	225	439	663	16.8
100 to 174 acres	2,638	1,663	298	708	991	18.7
175 to 259 acres	4,026	2,152	375	1,045	1,334	17.6
260 to 499 acres	6,338	2,884	464	1,416	1,777	16.0
500 to 999 acres	10,984	6,505	823	2,689	2,870	13.7
1,000 acres and over	27,502	10,665	1,244	3,474	3,719	8.7

The group of medium-sized farms, containing from 100 to 174 acres each, comprises over one-third of the total farm acreage, and more than one-fourth of the total value of farm property.

For the group of farms containing less than 3 acres each, the average values given in Table 9 are relatively high, as this group contains more than one-half of the florists' establishments of the state, and a large number of city dairies and vegetable farms. It should be borne in mind that the income from these industries is determined less by the acreage of land used than by the amount of capital invested in buildings, implements, and live stock, and by the expenditures for labor and fertilizers.

The average gross income per acre for each of the various groups classified by area is as follows: Farms under 3 acres, $407.71; 3 to 9 acres, $52.60; 10 to 19 acres, $25.72; 20 to 49 acres, $13.64; 50 to 99 acres, $9.29; 100 to 174 acres, $7.75; 175 to 259 acres, $6.45; 260 to 499 acres, $5.49; 500 to 999 acres, $4.61; and 1,000 acres and over, $1.78.

FARMS CLASSIFIED BY PRINCIPAL SOURCE OF INCOME.

Tables 10 and 11 present the leading features of the statistics relating to farms classified by principal source of income. If the value of the hay and grain raised on any farm exceeds that of any other crop and constitutes at least 40 per cent of the total value of products not fed to live stock, the farm is classified as a "hay and grain" farm. If vegetables are the leading crop, constituting 40 per cent of the value of products, it is a "vegetable" farm. The farms of the other groups are classified in accordance with the same general principle. "Miscellaneous" farms are those whose operators do not derive 40 per cent of their income from any one class of products. Farms with no income in 1899 are classified according to the agricultural operations upon other farms in the same locality.

TABLE 10.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY PRINCIPAL SOURCE OF INCOME, WITH PERCENTAGES.

PRINCIPAL SOURCE OF INCOME.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	226,720	99.9	22,648,109	100.0	$1,069,723,895	100.0
Hay and grain	27,095	104.1	2,819,847	12.5	140,739,391	13.2
Vegetables	17,083	59.1	1,009,397	4.5	101,102,441	9.4
Fruits	10,367	52.4	542,792	2.4	51,157,185	4.8
Live stock	38,182	91.3	3,485,805	15.4	145,572,118	13.6
Dairy produce	67,457	129.1	8,706,442	38.4	352,958,954	33.0
Tobacco	1,068	70.6	75,348	0.3	5,186,168	0.5
Sugar	51	135.4	6,907	(1)	279,240	(1)
Flowers and plants	983	7.5	7,362	(1)	8,692,939	0.8
Nursery products	237	74.1	17,568	0.1	3,803,232	0.4
Miscellaneous	64,197	93.1	5,976,641	26.4	260,237,227	24.3

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

TABLE 11.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY PRINCIPAL SOURCE OF INCOME.

PRINCIPAL SOURCE OF INCOME.	AVERAGE VALUES PER FARM OF—					Per cent of gross income on total investment in farm property.
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$2,431	$1,486	$247	$554	$802	17.0
Hay and grain	2,988	1,548	248	410	708	13.6
Vegetables	3,743	1,541	281	353	902	15.3
Fruits	2,719	1,651	244	321	992	20.1
Live stock	1,697	1,337	219	560	552	14.5
Dairy produce	2,564	1,582	269	817	984	18.8
Tobacco	2,535	1,654	260	407	979	20.2
Sugar	3,697	1,177	196	405	553	10.1
Flowers and plants	4,166	4,089	272	66	2,916	33.0
Nursery products	10,685	4,534	493	335	7,060	44.0
Miscellaneous	2,033	1,354	231	436	683	16.9

For the several classes of farms the average values per acre of products not fed to live stock are as follows: For farms deriving their principal income from flowers and plants, $389.34; nursery products, $95.24; fruit, $18.94; vegetables, $15.27; dairy produce, $7.63; miscellaneous products, $7.34; hay and grain, $6.80; live stock, $6.05; and sugar, $4.08.

The wide variations in the averages and percentages of gross income, shown for the several classes of farms, are largely due to the fact that in computing gross income no deduction is made for expenditures. For florists' establishments, nurseries, and market gardens, the average expenditures represent a far greater percentage of the gross income than in the case of "hay and grain," "live stock," or "miscellaneous" farms. Were it possible to present the average net incomes, the variations shown would be comparatively slight.

