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MANUFACTURES.

COMBINED TEXTILES.

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

SIR: I transmit herewith, for publication in bulletin form, a report on the entire textile industry, prepared under my direction by Mr. Edward Stanwood, of Boston, Mass., acting in the capacity of an expert special agent of the division of manufactures of the Census Office.

The several branches of the industry embraced in this report are cotton manufactures, including cotton goods and cotton small wares; wool manufactures, including woolen goods, worsted goods, carpets and rugs, other than rag, felt goods, and wool hats; silk manufactures; hosiery and knit goods; cordage and twine; linen goods; jute goods; and dyeing and finishing textiles.

In drafting the schedules of inquiry for the census of 1900 care was taken to preserve the basis of comparison with prior censuses. Comparison may be made safely with respect to all the items of inquiry except those relating to capital, salaried officials, clerks, etc., and their salaries, the average number of employees, and the total amount of wages paid. Live capital—that is, cash on hand, bills receivable, unsettled ledger accounts, raw materials, stock in process of manufacture, finished products on hand, and other sundries—was first called for at the census of 1890. No definite attempt was made prior to the census of 1890 to secure a return of live capital invested.

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 operation. At the census of 1900 the greatest and least numbers of employees were reported, and also the average number employed during each month of the year. The average number of wage-earners (men, women, and children) employed during the entire year was ascertained by using 12, the number of calendar months, as a divisor into the total of the average numbers reported for each month. 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 superin-

tendents (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.

In some instances 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.

The reports show a capital of \$1,042,997,577 invested in the 4,312 establishments reporting for the industry. 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 manufacturing corporations. The value of the products is returned at \$931,494,566, to produce which involved an outlay of \$23,289,162 for salaries of offi-

cials, clerks, etc.; \$209,022,447 for wages; \$63,122,916 for miscellaneous expenses, including rent, taxes, etc.; and \$521,345,200 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 the products 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 shop or factory. This statement is necessary in order to avoid erroneous conclusions from the figures presented.

Very respectfully,



Chief Statistician for Manufactures.

THE TEXTILE INDUSTRY OF THE UNITED STATES.

By EDWARD STANWOOD, *Expert Special Agent.*

Not only is the textile industry one of the most important branches of manufacture in this country and throughout the world, but its product comes into an especially intimate and personal relation to mankind because it is the material from which clothing is commonly made. It appears from the returns at the census of 1900 that the grand total value of textiles and of finished articles made from them was \$1,637,484,484. The sum is swelled by duplications. Yarn produced in one mill and entering into this total is reported by another mill as a material; and the woven cloth of the second mill, after having been reported as that mill's product, enters the tailor shop or the shirt factory as material once more. Eliminating duplications, by excluding from materials and products the value of the partly manufactured articles, the net value of products ready for direct consumption was \$1,095,127,934. Of this huge total, \$740,666,942, or over two-thirds of the whole, was the net value of the textile industry proper.

The various branches of the textile industry—the production of yarn, and its conversion, by doubling and twisting, by weaving, or by knitting—are so closely allied to each other that it is impossible radically to separate them. They may be divided sufficiently for practical purposes according to the processes employed, or, as is more customary, according to the vegetable or animal fiber which predominates in the manufacture. But it still remains true that several of the processes and different groups of these processes are combined, and that there is extensive use of two or more fibers in single establishments. A great number, in fact a large majority, of cotton-spinning factories, also weave their yarn; some of them twist and finish it into sewing thread, others knit it and make underwear. Some of them combine cotton with linen in the manufacture of towels. Many woolen and worsted mills mix cotton with wool in the production of cloth. Both cotton and woolen mills occasionally use large quantities of raw silk. Jute yarn is introduced as an adulterant in upholstery goods chiefly composed of more enduring material. The manufacturers of cordage and twine employ not only flax, hemp, jute, cotton, and other vegetable fibers, but also, to a limited extent, wool and silk.

While, therefore, it is a simple matter to classify mills according to the general nature of their business or according to the fiber chiefly used, yet it is evident that the textile industry is to be considered as a whole.

A freak of fashion may at any time cause an excessive demand for silk goods, to the detriment of the manufacturers of worsteds. A scarcity of cotton, like that which occurred during the Civil War, may compel people to change their habits and use woolen products instead of cotton. It is easy to substitute articles made from another fiber than that to which one has been accustomed; indeed, within certain limits, it is easy for manufacturers to operate machinery upon another fiber than that for which it was constructed; so that the textile industry can be treated adequately only when it is treated as a unit, based upon the spindle.

This method of considering the textile branch of manufacturing was first introduced at the Eleventh Census. It is now even more reasonable than it was ten years ago, because during the interval certain new combinations of fiber use have rendered the relations between the several industries more intimate than they were. As examples, may be mentioned the production in several large cotton mills of towels and toweling from pure linen or from linen and cotton mixed, and the use in silk mills of mercerized cotton so like silk in appearance. These new features preceded the taking of the census by so short a time that an adequate inquiry into the facts was not made in all cases, particularly with reference to the extent of the new linen industry.

Ten years ago the report upon combined textiles took cognizance only of the manufactures of wool—including hosiery and knit goods, cotton and silk—and dyeing and finishing the yarns and fabrics made from them. In the present report the chief industries based upon flax, hemp, and jute are included. Other important changes will be noticed.

At the census of 1900 there was, for the first time, a separation of cotton small wares from cotton goods proper. The establishments which manufacture such articles as tape and webbings, shoe lacings, embroideries, and the like, are not in a true sense cotton factories. Few of them spin their yarn; the machinery which they employ differs materially from that of ordinary cotton mills, and they are for the most part small establishments. They belong in the general class of textile manufactories, but not in the specific category of cotton mills.

It is proper to restore to the leading rank the cotton manufacture, which was displaced from that position during the Civil War, and has occupied the second

rank in official statistics ever since, mainly because it stood second in the value of products. But it is evident that the reason why the nominal value of wool products exceeded that of cotton products was that the cost of material, pound for pound, is several times that of cotton. At present the cotton manufacture, exclusive of cotton small wares, stands first in the amount of capital, in the number of hands employed, in the amount of wages paid, and even in the value of products; but it is still slightly behind the wool manufacture in the cost of material used.

The tables accompanying this report do not include all the establishments which it might be strictly reasonable to include as manufacturing textiles. The facts relating to those which make belting and hose of either linen or cotton mixed with rubber, elastic fabrics, batting, and wadding, and a few other articles of which these are types, were ascertained by answers to the inquiries upon the general manufacturing schedule and were too incomplete in their specification of materials used to be included in the accompanying tables without danger of misleading results. The several industries here presented are as follows:

- Cotton goods.
- Cotton small wares.
- Worsted goods.
- Woolen goods.
- Woolen carpets.
- Felt goods.
- Wool hats.
- Hosiery and knit goods.
- Silk goods.
- Cordage and twine.
- Linen goods.
- Jute goods.
- Dyeing and finishing textiles.

The value of product reported is in all cases the gross value at the mill, save that in the case of dyeing and finishing only the value added by the processes to which the goods were subjected is reported.

THE POSITION OF THE UNITED STATES AMONG NATIONS IN THE MANUFACTURE OF TEXTILES.

In the manufacture of textiles the progress of this country as compared with that of the world at large has been very great in recent years. In general, manufacturers may be said to have been engaged during the whole national history in conquering and occupying the home market. The domestic silk industry is a thing of yesterday. In 1870 the home manufacture represented a value of only \$12,210,662. The foreign value of importations during the same year was \$24,219,981. It appears from these figures that almost two-thirds of the silk goods consumed in the United States at that time was of foreign manufacture.

The wool industry existed in the country even before the era of national independence. In the year 1870 the value of products of domestic manufactures of wool

was \$199,257,262; that of imported was \$35,032,628, or 15 per cent of the consumption of the United States, on the basis of declared foreign value. The manufacture of cotton has been conducted on a large scale for nearly a century. Before the Civil War it became a leading article of export. Nevertheless, the importation even then was of more value than the exportation. In the year 1870, selected for the present comparison in all the textiles, the value of the domestic manufacture of cotton was reported to be \$177,489,739, and the value imported was \$21,899,120, or 11.2 per cent of the total amount consumed.

Combining the three textile industries, the total consumption for the year 1870 was valued at \$466,186,303, of which home manufactures furnished \$385,034,574; and \$81,151,729, or 17.4 per cent, represents the foreign value of imports. Briefly, American manufacturers supplied rather less than five-sixths of the textile goods used in the United States.

The conditions under which the several textile industries are established in a country differ in an interesting manner. The controlling influences are the supply of the raw material and the adaptability of the people to a manufacturing life. Sheep can be raised in any country where warm clothing is needed, save in the polar regions. The spinning wheel and the handloom are among the simplest forms of machinery, on which the homespun is woven. It is therefore natural that the woolen industry should spring up in primitive communities, and among people who are too poor to buy the material of their clothing; and as population increases, as the comforts of life become more available, and as labor becomes specialized and diversified, the production by machinery of woolen cloth for sale is one of the earliest developments of the manufacturing tendency. As might therefore be expected, it is found that this department of the textile industry has a place in almost all countries in which garments made of wool fiber are needed as a protection of the body against cold. It is an interesting corollary of this principle that even in this country the manufacture is carried on in almost every state in the Union, from Maine to Texas, from Florida to Washington.

Cotton is a subtropical plant. The lint can be separated from the seed by hand, and it can be spun and woven by processes as simple as those which in primitive communities convert wool into a clothing fabric. But the labor is so great and the efficiency of machinery is so superior to that of hand work that even the poorest communities can not afford to prepare the raw material and spin and weave it in this manner. Hence, virtually the whole manufacture is abandoned to the care of capital.

Moreover, inasmuch as the improvement of machinery has cheapened the processes to a wonderful degree, it has become more and more difficult for novices to engage in the business with success. The result is that the manufacture tends greatly to concentrate, to expand

in communities where already established, and to be neglected or to languish in regions where it is newly introduced, unless favored by special advantages. Such advantages may be convenient access to supplies of raw material or peculiar adaptability of the people to a manufacturing life.

In recent years there has been an introduction of the industry or a considerable growth of it from one of these two causes, in the East Indies, in China and Japan, in Canada, and in Mexico; in some of these cases the manufacture has been directly encouraged by Government measures and could hardly have been successful without that aid. It is easy to explain the very interesting and altogether marvelous expansion of the industry in the Southern states during the last decade—the most interesting feature, in fact, concerning the development of the textile manufacture during that period—upon the principles here suggested.

The situation with respect to silk is different from that of wool or cotton. Silk goods are a luxury, or at least a semiluxury. They are not required by persons devoid of æsthetic taste. They have not the warmth-giving properties of wool. They are in general a poor as well as a costly substitute for most of the purposes to which cotton goods are put. Moreover, silk culture is a difficult and uncertain occupation, requiring constant care, and often bringing disappointment and loss even to those who have bestowed the most pains upon it. One would accordingly expect to find the production of silk flourishing in those countries only where the climate is well adapted to the growth of the mulberry tree, and where the art of caring for the silkworm during all the stages of its life history has been acquired through many generations of study and experiment.

It would also be natural to expect that the communities within which the raw material is produced would engage in its conversion into yarn and cloth, and this is the case. The sources whence the nations called "civil-

ized" first drew the fine and costly fabric of silk were India, China, and Japan, and those countries still produce articles which the Western world can hardly match. The introduction of the silkworm into central and western Europe led to an immense expansion of the manufacture in France, Austria, Switzerland, and Italy. The English, with their capacity for manufacturing, adopted the industry, relying upon imported raw silk, and it flourished for many years, but has been declining during the past half century. The Germans, nearly surrounded by countries which are extensively engaged in silk culture, although themselves producing practically no raw silk, have succeeded much better, and the history of the manufacture in the German Empire has been one of great success.

The culture of the silkworm in the United States, although often urged upon the people and many times attempted in a small way, has never proved commercially successful, and the country does not appear even among the "scattering" as a producer of raw silk. Yet under an encouraging government policy the manufacture has been firmly established. Reasons corresponding to those which caused the wool manufacture to spring up in every part of the country and which concentrated the cotton manufacture where power is cheap, where rates of transportation are low, where labor is abundant, or in the immediate vicinity of a supply of raw cotton, result in a still greater localization of the silk industry. Eleven-twelfths of all the establishments in the country are in the 5 adjoining states of Pennsylvania, New Jersey, New York, Connecticut, and Massachusetts, and of the 1,045,304 throwing spindles, 996,118—more than nineteen-twentieths of the whole—are in the mills of those states.

Table 1 shows the value of the products and the imports of cotton, wool, and silk manufactures, and percentage of imports to the total consumption, 1870 and 1900.

TABLE 1.—VALUE OF DOMESTIC PRODUCTS, EXPORTS, IMPORTS FOR CONSUMPTION, AND TOTAL CONSUMPTION OF TEXTILES, WITH PER CENT OF IMPORTS TO TOTAL CONSUMPTION: 1870 AND 1900.

	1900					1870					Per cent of imports to total consumption.	
	Value of domestic products.	Exports. ¹	Domestic consumption.	Imports for consumption. ¹	Total consumption.	Value of domestic products.	Exports. ¹	Domestic consumption.	Imports for consumption. ¹	Total consumption.	1900	1870
Total.....	\$743,447,062	\$25,556,057	\$717,891,005	\$82,214,010	\$800,105,015	\$388,967,668	\$3,923,089	\$385,034,574	\$81,151,729	\$466,186,303	10.8	17.4
Cotton manufactures ..	339,200,320	24,003,087	315,197,233	39,789,989	354,987,222	177,489,789	8,787,282	178,702,457	21,899,120	195,601,577	11.2	11.2
Wool manufactures.....	296,990,484	1,300,362	295,690,122	15,620,487	311,310,609	199,257,262	124,159	199,133,103	85,082,628	284,165,731	5.0	15.0
Silk manufactures.....	107,256,258	252,608	107,003,650	26,803,584	133,807,184	12,210,662	11,648	12,199,014	24,219,981	36,418,995	20.0	66.5

¹Annual Report United States Treasury Department on Commerce and Navigation of the United States, 1870 and 1900. These are foreign, and not duty-paid values.

The value now reported for hosiery and knit goods can not be divided between cotton and wool; but if it be added to the reported home production, the total value of the textiles consumed in the United States in 1900 is \$895,587,581, and the percentage imported is but 9.18. It may also be mentioned that in recent

years a great proportion of the articles classed as cotton goods imported consists of laces, embroideries, trimmings, edgings, and other merchandise of which these are the types, which are not strictly to be classified with the products of the spindle, the loom, and the knitting machine.