FARMS CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK.

Tables 12 and 13 present data relating to farms classified by the reported value of products not fed to live stock.

TABLE 12.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK, WITH PERCENTAGES.

VALUE OF PRODUCTS NOT FED TO LIVE STOCK.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State	226,720	99.9	22,648,109	100.0	$1,069,723,895	100.0
$0	487	57.7	28,116	0.1	2,021,610	0.2
$1 to $49	3,370	32.7	110,095	0.5	5,615,490	0.5
$50 to $99	7,944	29.3	233,020	1.0	12,099,130	1.1
$100 to $249	31,918	42.4	1,480,248	6.5	66,386,110	6.2
$250 to $499	52,395	74.1	3,884,443	17.2	149,312,530	14.0
$500 to $999	68,689	107.7	7,398,874	32.7	308,055,490	28.8
$1,000 to $2,499	51,295	153.1	7,854,196	34.7	392,162,610	36.7
$2,500 and over	7,622	217.7	1,659,117	7.3	134,070,925	12.5

TABLE 13.—AVERAGE VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME PER FARM, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK.

VALUE OF PRODUCTS NOT FED TO LIVE STOCK.	AVERAGE VALUES PER FARM OF—					Per cent of gross income on total investment in farm property.
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	
	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.		
The State	$2,431	$1,486	$247	$554	$802	17.0
$0	2,311	1,166	117	557		
$1 to $49	867	653	56	90	46	2.7
$50 to $99	736	613	64	110	74	4.9
$100 to $249	883	750	94	174	172	9.1
$250 to $499	1,368	994	158	330	359	12.6
$500 to $999	2,233	1,433	251	568	738	16.5
$1,000 to $2,499	4,026	2,275	401	943	1,450	19.0
$2,500 and over	10,349	4,713	765	1,763	4,093	23.3

Of the farms of the state, 487, ranging in area from 3 to 1,000 acres, report no income. The average values of the land and improvements, buildings, and live stock of these farms are very high. This, together with the fact that 283 of them are operated by their owners, indicates that many of them are the suburban or summer homes

of city merchants and professional men who derive their principal income from other than agricultural pursuits. The same statement is also true of some of the farms with reported incomes of less than $100. Some, however, are farms that were partially abandoned in 1899, while others had changed owners or tenants, and the persons in charge, June 1, 1900, could not always give definite information concerning the products of the preceding year. To this extent the reports fall short of giving a complete exhibit of farm income in 1899.

LIVE STOCK.

At the request of the various live-stock associations of the country, a new classification of domestic animals was adopted for the Twelfth Census. The age grouping for neat cattle was determined by their present and prospective relations to the dairy industry and the supply of meat products. Horses and mules are classified by age, and neat cattle and sheep by age and sex. The new classification permits a very close comparison with previous census reports.

Table 14 presents a summary of live-stock statistics.

TABLE 14.—NUMBER OF DOMESTIC ANIMALS, FOWLS, AND BEES ON FARMS, JUNE 1, 1900, WITH TOTAL AND AVERAGE VALUES, AND NUMBER OF DOMESTIC ANIMALS NOT ON FARMS.

LIVE STOCK.	Age in years.	ON FARMS.			NOT ON FARMS.
		Number.	Value.	Average value.	Number.
Calves	Under 1	507,140	$3,144,954	$6.20	5,963
Steers	1 and under 2	36,446	578,624	15.88	730
Steers	2 and under 3	23,492	656,229	27.93	2,875
Steers	3 and over	8,253	385,378	46.70	5,207
Bulls	1 and over	85,140	1,730,526	20.33	517
Heifers	1 and under 2	335,844	5,151,703	15.34	3,136
Cows kept for milk	2 and over	1,501,608	48,694,512	32.43	36,313
Cows and heifers not kept for milk.	2 and over	98,466	2,393,248	24.31	814
Colts	Under 1	20,027	650,894	32.50	856
Horses	1 and under 2	30,033	1,771,023	58.97	1,192
Horses	2 and over	578,378	45,556,014	78.77	303,889
Mule colts	Under 1	192	6,162	32.09	7
Mules	1 and under 2	182	9,160	50.33	14
Mules	2 and over	2,939	213,850	72.76	1,845
Asses and burros	All ages	338	8,109	23.99	421
Lambs	Under 1	761,230	1,940,183	2.55	4,032
Sheep (ewes)	1 and over	938,315	3,729,631	3.97	12,330
Sheep (rams and wethers).	1 and over	46,201	252,127	5.46	1,686
Swine	All ages	676,639	3,794,332	5.61	52,176
Goats	All ages	1,316	6,442	4.90	3,046
Fowls:[1]					
Chickens[2]		8,964,736			
Turkeys		190,879			
Geese		45,933	4,310,755		
Ducks		150,864			
Bees (swarms of)		187,208	593,784	3.17	
Unclassified			6,075		
Value of all live stock			125,583,715		

[1] The number reported is of fowls over 3 months old. The value is of all, old and young.
[2] Including Guinea fowls.