It is a matter of extreme difficulty to ascertain the exact standing of the United States as a producer of textiles. The statistics are collected in no other country with the care and thoroughness which characterize an American census. The figures presented by statisticians of recognized repute are necessarily estimates to a large extent; and the years for which the estimates are made do not coincide with the census years of this country, unless by accident. Nevertheless, the situation may be set forth in broad terms with much confidence, inasmuch as there are some facts having an official character which furnish trustworthy indications.

Taking first the cotton manufacture, there is the assistance of Government and commercial statistics showing the amount of cotton produced, imported, exported, and consequently the amount retained for consumption in each country. There is also the help afforded by close annual estimates by most experienced observers of the number of spindles in operation in every country of the world in which cotton is manufactured on a large scale. The following table, compiled from statistics gathered by Thomas Ellison, of Liverpool, the highest authority in the world on the subject of cotton, shows the consumption of cotton in Great Britain, on the continent of Europe, and in the United States, at various periods, namely, the average annual consumption in the five years ending with the American census years from 1830 to 1880, followed by the annual consumption in each of the years 1890 and 1900. The amounts are expressed in thousands of bales of a uniform weight of 400 pounds.

CONSUMPTION OF COTTON AT DECENNIAL PERIODS, 1830-1900.

	Great Britain, number of thousand bales.	Continent Europe, number of thousand bales.	United States, number of thousand bales.
Average for 5 years ending—			
1830	711	411	180
1840	1,156	629	255
1850	1,458	776	553
1860	2,265	1,490	813
1870	2,639	1,842	875
1880	2,924	2,455	1,543
Year 1890	4,140	4,277	12,983
Year 1900	4,079	5,720	4,599

¹ Census figures, reduced to bales of 400 pounds. Cotton used in wool manufactures included.

This table seems to indicate that the United States was, in the year 1900, the leading country of the world in the manufacture of cotton. The same inference might be drawn from the statistics collected by the New York Chronicle, which, in its Cotton Crop Supplement for 1900,¹ gives the weekly consumption for the preceding years as shown in the following table, in bales of 500 pounds each. The annual consumption (52 weeks) of bales of corresponding weight, and the number reduced to bales of 400 pounds, are added for purposes of comparison with the preceding table.

¹ September 8, 1900.

WORLD'S CONSUMPTION OF COTTON, 1900.

[New York Commercial Chronicle.]

	Weekly, number of 500-pound bales.	ANNUAL.	
		Number of 500-pound bales.	Equivalent 400-pound bales.
Total	262,295	13,639,340	17,049,175
Great Britain	164,115	8,533,980	4,167,475
Continent	88,000	4,576,000	5,720,000
United States	74,148	3,855,696	4,819,620
East Indies	21,538	1,119,976	1,399,970
Japan	12,000	624,000	780,000
Canada	2,141	111,332	139,105
Mexico	363	18,356	22,945

¹ The amount reported in 1900, prior to the receipt of Mr. Ellison's report, was 67,654 bales weekly. In the Cotton Crop Supplement, September 7, 1901, the amount was changed to 64,115 bales weekly.

Although the amount consumed by the countries of the European continent exceeded that consumed in the United States, the consumption in this country greatly exceeded that of any one of those countries: France, Germany, Austria, or Russia.

It is, however, universally known that Great Britain is far in the lead in the cotton manufacture. The fact is brought out in the special report on the cotton industry, that an immense proportion of the spinning in the United States is coarse or medium yarns, whereas the average spinning on the other side of the Atlantic is much finer. A better test of the comparative standing is afforded by the number of spindles. The following table, like that showing the consumption of cotton, is made up from the figures compiled by Mr. Ellison, and are partly official and partly estimated:

COTTON SPINDLES IN THE WORLD AT VARIOUS PERIODS, IN THOUSANDS.

	1900	1897	1887	1877	1861
Great Britain	46,000	44,900	43,000	39,500	30,300
Continent of Europe	33,000	30,350	23,750	19,600	10,000
United States	19,003	16,800	13,500	10,000	5,000
India	4,400	4,000	2,400	1,230	338
Japan	1,500	970			
China	600	440			
Canada	640	550			
Mexico	460	450			

A more detailed statement of the spindles in the countries of the world in 1900 has been prepared for this report by the editor of the New York Commercial and Financial Chronicle. It is presented, together with another statement made by Mr. Hachiro H. Fukuhara, a Japanese, who has been investigating the cotton manufacture in Europe and America with a view to promoting the industry in his own country. The general correspondence of the two statements, compiled independently, is a strong point in favor of the accuracy of both. They show that this country stands next after Great Britain in the number of spindles, and that it operates more than twice as many spindles as Germany, which has the third rank.

NUMBER OF SPINDLES IN THE COUNTRIES OF THE
WORLD, AS ASCERTAINED AT NEAREST AVAILABLE
DATE TO 1900.

	New York Chronicle, number.	Mr. Fuku- hara, number.
Total	103,383,386	103,050,677
United Kingdom	45,400,000	45,400,000
United States	18,590,515	18,100,000
Germany	17,155,500	7,884,000
Russia	26,090,889	6,000,000
France	35,039,000	5,300,000
India	4,945,783	5,002,473
Austria and Hungary	13,140,171	8,140,000
Spain	22,614,500	2,615,000
Switzerland	11,709,400	1,972,000
Italy	12,092,730	1,886,000
Japan	1,220,975	1,250,000
Poland	6,850,000	965,000
Belgium	1,880,800	900,000
China	600,000	560,048
Canada	640,000	500,000
Mexico	2491,443	448,156
Sweden	2,860,000	360,000
Holland	1,269,680	350,000
Portugal	3160,000	230,000
Norway	4112,000	118,000
Greece	6970,000	70,000
Roumania	240,000	.....
Smyrna	10,000	.....

¹ 1898. ² 1899. ³ 1894. ⁴ 1896. ⁵ 1897. ⁶ 1895.

The materials for estimating the relative standing of different countries in the wool industry are less abundant and less trustworthy than those available for the cotton manufacture. There are no accurate returns, even of the consumption of wool, except in Great Britain and the United States; there is no common standard of machinery; and no return of the number of hands employed. The most recent figures, and they are merely careful and probably nearly correct estimates, are for the year 1894. They are compiled¹ from the trade circular of Helmuth Schwartz & Co., of London, who are recognized authority upon the production and consumption of wool throughout the world.

The estimate is that in the year 1894 the home production and the net importation of the United Kingdom made available for the consumption of that country aggregated 507,000,000 pounds of wool; for the Continent of Europe, 1,247,000,000 pounds; for North America, 458,000,000 pounds. The estimate of the same authority for the year 1900 gave the United Kingdom for home consumption 502,000,000 pounds. It is, perhaps, not far from the truth to assume that the consumption of five-sixths, possibly more, of the wool manufactured on the Continent of Europe of which commerce takes account is divided nearly equally among France, Germany, and Austria-Hungary. For this inference, reliance has to be placed upon statistics which are none too recent. Assuming, in order to make an estimate, that the consumption in 1892 was the same as in 1894, and that the home production of each country was the same in 1892 as in 1900, the result, stated in pounds of wool consumed, is as follows:

COUNTRIES.	Total, pounds.	Production, pounds.	Net import, pounds.
Total	1,227,500,000	217,500,000	1,010,000,000
France	457,610,000	103,610,000	354,000,000
Germany	383,090,000	49,590,000	333,500,000
Austria	386,800,000	64,300,000	322,500,000

NOTE.—The materials from which the foregoing statement is composed are to be found in the Wool Book, 1895, pages 79, 81, 82, and 85, and the Bulletin of the National Association of Wool Manufacturers for November, 1900, page 14.