The total value of live stock on farms, June 1, 1900, was $125,583,715. Of this amount, 38.8 per cent represents the value of cows kept for milk; 38.2 per cent, that of horses; 11.2 per cent, that of neat cattle other than dairy cows; 4.7 per cent, that of sheep; 3.4 per cent, that of poultry; 3.0 per cent, that of swine; and 0.7 per cent, that of all other live stock.

Of the total number of steers 3 years old and over, 38.7 per cent are kept in towns or cities; the corresponding percentage for horses 2 years old and over, being 34.4. The total number of goats kept in towns or cities is more than twice the number kept on farms.

No reports were secured of the value of live stock not on farms, but it is probable that such animals have higher average values than those on farms. Allowing the same averages, however, the value of live stock not on farms is $26,184,844. The total value of all live stock in the state is approximately $151,768,560.

CHANGES IN LIVE STOCK ON FARMS.

The following table shows the changes since 1850 in the numbers of the most important domestic animals.

TABLE 15.—NUMBER OF SPECIFIED DOMESTIC ANIMALS ON FARMS: 1850 TO 1900.

YEAR.	Dairy cows.	Other neat cattle.	Horses.	Mules and asses.	Sheep.[1]	Swine.
1900	1,501,608	1,094,781	628,488	3,651	984,516	676,639
1890	1,440,230	691,102	664,430	4,636	1,528,979	843,842
1880	1,437,855	901,866	610,358	5,072	1,715,180	751,907
1870	1,350,661	694,663	536,861	4,407	2,181,578	518,251
1860	1,123,634	849,540	503,725	1,553	2,617,855	919,178
1850	931,324	946,315	447,014	963	3,453,241	1,018,252

[1] Lambs not included.

The development of intensive agriculture in New York has been attended by important changes in the general character of live stock kept on farms.

The remarkable growth in dairying is shown by the constantly increasing number of dairy cows; the gradual but constant decrease in the number of sheep since 1850 and of swine during the last decade is incident to the transfer of the meat-producing and wool-growing industries to the Western states. There was, during the last ten years, a small decrease in the number of horses and mules throughout the state.

Compared with the census of 1890, the present census shows increases of 4.3 per cent in the number of dairy cows, and of 58.4 per cent in the number of other neat cattle, and decreases as follows: Horses, 5.4 per cent; mules and asses, 21.2 per cent; sheep, 35.6 per cent; and swine, 19.8 per cent.

In 1900 the enumerators were instructed to report no fowls under three months old, this limitation not being made in former census years. This fact probably accounts for the apparent decreases in the number of turkeys, ducks, and geese, and the small increase in the number of chickens. Compared with the Eleventh Census, the report of 1900 shows an increase of 6.4 per cent in the number of chickens, and the following decreases: Turkeys, 52.6 per cent; ducks, 49.9 per cent; and geese, 42.9 per cent.

ANIMAL PRODUCTS.

Table 16 is a summarized exhibit of the animal products of 1899.

TABLE 16.—QUANTITIES AND VALUES OF SPECIFIED ANIMAL PRODUCTS, AND VALUES OF POULTRY RAISED, ANIMALS SOLD, AND ANIMALS SLAUGHTERED ON FARMS, IN 1899.

PRODUCTS.	Unit of measure.	Quantity.	Value.
Wool	Pounds	6,674,165	$1,387,969
Mohair and goat hair	Pounds	383	155
Milk	Gallons	[1]772,799,352	[2]55,474,155
Butter	Pounds	74,714,376	
Cheese	Pounds	2,624,552	
Eggs	Dozens	62,096,690	8,630,062
Poultry			6,161,429
Honey	Pounds	3,422,497	352,795
Wax	Pounds	84,075	
Animals sold			15,025,932
Animals slaughtered			8,319,750
Total			95,352,247

[1] Comprises all milk produced, whether sold, consumed, or made into butter or cheese.
[2] Comprises the value of milk sold and consumed, and of butter and cheese made.

The value of the animal products for the state in 1899 was $95,352,247. Of this amount 58.2 per cent represents the value of dairy products; 24.5 per cent, that of animals sold and animals slaughtered on farms; 15.5 per cent, that of poultry and eggs; 1.4 per cent, that of wool, mohair, and goat hair; and 0.4 per cent, that of honey and wax.

DAIRY PRODUCE.

The importance of the dairy industry is shown by the fact that in 1899 the proprietors of 67,457 farms, or 29.8 per cent of all in the state, derived their principal income from the sale of dairy produce, while the value of all dairy products constituted 30.5 per cent of the gross farm income. The production of milk in 1899 was 108,882,112 gallons greater than in 1889, a gain of 16.4 per cent. As the number of dairy cows increased but 4.3 per cent in the same time, the increased production of milk indicates an improvement in the grade of cows kept, and in the care given them.

Decreases since 1889 of 23.9 per cent in the quantity of butter produced on farms, and 39.3 per cent in the quantity of cheese, are significant of a change in the general character of the dairy industry. The larger quantities of butter and cheese made in creameries and cheese factories, and the increased consumption of milk and cream in cities, account for the change.

Of the $55,474,155 given in Table 16 as the value of dairy products, $46,670,916, or 84.1 per cent, represents the value of such products sold, and $8,803,239, or 15.9 per cent, that of dairy produce consumed on farms. Of the former amount, $36,248,833 was received from the sale of 445,427,888 gallons of milk; $9,868,446, from 51,861,592 pounds of butter; $312,414, from 609,866 gallons of cream; and $241,223, from 2,524,917 pounds of cheese.

POULTRY AND EGGS.

The value of the products of the poultry industry for 1899 was $14,791,491, of which 58.3 per cent represents the value of eggs produced, and 41.7 per cent, that of poultry raised. Over sixteen million dozen more eggs were produced in 1899 than in 1889, the gain being 35.6 per cent.

ANIMALS SOLD AND ANIMALS SLAUGHTERED.

The value of animals sold and animals slaughtered on farms in 1899 was $23,345,682, or 12.8 per cent of the gross farm income. Of all farmers reporting live stock, 162,630, or 75.2 per cent, report animals slaughtered, the average value per farm being $51.16. Sales are reported by 147,238 farmers, or 68.1 per cent of all reporting live stock, the average receipts per farm being $102.05. In obtaining these reports, the enumerators were instructed to secure from each farm operator a statement of the amount received from sales in 1899, less the amount paid for animals purchased during the same year.

WOOL.

The production of wool for the state has decreased steadily since 1869, the production of 1899 being 6,674,165 pounds, a decrease of 0.6 per cent since 1889.

HONEY AND WAX.

In 1899, 3,422,497 pounds of honey and 84,075 pounds of wax were produced, a decrease of 20.1 per cent since 1889 in quantity of honey, and an increase of 26.1 per cent in quantity of wax.

HORSES AND DAIRY COWS ON SPECIFIED CLASSES OF FARMS.

Table 17 presents, for the leading groups of farms, the number of farms reporting horses and dairy cows, the total number of these animals, and the average number per farm. In computing the averages presented, only those farms which report the kind of stock under consideration are included.

TABLE 17.—HORSES AND DAIRY COWS ON SPECIFIED CLASSES OF FARMS, JUNE 1, 1900.

CLASSES.	HORSES.			DAIRY COWS.		
	Farms reporting.	Number.	Average per farm.	Farms reporting.	Number.	Average per farm.
Total	203,469	628,438	3.1	196,366	1,501,608	7.6
White farmers	202,832	626,848	3.1	195,920	1,499,941	7.7
Colored farmers	637	1,590	2.5	446	1,667	3.7
Owners[1]	150,607	448,179	3.0	146,004	1,023,531	7.0
Managers	3,278	17,196	5.2	2,999	31,431	10.5
Cash tenants	21,461	65,586	3.1	19,986	166,084	8.3
Share tenants	28,123	97,477	3.5	27,377	280,612	10.2
Under 20 acres	22,502	33,769	1.5	18,650	37,604	2.0
20 to 99 acres	88,766	225,179	2.5	86,227	394,118	4.6
100 to 174 acres	61,540	219,912	3.6	61,117	564,136	9.2
175 to 259 acres	20,847	92,046	4.4	20,673	308,116	14.9
260 acres and over	9,814	57,532	5.9	9,699	197,632	20.4
Hay and grain	20,470	83,382	4.1	18,137	80,960	4.5
Vegetable	15,301	44,510	2.9	12,187	38,299	3.1
Fruit	8,985	23,694	2.6	7,107	19,273	2.7
Live stock	34,990	102,891	2.9	34,509	178,569	5.2
Dairy	64,390	209,901	3.3	67,638	922,128	13.6
Tobacco	847	2,752	3.2	837	4,328	5.2
Sugar	36	112	3.1	31	243	7.8
Miscellaneous[2]	58,450	161,196	2.8	55,920	257,808	4.6

[1] Including "part owners" and "owners and tenants."
[2] Including florists' establishments and nurseries.