¹ The Wool Book, Boston: 1895, page 64.

The use of wool in the manufactures of the United States, according to the present census, amounted to 394,369,523 pounds in the year 1900; somewhat less, it will be observed, than the amount above allowed for North America in the Helmuth-Schwartz estimate for the year 1894. Although the inference can not be put forth with much confidence, all the available facts seem to suggest that, judged by the standard of wool consumed—by no means a perfect test—the United States stands after Great Britain, the leading country, and France the second, and on a fairly even footing with Germany and Austria.

The report upon the silk manufacture gives a trustworthy exhibit of the position of the United States in that branch of the textile industry, in the following table:

VALUE OF SILK PRODUCTS OF EUROPE AND THE
UNITED STATES: 1900.¹

COUNTRIES.	Value of products.	Percent of products.
Total	\$395,000,000	100.0
France	122,000,000	30.9
United States	92,000,000	23.3
Germany	78,000,000	19.5
Switzerland	38,000,000	9.6
Russia (in Europe)	21,000,000	5.3
Austria	17,000,000	4.3
Great Britain	15,000,000	3.8
Italy	13,000,000	3.3
Spain and Portugal	4,000,000	1.0

¹ International Universal Exposition at Paris; Report of United States Commissioner Peck; Report on silk fabrics, contributed by Franklin Allen, jr., of the United States, in the silk section (Class 83). Government Printing Office, Washington, D. C., 1901, page 565.

It appears that in value of production the United States is surpassed by France alone, and reasons are given in the report for an opinion that the excess is swelled by some items that should not be reckoned to the credit of France. At the rate of progress made by the United States it seems probable that at the next enumeration it will take the first position among silk manufacturing nations, if it has not already (1902) done so. It may be remarked that value of production is a better test of the relative standing of nations in the case of silk than it is in the case of cotton, where so much depends upon the fineness of spinning, or than in the case of wool, where the difference is so wide in the value per pound of material used in the manufacture of carpets and of fine worsted cloth.

A general summary shows that the United States is second in the cotton industry, nearly tied for the third place in woollens, and second in silk. But the country so far exceeds any of its rivals, except Great Britain, in cotton, that the position as the second manufacturing nation in the world in textiles will be conceded to be beyond dispute. It is interesting, therefore, to inquire how the United States stands in comparison with the United Kingdom, which alone surpasses it in this respect. The only available test is the number of hands employed. The Annual Report for 1900 of the Chief Inspector of Factories and Workshops, published as a

"blue book," gives the number of employees in all the textile factories in the United Kingdom in 1899. The numbers are given herewith, and the corresponding numbers of employees in American textile factories in 1900 are given for purposes of comparison:

	United Kingdom, 1899, wage-earners, number.	United States, 1900, wage-earners, average number.
Total	1,010,162	631,675
Cotton	528,107	302,861
Wool, worsted, and shoddy	256,425	159,108
Silk	35,461	65,416
Hosiery	35,464	83,357
Flax, hemp, and jute	156,705	20,903

Only wage-earners are reported in the figures for the United States, and apparently none others are included in the British returns. So far as these facts are a safe basis for a conclusion, the importance of the textile industry as a whole in the United States is about three-fifths as great as the same industry in Great Britain. Were the flax, hemp, and jute manufactures, in which this country is greatly inferior, to be eliminated, the proportion would be nearly three-fourths.

A GENERAL SURVEY OF THE TEXTILE INDUSTRY.

Table 2, in continuation of that which was first presented at the Eleventh Census, exhibits the general condition of each branch of the textile manufacture, and of the industry as an entity, at decennial periods for the last half century.

TABLE 2.—COMPARATIVE SUMMARY, BY INDUSTRIES: 1850 TO 1900.

INDUSTRIES.	Year.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products.
				Number.	Salaries.	Average number.	Total wages.			
Combined textiles.....	1900	4,812	\$1,042,997,577	16,822	\$23,289,162	661,451	\$209,022,447	\$63,122,916	\$521,345,200	\$931,494,566
Cotton manufacture:										
Cotton goods	1900	973	460,842,772	4,713	7,123,574	297,929	85,126,310	21,050,144	178,441,390	332,806,156
Cotton small wares.....	1900	82	6,397,385	189	225,625	4,932	1,563,442	462,584	8,110,137	6,394,164
Wool manufacture	1900	1,414	310,179,749	4,495	6,455,495	159,108	57,933,817	17,329,932	181,159,127	296,990,484
Silk manufacture	1900	483	81,082,201	2,657	3,134,352	65,416	20,932,194	10,264,208	62,406,665	107,256,258
Hosiery and knit goods	1900	921	31,860,604	2,809	3,124,798	83,357	24,358,627	6,599,865	51,071,859	95,482,566
Flax, hemp, and jute	1900	141	41,991,762	641	957,190	20,903	6,331,741	2,678,286	32,197,885	47,601,607
Dyeing and finishing textiles	1900	298	60,643,104	1,318	2,267,128	29,776	12,726,316	4,137,947	17,958,137	44,963,331
Combined textiles.....	1890	4,276	767,705,310	10,637	12,539,920	517,237	168,488,982	44,788,668	447,546,540	750,262,283
Cotton manufacture.....	1890	905	354,020,843	2,709	3,464,734	218,876	66,024,588	16,716,524	154,912,979	267,981,724
Wool manufacture	1890	1,693	245,836,743	3,652	4,057,695	154,271	54,339,775	15,022,263	167,233,987	270,527,511
Silk manufacture	1890	472	51,007,587	1,531	1,917,877	49,332	17,762,441	4,259,623	51,004,425	87,298,464
Hosiery and knit goods	1890	796	50,607,738	1,621	1,685,153	59,588	16,578,119	3,627,245	35,861,585	67,241,013
Flax, hemp, and jute	1890	162	27,731,649	458	609,170	15,519	4,872,389	1,431,932	26,148,344	37,313,021
Dyeing and finishing textiles	1890	248	38,450,800	666	805,291	19,601	8,911,720	3,131,081	12,385,220	28,900,560
Combined textiles.....	1880	4,018	412,721,496	(¹)	(²)	³ 384,251	105,050,666	(³)	802,709,894	532,673,488
Cotton manufacture ⁴	1880	756	208,280,846			⁵ 174,659	42,040,510		102,206,347	192,080,110
Wool manufacture	1880	2,330	143,512,278			132,672	40,687,612		149,160,600	238,085,686
Silk manufacture	1880	382	19,125,300			81,337	9,146,705		22,467,701	41,033,045
Hosiery and knit goods	1880	359	15,579,691			28,885	6,701,475		15,210,951	29,167,227
Dyeing and finishing textiles	1880	191	26,223,981			16,698	6,474,304		13,664,296	32,297,420
Combined textiles.....	1870	4,790	297,694,243	(²)	(²)	274,943	86,565,191	(³)	353,249,102	520,886,764
Cotton manufacture.....	1870	956	140,706,291			135,369	39,044,132		111,736,936	177,489,739
Wool manufacture	1870	3,208	121,451,059			105,071	35,928,150		124,315,792	199,257,262
Silk manufacture	1870	86	6,231,130			6,649	1,942,286		7,817,569	12,210,562
Hosiery and knit goods	1870	248	10,931,260			14,788	4,429,085		9,835,823	18,411,564
Dyeing and finishing textiles	1870	292	18,374,503			18,066	5,221,538		99,539,992	⁶ 113,017,537
Combined textiles.....	1860	3,027	150,080,852	(²)	(²)	194,082	40,353,462	(³)	112,842,111	214,740,614
Cotton manufacture.....	1860	1,091	98,585,289			122,028	23,940,108		57,285,534	115,681,774
Wool manufacture	1860	1,476	38,814,422			50,419	11,699,630		43,447,048	73,454,000
Silk manufacture	1860	139	2,926,080			5,435	1,050,224		3,901,777	6,607,771
Hosiery and knit goods	1860	197	4,035,510			9,103	1,661,972		3,202,317	7,280,606
Dyeing and finishing textiles	1860	124	5,718,671			7,097	2,001,628		5,005,435	11,716,463
Combined textiles.....	1850	3,025	112,513,947	(²)	(²)	146,877	(²)	(³)	76,715,959	128,769,971
Cotton manufacture.....	1850	1,094	74,500,931			92,286	(⁷)		34,835,056	61,869,184
Wool manufacture	1850	1,675	31,971,631			45,438	(⁷)		28,831,633	45,008,779
Silk manufacture	1850	67	678,300			1,743	(⁷)		1,093,860	1,809,476
Hosiery and knit goods	1850	85	544,785			2,325	(⁷)		416,113	1,028,102
Dyeing and finishing textiles	1850	104	4,818,350			5,105	(⁷)		11,540,347	15,464,430