CROPS.

The following table gives the statistics of the principal crops grown in 1899.

TABLE 18.—ACREAGES, QUANTITIES, AND VALUES OF THE PRINCIPAL FARM CROPS IN 1899.

CROPS.	Acres.	Unit of measure.	Quantity.	Value.
Corn	658,652	Bushels	20,024,865	$9,181,791
Wheat	557,736	Bushels	10,412,675	7,332,597
Oats	1,329,753	Bushels	40,785,900	12,929,092
Barley	111,658	Bushels	2,943,250	1,402,184
Rye	177,416	Bushels	2,431,670	1,393,313
Buckwheat	289,862	Bushels	3,815,350	2,045,737
Flaxseed	159	Bushels	1,350	1,485
Clover seed		Bushels	7,830	42,384
Grass seed		Bushels	3,619	5,406
Hay and forage	5,154,965	Tons	6,389,496	55,237,446
Tobacco	11,307	Pounds	13,958,370	1,172,236
Hops	27,583	Pounds	17,332,310	1,600,305
Peppermint	62	Pounds	700	613
Broom corn	356	Pounds	201,060	8,967
Dry beans	129,208	Bushels	1,360,445	2,472,668
Dry pease	14,748	Bushels	251,889	230,609
Potatoes	395,640	Bushels	38,060,471	15,019,135
Sweet potatoes	73	Bushels	8,681	5,588
Onions	6,033	Bushels	2,177,271	1,066,042
Chicory	4	Pounds	20,500	162
Miscellaneous vegetables	138,285			9,590,016
Maple sugar		Pounds	3,623,540	307,184
Maple sirup		Gallons	413,159	323,996
Sorghum sirup	[1]14	Gallons	973	371
Sugar beets	2,053	Tons	16,003	75,487
Small fruits	25,051			2,538,363
Grapes	[2]42,337	Centals	2,476,981	[3]2,763,711
Orchard fruits	[2]437,582	Bushels		[4]10,542,272
Nuts				71,122
Forest products				7,671,099
Willows	366			22,495
Flowers and foliage plants	1,496			2,867,673
Seeds	529			54,148
Nursery products	8,238			1,642,107
Miscellaneous	442			[5]300,549
Total	9,521,648			149,918,353

[1] Sorghum cane.
[2] Estimated from the number of vines or trees.
[3] Including value of wine, raisins, etc.
[4] Including value of cider, vinegar, etc.
[5] The greater part of this value was derived from products for which no acreage was reported.

Of the total value of crops, hay and forage contributed 36.9 per cent; cereals, 22.9 per cent; vegetables, including potatoes, sweet potatoes, and onions, 17.1 per cent; fruits, 10.6 per cent; forest products, 5.1 per cent; nursery and florists' products and seeds, 3.0 per cent; and all other crops, 4.4 per cent.

The average values per acre of the various crops are as follows: Flowers and plants, $1,916.89; nursery products, $199.33; tobacco, $103.67; small fruits, $101.33; miscellaneous vegetables, $69.35; grapes, $65.28; hops, $58.12; potatoes, $37.96; orchard fruits, $24.09; beans and pease, $18.77; cereals, $10.97.

CEREALS.

The following table is an exhibit of the changes in cereal production since 1849.

TABLE 19.—ACREAGE AND PRODUCTION OF CEREALS: 1849 TO 1899.

PART 1.—ACREAGE.

YEAR.[1]	Barley.	Buckwheat.	Corn.	Oats.	Rye.	Wheat.
1899	111,658	289,862	658,654	1,329,753	177,416	557,736
1889	349,311	280,029	493,320	1,417,371	236,874	402,561
1879	356,629	291,228	779,272	1,261,171	244,923	736,611

[1] No statistics of acreage were secured prior to 1879.

PART 2.—BUSHELS PRODUCED.

1899	2,943,250	3,815,350	20,024,865	40,785,900	2,431,670	10,412,675
1889	8,220,242	4,675,735	15,109,969	38,896,479	3,065,623	8,304,539
1879	7,792,062	4,461,200	25,690,156	37,575,500	2,684,690	11,587,766
1869	7,434,621	3,904,030	16,462,825	35,293,625	2,478,125	12,178,462
1859	4,186,668	5,126,307	20,061,049	35,175,134	4,786,905	8,681,105
1849	3,585,059	3,183,955	17,858,400	26,552,814	4,148,182	13,121,498

The total area devoted to cereals in 1879 was 3,669,834 acres; in 1889, 3,239,466 acres; and in 1899, 3,125,079 acres. Of the total area under cereals in 1899, 42.5 per cent was devoted to oats; 21.1 per cent, to corn; 17.8 per cent, to wheat; 9.3 per cent, to buckwheat; 5.7 per cent, to rye; and 3.6 per cent, to barley.

The increases in area devoted to cereals in the decade 1889–1899, were: Corn, 33.5 per cent; wheat, 20.6 per cent; and buckwheat, 3.5 per cent. The decreases were: Oats, 6.2 per cent; rye, 25.1 per cent; and barley, 68.1 per cent.

The total number of bushels of cereals produced in 1849 was 68,449,908, and in 1899, 80,413,710, showing an increase of 17.5 per cent in fifty years.

Oats are raised in every county in the state, but particularly in the St. Lawrence Valley, Jefferson and Lawrence counties each reporting more than 2,000,000 bushels. The acreage under corn is distributed throughout the state, the largest yield coming from the counties of Onondaga, including Onondaga Indian reservation, Cayuga, and Dutchess, respectively. Wheat is most extensively grown in the Genesee Valley, especially in Monroe and Ontario counties.

HAY AND FORAGE.

In 1900, 210,527 farmers, or 92.9 per cent of the total number, reported hay and forage crops. Exclusive of cornstalks, an average yield of 1.2 tons per acre was obtained. The total area in hay and forage in 1899 was 5,154,965 acres, or 1.7 per cent less than ten years before.

In 1899 the acreages and yields of the various kinds of hay and forage were as follows: Wild, salt, and prairie grasses, 26,006 acres and 29,719 tons; millet and Hungarian grasses, 10,401 acres and 18,341 tons; alfalfa or lucern, 5,582 acres and 13,002 tons; clover, 103,155 acres and 114,660 tons; other tame and cultivated grasses, 4,758,523 acres and 5,082,322 tons; grains cut green for hay, 61,697 acres and 96,693 tons; crops grown for forage, 189,601 acres and 964,738 tons; and cornstalks, 45,469 acres and 70,021 tons.

In Table 18 the production of cornstalks is included under "hay and forage," but the acreage is included under "corn," as the forage secured was an incidental product of the corn crop.

ORCHARD FRUITS.

The changes in orchard fruits since 1890 are shown in the following table.

TABLE 20.—ORCHARD TREES AND FRUITS: 1890 AND 1900.

FRUITS.	NUMBER OF TREES.		BUSHELS OF FRUIT.	
	1900.	1890.	1899.	1889.
Apples	15,054,832	14,428,381	24,111,257	8,493,846
Apricots	25,606	6,540	15,710	281
Cherries	539,712	391,446	218,642	44,298
Peaches	2,522,729	1,014,110	466,850	169,976
Pears	2,188,909	1,173,206	960,170	588,767
Plums and prunes	988,147	504,365	803,688	73,411

Of the farmers of the state, 158,860, or 70.1 per cent,

reported orchard fruits for 1899. The value of orchard products was not reported by the census of 1890, but in 1879 the total value of such products was $8,409,794. For 1899 the corresponding value is $10,542,272, a gain in twenty years of 25.4 per cent. The total number of trees increased from 17,518,048 to 21,470,841 in the last ten years. For this period the percentages of increase in the numbers of the various trees are as follows: Apricot, 291.5; peach, 148.8; plum and prune, 95.9; pear, 86.1; cherry, 37.9; and apple, 4.3.

In 1900, 70.1 per cent of all fruit trees in the state were apple trees; 11.7 per cent, peach trees; 10.2 per cent, pear trees; 4.6 per cent, plum and prune trees; and 3.4 per cent, all other fruit trees.

Apple trees were reported by 174,579 farmers. A large percentage of the apple trees reported are in the western counties, more than one-fourth of the total number being in Niagara, Wayne, Monroe, Erie, and Orleans counties.

Niagara, Ulster, and Monroe counties contain over one-half of the peach trees, which are reported by 21,798 farmers. Nearly one-fifth of the pear and plum and prune trees are grown in Niagara county, and Columbia is the leading cherry-growing county. The majority of the apricot trees are reported from Seneca and Ontario counties.

In addition to the trees given in Table 20, unclassified fruit trees to the number of 155,876 are reported, with a yield of 95,993 bushels of fruit. The value of orchard products, given in Table 18, includes the value of 145,953 barrels of cider, 18,250 barrels of vinegar, and 3,658,610 pounds of dried and evaporated fruits. Approximately four-fifths of this fruit comes from Wayne county.