¹ Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See detailed summary for each industry.)

² Not reported separately.

³ Not reported.

⁴ In addition to those data there were received at the census of 1880 returns for 249 mills, classed as "special mills," engaged in working raw cotton, waste, or cotton yarn into hosiery, webbing, tapes, and fancy fabrics, and mixed goods or other fabrics, which are not sold as specific manufactures of wool or cotton. These 249 establishments reported \$11,224,448 capital, 12,928 employees, \$3,573,909 wages, \$2,338,385 cost of cotton consumed, \$18,890,273 value of products, and should be considered in making comparisons. In 1890 this class of mills is reported under a number of different heads, although some of them may be included in the totals for the textile industries presented in the figures for 1890.

⁵ Includes 2,115 officers and clerks, whose salaries were not reported.

⁶ At the census of 1870 the value of the fabric itself was reported, whereas in all subsequent censuses merely the value added to such fabric by the process of dyeing and finishing is given.

⁷ This item was not fully reported at the census of 1850.

Great reliance can not be placed upon any manufacturing census of the United States prior to that of 1870, at which time a scientific method was employed for the first time, and since which the returns have been more thorough, more carefully scanned, and more accurate. But inasmuch as the rule adopted for ascertaining the capital employed has been changed at each census, except for 1890 and 1900, the indication of increase can be taken as only approximately true. With this caution it appears that the capital invested in textile manufactures, omitting flax, hemp, and jute, has multiplied more than eight times in fifty years, and that the value of products is almost sevenfold that reported in 1850. Neither capital nor value of products is a fair test of the increase of the industry, the first item for the reason just given, and the value of products because there has been a progressive decrease in the cost of the fibers which constitute the raw material, and hence in the value of the pound of yarn or the yard of cloth. Another standard of comparison is afforded by the number of employees. Table 3 shows the percentage of increase in the average number of wage-earners and in the value of products.

TABLE 3.—PER CENT OF INCREASE IN AVERAGE NUMBER OF WAGE-EARNERS AND IN VALUE OF PRODUCTS: 1850 to 1900.¹

PERIODS.	Percent of increase in—	
	Average number of wage-earners.	Value of products.
1850 to 1900	336.1	586.4
1890 to 1900	27.7	22.4
1880 to 1890	30.6	35.5
1870 to 1880	39.8	2.4
1860 to 1870	41.7	142.3
1850 to 1860	82.1	66.8

¹ Not including flax, hemp, and jute.

It appears that the total increase in the number of wage-earners in the textile manufactures, excluding flax, hemp, and jute, for which comparative figures are not available, during the half century has been 336.1 per cent. The rate of increase has averaged 34.4 during each decennial period. The rate during the last decade was the smallest of those reported, but it was based upon a much larger aggregate, so that numerically the increase was greater than in the period 1880-1890. It is an interesting fact that the increase has in each decade, except that of 1850-1860, exceeded the general growth of population in spite of the enormous increase in the efficiency of machinery, which makes the productive power of one man's labor many times as great as it was at the beginning of the half century. In con-

sidering the statement of the percentage of increase in the value of products, full account should be taken of the disturbance of all estimates of this sort which include the period from 1860 to 1880. Prices were greatly inflated during the first half of the twenty-year period by the depreciation of the monetary standard, and also by the scarcity of cotton, which made the price exceedingly high. During the last half of the period prices gradually declined, owing to the restoration of normal conditions in the cotton market and the return to a gold basis.

NUMBER OF ESTABLISHMENTS.

The number of establishments engaged in all the textile industries, except flax, hemp, and jute, has increased since 1850 from 3,025 to 4,171, or 37.9 per cent. The number has shown a positive decrease since 1870. The gross number at the last 4 censuses has been 4,790, 4,018, 4,114, and 4,171, respectively. Yet the number of silk factories has increased largely, and there has been a great development of the cotton industry in the South, involving the installation of hundreds of new establishments. The decrease has mostly occurred in the number of establishments manufacturing wool. Nevertheless, a somewhat similar process is going on in all branches of the industry, an abandonment and final closing of small establishments and a consolidation akin to that which is taking place in all other industries.

This tendency is marked, to a certain extent, in the case of cotton by the very extensive building of new mills in the Southern states. It is fully apparent in the case of wool for a reason which will be apparent to all persons who are aware of the difference in the conditions under which the two industries are conducted. It will be seen that the average capital reported by the 973 cotton manufacturing establishments is more than \$473,000; the average of those engaged in the manufacture of wool is less than \$220,000. Ten years ago the average capital in the latter industry was less than \$150,000. Most cotton factories are owned and operated by corporations; a large number of woolen factories are owned by individuals or firms, some of which are small producers, chiefly for local consumption. The tendency of textile manufactures both to concentrate and to group themselves in favorable regions is most marked, and is likely to be more apparent as time passes.

THE GENERAL GROWTH IN TWENTY YEARS.

Table 4 presents a comparative summary of the leading facts relating to the industry as a whole, not including flax, hemp, and jute, in 1880, 1890, and 1900, with the per cent of increase for each decade.