The quantity of fruit produced in any year is determined so largely by the nature of the season, that comparisons between the crop of 1889 and that of 1899 have little significance. In the latter season there was a very large production of all fruits.

SMALL FRUITS.

The total area used in the cultivation of small fruits in 1899 was 25,051 acres, distributed among 39,984 farmers. The value of the fruits grown was $2,538,363, an average of $63 per farm. Of the total area, 12,376 acres, or 49.4 per cent, were devoted to raspberries and Logan berries. The total production of these berries for the state was 17,575,530 quarts, of which nearly one-half were grown in the adjoining counties of Wayne, Ontario, Yates, and Monroe. The acreages and productions of the other small fruits were as follows: Strawberries, 7,311 acres and 13,849,860 quarts; currants, 2,594 acres and 4,584,080 quarts; blackberries and dewberries, 2,060 acres and 3,167,090 quarts; and other berries, 710 acres and 862,107 quarts.

VEGETABLES.

The value of the vegetables grown in 1899, including potatoes, sweet potatoes, and onions, was $25,080,781, representing 14.1 per cent of the gross farm income. Of the total, 58.5 per cent represents the value of potatoes. This important crop was reported by 194,914 farmers, or 86.0 per cent of the total number in the state.

Aside from the land devoted to potatoes and onions, 138,285 acres were used in the growing of miscellaneous vegetables. The products of 42,123 acres of this area were not reported in detail. Of the remaining area, 35,818 acres were devoted to sweet corn; 25,261, to cabbages; 9,159, to tomatoes; 7,421, to pease; 3,624, to cucumbers; 2,021, to beans; 1,830, to cauliflower; 1,735, to beets; 1,624, to celery; 1,569, to carrots; 1,533, to muskmelons; 1,335, to turnips; 811, to asparagus; 749, to squashes; 323, to lettuce; 288, to radishes; 277, to spinach; 276, to watermelons; 205, to parsnips; 192, to rhubarb; and 111, to other vegetables.

SUGAR BEETS.

Though begun in the last decade, the growing of sugar beets has become an important branch of agriculture in New York. In 1899, 774 farmers devoted to this crop an area of 2,053 acres, an average of 2.7 acres per farm. They obtained and sold from this land 16,003 tons of beets, an average of 7.8 tons per acre, and received therefrom $75,487, an average of $98 per farm, $37 per acre, and $4.72 per ton.

Beets were raised in 28 counties, Wayne, Broome, Ontario, Yates, and Steuben counties, ranking in the order named, reporting 76.0 per cent of the total acreage.

HOPS.

The cultivation of hops has for years been an important industry in New York, and was reported as early as 1839. Up to 1880, the production increased in each decade as follows: 1850 to 1860, 7,135,632 pounds; 1860 to 1870, 7,886,750 pounds; 1870 to 1880, 4,070,250 pounds; but from 1880 to 1890 it decreased 1,565,902 pounds, or 7.2 per cent. In 1899, 5,003 farmers, in 32 counties, devoted to this crop 27,533 acres, an average of 5.5 acres per farm. They obtained from this land 17,332,340 pounds, an average of 630 pounds per acre, which was a decrease since 1889 of 2,730,689 pounds, or 13.6 per cent. From the sale of this product they received $1,600,305, an average of $320 per farm, $58 per acre, and $0.09 per pound. The counties producing the most hops are Otsego, Schoharie, Madison, and Oneida, ranking in the order named, and reporting 80.1 per cent of the total acreage.

The recent growth of hop culture on the Pacific coast has affected the production of this crop in the Eastern states, and accounts for the noticeable decrease in New York.

TOBACCO.

According to the census of 1850, New York produced in 1849, 83,189 pounds of tobacco. The census of 1860 showed a production of 5,764,582 pounds, while between 1860 and 1870 there was a decrease of 3,414,784 pounds, or 59.2 per cent. In each of the three decades since 1870, there has been a considerable increase in production. Between 1870 and 1880 there was a gain of 4,131,633

pounds, or 175.8 per cent, and between 1880 and 1890 there was a gain of 2,834,704 pounds, or 43.7 per cent.

The present census shows that in 1899 tobacco was grown in New York by 4,221 farmers, who obtained from 11,307 acres, a yield of 13,958,370 pounds, valued at $1,172,236. This was a gain over the crop area of 1889, of 2,678 acres, or 31.0 per cent, and an increase in production of 4,642,235 pounds, or 49.8 per cent. The average area in tobacco for each farm on which tobacco was grown was 2.7 acres. The average yield per acre in 1899 was 1,234 pounds, against 1,080 pounds in 1889, and 1,313 pounds in 1879. The average value was 8.4 cents per pound.