TABLE 4.—COMPARATIVE SUMMARY, NOT INCLUDING FLAX, HEMP, AND JUTE, 1880 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	DATE OF CENSUS.			PER CENT OF INCREASE.	
	1900	1890	1880	1890 to 1900	1880 to 1890
Number of establishments.....	4,171	4,114	4,018	1.4	2.4
Capital.....	\$1,001,005,815	\$739,973,661	\$412,721,496	85.3	79.3
Salaries of officials, clerks, etc., number.....	16,181	110,179	(²)	59.0	.....
Salaries.....	\$22,331,972	\$11,930,750	(²)	87.2	.....
Wage-earners, average number.....	640,548	501,718	384,251	27.7	30.6
Total wages.....	\$202,690,706	\$163,616,593	\$105,050,666	23.9	55.8
Men, 16 years and over.....	288,871	216,345	159,382	33.5	35.7
Wages.....	\$114,959,158	\$91,038,323	(²)	26.3	.....
Women, 16 years and over.....	283,688	243,589	169,806	16.4	43.5
Wages.....	\$78,084,564	\$66,644,785	(²)	17.2	.....
Children, under 16 years.....	68,039	41,784	55,063	62.8	+24.1
Wages.....	\$9,646,984	\$5,933,485	(²)	62.6	.....
Miscellaneous expenses.....	\$50,444,630	\$43,856,786	(²)	39.4	.....
Cost of materials used.....	\$489,147,315	\$421,898,196	\$302,709,894	16.1	39.2
Value of products.....	\$883,892,959	\$721,949,262	\$592,673,488	22.4	35.5

¹ Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See detailed summary for each industry.)

² Not reported separately.

³ Includes 2,115 officers and clerks whose salaries are not reported.

⁴ Decrease.

⁵ Not reported.

The comparison of all the items in combination gives a better measure of growth than can be found in any single item of the statement. It will be seen that as to all the items which were reported in the enumeration of 1880 there was an increase in the ensuing decade, with the single exception of children employed. The decrease in this item was due to a combined legislative and social movement in the Northern states to eliminate child labor as far as practicable. For the decade from 1890 to 1900 there was an increase in every item, ranging in amounts from 1.4 per cent in the number of establishments to 87.2 per cent in the salaries of office clerks, etc. It is scarcely necessary to say that the increase in salaried employees is rather apparent than real, and is due to the transfer to this item of superintendents, overseers, etc., who were reported in 1890 with wage-earners. The next largest increase is that in the number of children employed, 62.8 per cent, and of their wages, 62.6 per cent. This reversal of the movement previously noted was a consequence of the

immense increase of cotton manufacturing in the South, where it was necessary to enlist all the labor procurable.

Neither of the items showing a minimum or a maximum of increase is of much weight in estimating the growth of the industry, but it will be seen that the reported increase of capital, 35.3 per cent; of wage-earners, 27.7 per cent; of wages, 23.9 per cent; and of miscellaneous expenses, 39.4 per cent, are sufficiently uniform to give a fair indication of the progress that has been made. The fact that the cost of materials has increased only 16.1 per cent, and the value of products only 22.4 per cent, is explainable by the large decrease in the average price of the raw materials used, which is reflected in the value of products. The quantity of product shows an increase corresponding to that of the other items mentioned.

CAPITAL INVESTED.

Table 5 presents a summary of the capital invested in the several branches of the textile industry, 1840 to 1900, inclusive.

TABLE 5.—COMPARATIVE SUMMARY OF CAPITAL: 1840 TO 1900.

DATE OF CENSUS.	Total.	Cotton manufacture. ¹	Wool manufacture. ²	Silk manufacture.	Hosiery and knit goods	Flax, hemp, and jute. ³	Dyeing and finishing textiles
1900.....	\$1,042,997,577	\$467,240,157	\$310,179,749	\$81,082,201	\$81,860,604	\$41,991,762	\$60,643,104
1890.....	787,705,310	354,020,848	245,886,743	51,007,527	50,607,788	27,781,649	38,450,800
1880.....	412,721,496	208,280,846	143,512,278	19,125,300	15,579,591	.....	26,228,981
1870.....	297,694,243	140,708,291	121,451,059	6,231,180	10,931,260	.....	18,374,503
1860.....	150,080,852	98,585,269	88,814,422	2,926,980	4,035,510	.....	5,718,671
1850.....	112,513,947	74,500,931	31,971,681	678,300	544,735	.....	4,818,350
1840.....	66,887,488	51,102,859	15,765,124	.....	(⁴)	.....	.....

¹ Includes cotton goods and cotton small wares.

² Includes worsted goods; woolen goods; carpets and rugs, other than rag; felt goods, and wool hats.

³ Includes cordage and twine; jute and jute goods, and linen goods; also two establishments classified in 1890 as "linen thread."

⁴ Not reported separately.

While the method of ascertaining the capital has been changed at nearly every census the statement is nevertheless interesting. The successive changes have in general had the result of including more and more of the actual capital employed; that is to say, at the earlier censuses the capital stated was merely the nominal capital of corporations or the estimated capital of individuals and firms. The method pursued at the censuses of 1890 and 1900 has been to sum the value of plant and to include also such items as stock in process, bills receivable, etc., thus including in the capital the accumulation which has been invested in the business and the capital of others than the owners which has been borrowed and practically invested in the manufacture. In this way the reported capital shows a much larger increase than would have been exhibited if the original method had been followed.

It will be seen that the largest amount of capital was, at every census, that invested in cotton manufacture. At the beginning of the period, 1840, it was more than three times that invested in the wool manufacture, and at the census of 1900 it was still more than 50 per cent greater than that of the wool manufacture. The actual increase, however, has been more than \$400,000,000, against a little less than \$300,000,000 in wool. The capital invested in wool in 1900 was almost twenty times that reported in 1840. The growth of the silk manufacture and that of hosiery and knit goods, estimated by their capital, were almost the same from 1850 to 1900, and the rate of growth of each from decade to decade has been also quite uniform. Flax, hemp, and jute manufactures were first reported separately in

1890, and during the last decade increased about 50 per cent. The dyeing and finishing industry also shows a large growth during each ten-year period.

COST OF MATERIALS AND VALUE OF PRODUCTS.

Tables 6 and 7 should be considered together. Table 6 shows the cost of materials and value of products for each branch of the industry in 1890 and 1900, and also, for each census, the cost of materials per \$100 of products. Table 7 shows the value of products for each branch of the industry from the earliest period for which the foundation for a reasonable estimate exists.

TABLE 6.—COMPARATIVE SUMMARY, COST OF MATERIALS, VALUE OF PRODUCTS, AND COST OF MATERIALS PER \$100 OF PRODUCTS: 1890 AND 1900.

INDUSTRIES.	Year.	Cost of materials used.	Value of products.	Cost of materials per \$100 of products.
Cotton manufacture ¹	1900	\$176,551,527	\$339,200,320	\$52.05
	1890	154,912,979	267,981,724	57.81
Wool manufacture ²	1900	181,159,127	296,990,484	61.00
	1890	167,233,987	270,527,511	61.82
Silk manufacture.....	1900	62,406,665	107,256,258	58.18
	1890	51,004,425	87,293,454	58.48
Hosiery and knit goods.....	1900	51,071,859	95,482,566	53.49
	1890	35,861,535	67,241,013	53.33
Flax, hemp, and jute ³	1900	32,197,885	47,601,607	67.64
	1890	26,148,344	37,813,021	70.08
Dyeing and finishing textiles...	1900	17,958,137	44,963,331	39.94
	1890	12,385,220	28,900,560	42.85

¹Includes cotton goods and cotton small wares.