Tobacco was grown in 1899 in 31 counties of the state. The leading county was Onondaga, which furnished 32.4 per cent of the acreage, and 30.9 per cent of the production of the state. The counties next in rank were Chemung, Steuben, Cayuga, and Oswego. These 5 counties together furnished 89.0 per cent of the entire acreage, and 90.4 per cent of the entire production of the state.

FLORICULTURE.

The area devoted to the cultivation of flowers and ornamental plants in 1899 was 1,496 acres, and the value of the products sold therefrom was $2,867,673. These flowers and plants were grown by 1,212 farmers and florists. Of this number, 983 made commercial floriculture their principal business. They had invested in the aggregate $8,692,939, of which $4,389,995 represents the value of land and improvements other than buildings; $3,970,102, that of buildings; $267,712, that of implements and machinery; and $65,130, that of live stock. Their sales of flowers and plants amounted to $2,622,899; and of other products $243,458. They expended for labor $688,191, and for fertilizers $61,627. The average income for each farm reporting (including products fed to live stock) was $2,928.

In addition to the 983 principal florists' establishments, 2,361 farms and market gardens made use of glass in the propagation of flowers, plants, or vegetables. They had an area under glass of 5,617,357 square feet, making, with the 8,018,083 square feet belonging to the florists' establishments, a total of 13,635,440 square feet of land under glass.

NURSERIES.

The total value of nursery stock sold in 1899 was $1,642,107, reported by the operators of 485 farms and nurseries. Of this number, 237 derived their principal income from the nursery business. They had 17,568 acres of land, valued at $2,532,482; buildings worth $1,074,625; implements and machinery valued at $116,780; and live stock valued at $79,345. Their total income, exclusive of products fed to live stock, was $1,673,130, of which $1,530,360 represents the value of nursery stock, and $142,770 that of other products. The expenditure for labor was $468,873, and for fertilizers $29,205. The average income for each farm reporting (including products fed to live stock) was $7,187. Monroe county is far in advance of any other in the production of nursery stock, furnishing, in 1899, 37.9 per cent of the entire acreage devoted to the business.

LABOR AND FERTILIZERS.

The total expenditure for labor on farms in 1899, including the value of board furnished, was $27,102,130, an average of $120 per farm. The average was highest on the most intensively cultivated farms, being $1,978 for nurseries, $700 for florists' establishments, $182 for fruit farms, $165 for vegetable farms, $150 for tobacco farms, $129 for dairy farms, $120 for sugar farms, $109 for hay and grain farms, and $85 for live-stock farms. "Managers" expended on an average $563; "share tenants," $116; "cash tenants," $115; and "owners," $106. White farmers expended $120 per farm, and colored farmers, $33.

Fertilizers purchased in 1899 cost $4,493,050, an average of $20 per farm and an increase since 1889 of 23.9 per cent. The average expenditure was $123 for nurseries, $84 for vegetable farms, $63 for florists' establishments, $37 for tobacco farms, $23 for fruit farms, $18 for hay and grain farms, $12 for dairy farms, $11 for sugar farms, and $10 for live-stock farms.

IRRIGATION STATISTICS.

In 1899 irrigation was reported on 11 farms, the area irrigated being 123 acres and the cost of the systems, $4,372, or $35.54 per acre. The total value of the irrigated products on these farms was $11,735, or $95 per acre. The acreage and values of the irrigated products were as follows: Vegetables, 20 acres, valued at $5,015, or $250.75 per acre; tobacco, 2 acres, valued at $200, or $100 per acre; small fruit, 10 acres, valued at $2,600, or $260 per acre; miscellaneous crops, flowers, plants, etc., 25 acres, valued at $3,060, or $122.40 per acre; and hay, 66 acres, valued at $860, or $13.03 per acre.

The most extensive irrigation plant in the state, located in Rensselaer county, irrigates 55 acres. A small mountain stream furnishes the water, which is diverted into a large reservoir, 210 feet above the land to be irrigated, and thence directed to the land through cast-iron pipes. In the spring and autumn the water is turned upon a Pelton wheel, the power developed being utilized in the operation of a sawmill.

No reports were received of numerous irrigation systems on the small truck farms in the vicinity of several of the large cities of the state. Many of these farms are operated by Italians and Chinese, and their irrigation plants are usually very inexpensive, the water being supplied chiefly from the city water mains, and delivered to the land through garden hose.