²Includes worsted goods; woolen goods; carpets and rugs, other than rag; felt goods; and wool hats.

³Includes cordage and twine; jute and jute goods; and linen goods; also 2 establishments classified in 1890 as "linen thread."

TABLE 7.—COMPARATIVE SUMMARY, VALUE OF PRODUCTS: 1810 TO 1900.

DATE OF CENSUS.	Total.	Cotton manufacture. ¹	Wool manufacture. ²	Silk manufacture.	Hosiery and knit goods.	Flax, hemp, and jute. ³	Dyeing and finishing textiles.
1900.....	\$931,494,556	\$339,200,320	\$296,990,484	\$107,256,258	\$95,482,566	\$47,601,607	\$44,963,331
1890.....	759,262,283	267,981,724	270,527,511	87,293,454	67,241,013	37,813,021	28,900,560
1880.....	532,673,488	192,090,110	238,085,036	41,039,045	29,167,227	.....	32,297,420
1870.....	520,386,764	177,489,739	199,257,262	12,210,662	18,411,564	.....	113,017,587
1860.....	214,740,614	115,981,774	73,454,000	6,607,771	7,280,606	.....	11,716,463
1850.....	128,709,971	61,869,194	48,608,770	1,809,476	1,028,102	.....	15,454,430
1840.....	67,047,462	46,350,453	20,695,993	.....	.....	.....	.....
1830.....	37,002,961	22,534,815	14,528,168	.....	.....	.....	.....
1820.....	9,247,225	4,834,157	4,413,038	.....	.....	.....	.....
1810.....	61,685,785	\$26,076,997	\$25,608,788	.....	.....	.....	.....

¹Includes cotton goods and cotton small wares.

²Includes worsted goods; woolen goods; carpets and rugs, other than rag; felt goods; and wool hats.

³Includes cordage and twine; jute and jute goods; linen goods; and two establishments in 1890 classified as "linen thread."

⁴At the census of 1870 the value of the fabric itself was reported, whereas in all subsequent censuses merely the value added to such fabric by the process of dyeing and finishing is given.

⁵Includes manufactures of cotton and flax in families and otherwise.

⁶Includes manufactures of wool in families and otherwise.

The comparison between cost of materials and value of products reflects the decline already noted in the cost of the several fibers used in the manufacture. The decline is most marked in the case of cotton, where the cost of materials has declined \$5.76 in \$100 of product, whereas in wool and silk the decline has been fractional. There are influences which serve to make the present cost of materials more uniform than would be expected from the large difference in the price per pound of cotton, wool, and silk. Thus, the percentage of amount

employed in the wool manufacture is much greater than in cotton, and the higher relative cost of labor due to that fact neutralizes, to a certain extent, the greater cost of wool per pound. On the other hand, the cost of materials in flax, hemp, and jute—the most inexpensive materials entering into the textile industry—shows a greater percentage than either of the other branches, owing to the small amount of labor required for handling a great quantity of material.

The table which shows the value of product during

the Nineteenth century makes use of one of the two only standards that are possible for estimating the relative importance of the several industries at the close of each decade. The figures given for 1810, 1820, 1830, and 1840 are taken from the report made to James Guthrie, Secretary of the Treasury in 1855, the most reliable authority for these years. The cotton manufacture was begun in Pawtucket, R. I., in 1791. Prior to the War of 1812 there was no mill in the country which carried on both spinning and weaving under the same management, but the number of spinning mills was large.

No statement of the value of the wool manufacture has been made prior to the year 1820. It will be seen that at that time the cotton manufacture was more than five times as great in value, according to the estimate, as the wool. In 1830 wool was more than half as important as cotton. From that time there was a steady increase of both industries, which has been continued ever since. Cotton greatly outranked wool in 1860, but the interruption of the cotton manufacture which resulted from the Civil War gave wool an advantage, which is to be seen in the returns for 1870 and 1880, and to a very slight extent in 1890; but at the present census cotton has again resumed the leadership which before the Civil War it held so long.

The silk manufacture first appears in 1850, and at the same time the hosiery and knit goods industry was reported separately from the wool manufacture. Both of these industries have grown enormously, and at the present time the value of the silk manufacture is more than one-third that of wool, and nearly one-third that of cotton; and knit goods lag but little in the rear.

The flax, hemp, and jute industry has always existed, and no doubt at the beginning of the Government under the Constitution the production of cordage far exceeded in value that of any other branch of the manufacture now classed as textile. It has assumed great importance in modern industry in consequence of the immense demand for binding twine.

The increase of dyeing and finishing has, of course, kept pace with the other textile industries of which it is the necessary concomitant. It should be noted that

the amount reported as the value of dyeing and finishing in 1870 represents the value of the finished product. For every other enumeration it is simply the value added to the product of other establishments.

CONSUMPTION OF TEXTILE FIBERS.

Table 8 presents a statement of the consumption of textile fibers, in pounds, from 1840 to 1900, and furnishes a measure of the relative growth of the cotton, wool, and silk industries.

TABLE 8.—CONSUMPTION OF TEXTILE FIBERS: 1840 TO 1900.

YEARS.	Cotton, pounds. ¹	Wool, pounds. ²	Silk, pounds.
1900	1,910,509,198	412,828,480	9,760,770
1890	1,193,374,641	372,797,413	6,376,881
1880	798,344,888	296,192,229	2,690,482
1870	430,781,987	219,970,174	684,488
1860	443,845,378	98,379,785	462,965
1850	288,558,000	70,862,829	
1840	126,000,000		

¹ Includes cotton consumed in establishments classed as cotton goods, cotton small wares; woolen goods, worsted goods, carpets and rugs, other than rag; felt goods; wool hats; and hosiery and knit goods.

² Includes wool consumed in establishments classed as woolen goods; worsted goods, carpets and rugs, other than rag; felt goods; wool hats; and hosiery and knit goods.

The indication of Table 8 is substantially the same as that of the table showing the value of products. It will be seen that whereas there was a large increase in the amount of wool used at each enumeration, there was a decrease of cotton from 1860 to 1870, and that during the twenty-year period from 1860 to 1880 the amount of wool used increased threefold, whereas the amount of cotton did not double itself. During the last decade the increase of wool has been little more than 10 per cent, whereas the increase of cotton has been more than 60 per cent.

EMPLOYEES AND THEIR WAGES.

Table 9 presents the total number of wage-earners in each branch of the industry, classified as men, women, and children, and the wages earned during the census year 1900.

TABLE 9.—AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES, BY INDUSTRIES: 1900.

INDUSTRIES.	TOTAL.		MEN, 16 YEARS AND OVER.		WOMEN, 16 YEARS AND OVER.		CHILDREN, UNDER 16 YEARS.	
	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.
Total	661,451	\$209,022,447	298,867	\$118,783,713	292,286	\$80,258,716	70,298	\$9,980,018
Cotton manufacture:								
Cotton goods	297,929	85,126,310	134,354	46,923,865	123,709	32,917,933	39,866	5,285,012
Cotton small wares	4,932	1,503,442	1,367	671,516	8,173	828,732	892	63,194
Wool manufacture ¹	159,108	57,033,817	83,371	36,412,872	64,141	19,549,423	11,606	1,971,522
Silk manufacture	65,416	20,982,194	24,206	10,699,483	34,797	9,377,696	6,413	965,015
Hosiery and knit goods	83,887	24,355,627	21,154	8,890,728	53,565	14,243,808	8,668	1,224,091
Flax, hemp, and jute ²	20,903	6,831,741	9,996	3,824,555	8,643	2,174,162	2,259	333,084
Dyeing and finishing textiles	29,776	12,726,316	24,419	11,361,194	4,233	1,165,972	1,104	198,150

¹ Includes worsted goods; woolen goods; carpets and rugs, other than rag; felt goods; and wool hats.

² Includes cordage and twine; jute and jute goods; and linen goods.

The striking fact appears that the average number of wage-earners employed during the entire year in the manufacture and finishing of all the cloth necessary for a population of over 75,000,000 was but 640,548, the number employed in flax, hemp, and jute being deducted from the total shown in this table. It is a remarkable illustration of the power of machinery that much less than one person in a hundred was required to furnish the materials for the clothing of the American people. The

number of persons employed in the cotton manufacture, including cotton small wares, was almost twice as great as that in the wool manufacture, which again was nearly three times the number of persons employed in silk mills.

Table 10 shows the average number of wage-earners, men, women, and children, in the several branches of the industry and the percentage that each is of the total for 1880, 1890, and 1900.

TABLE 10.—AVERAGE NUMBER OF WAGE-EARNERS, AND PROPORTION OF MEN, WOMEN, AND CHILDREN: 1880 TO 1900.

	Year.	AVERAGE NUMBER OF WAGE-EARNERS.				PER CENT OF TOTAL.		
		Total.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.	Men.	Women.	Children.
Total	1900	661,451	298,867	292,286	70,298	45.2	44.2	10.6
	1890	517,237	223,712	250,512	43,013	43.3	48.4	8.8
	1880	884,251	159,382	169,806	55,063	41.5	44.2	14.3
Cotton manufacture.....	1900	802,861	185,721	126,882	40,258	44.8	41.9	13.3
	1890	218,876	88,837	106,607	23,432	40.6	48.7	10.7
	1880	174,659	61,760	84,558	28,341	35.4	48.4	16.2
Wool manufacture	1900	159,108	83,371	64,141	11,596	52.4	40.3	7.3
	1890	154,271	78,550	64,944	10,777	50.9	42.1	7.0
	1880	182,672	67,942	49,107	16,623	51.2	37.0	11.8
Silk manufacture	1900	65,416	24,206	34,797	6,413	37.0	58.2	9.8
	1890	49,382	17,602	28,914	2,866	35.6	58.6	5.8
	1880	31,337	9,375	16,896	5,066	29.9	52.3	17.8
Hosiery and knit goods	1900	88,387	21,154	53,565	8,668	25.4	64.2	10.4
	1890	59,588	14,846	40,826	3,916	24.9	68.5	6.6
	1880	28,885	7,517	17,707	3,661	26.0	61.3	12.7
Flax, hemp, and jute.....	1900	20,903	9,996	8,648	2,259	47.8	41.4	10.8
	1890	15,519	7,367	6,923	1,229	47.5	44.6	7.9
Dyeing and finishing textiles	1900	29,776	24,419	4,253	1,104	82.0	14.3	3.7
	1890	19,601	16,510	2,298	793	84.2	11.7	4.1
	1880	16,698	12,788	2,038	1,872	76.6	12.2	11.2

¹ Includes 2,115 officers and clerks whose salaries are not reported.

Table 10 shows that the total number of wage-earners increased from 1880 to 1890, and from 1890 to 1900, in each case, by about 140,000. To this number the wool industry contributed but slightly (the total addition in twenty years being only 26,436), whereas the number of wage-earners in cotton, in silk, in hosiery, in flax, hemp, and jute, and in dyeing and finishing all increased largely. The increase in the number of men during the past decade was 75,155; of women, 41,774; of children, 27,285. The preponderance of increase in the case of men is shown most clearly in the columns showing the percentage. In the industry as a whole the number of men in a hundred employed has increased from 41.5 in 1880 to 43.3 in 1890 and to 45.2 in 1900. The proportion of women showed an increase from 1880 to 1890 of from 44.2 to 48.4, but during the past decade has declined to 44.2. The proportion of children had decreased in the twenty years from 14.3 to 10.6, but shows an increase during the last decade, owing to circumstances which have already been mentioned.

These several movements affecting the proportionate number of men, women, and children are seen most plainly in the case of the cotton manufacture, where the proportion of men has increased in twenty years from 34.4 to 44.8, and during the same period the proportion of women has decreased from 48.4 to 41.9. The causes of the shifting of employment from women to men is discussed in the report upon the cotton manufacture. So far as the other industries are concerned, there has been little change, but that which has taken place corresponds, so far as men are concerned, to the changes just noted, but a considerable decrease in the number of children has, in some cases, resulted in an increase in the number of women employed.

GEOGRAPHICAL DISTRIBUTION.

Table 11 presents a comparative summary of the industry by states, arranged geographically, exclusive of flax, hemp, and jute for 1880, 1890, and 1900.

TABLE 11.—COMPARATIVE SUMMARY, NOT INCLUDING FLAX, HEMP, AND JUTE, BY STATES ARRANGED GEOGRAPHICALLY: 1880 TO 1900.

STATES.	Year.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products.
				Number.	Salaries.	Average number.	Total wages.			
United States.....	1900	4,171	\$1,001,005,815	16,181	\$22,831,972	640,548	\$202,690,706	\$60,444,630	\$489,147,315	\$888,892,959
	1890	4,114	739,973,661	110,179	11,930,750	501,718	163,616,593	421,398,196	211,974,959	721,949,262
	1880	4,018	412,721,496	(2)	(2)	384,261	105,050,666	43,356,736	302,709,894	532,673,488
New England states.....	1900	1,124	524,899,362	5,688	9,527,370	286,469	101,934,256	26,403,681	222,297,451	412,875,975
	1890	1,210	426,365,388	3,524	4,915,773	256,018	86,978,178	24,501,029	211,974,959	365,613,324
	1880	1,214	261,561,147			217,674	60,611,202	172,223,778	172,223,778	310,542,352
Maine.....	1900	101	36,720,033	350	555,963	21,938	7,369,946	2,358,238	15,524,745	29,394,372
	1890	107	30,990,097	217	302,438	19,794	6,277,442	1,867,550	14,495,290	24,911,195
	1880	126	19,932,406			15,869	4,204,778		12,148,526	21,470,567
New Hampshire.....	1900	97	44,107,098	382	622,437	29,538	10,088,051	2,264,958	20,675,482	37,495,180
	1890	118	43,891,412	330	419,199	29,243	9,624,938	2,339,287	22,225,159	37,256,364
	1880	126	31,247,024			24,743	6,904,069		18,809,037	32,757,353
Vermont.....	1900	43	6,724,920	109	147,128	3,613	1,253,388	282,863	3,373,931	5,657,217
	1890	45	5,491,250	70	72,438	2,970	1,043,588	301,466	2,626,282	4,744,326
	1880	58	3,790,267			3,204	807,048		2,881,935	4,671,041
Massachusetts.....	1900	483	273,562,835	2,713	4,744,037	149,089	53,819,143	13,072,020	113,354,739	218,612,791
	1890	533	215,254,813	1,711	2,498,825	125,108	43,091,382	12,930,047	107,465,624	184,938,074
	1880	496	120,443,376			106,743	29,801,616		84,228,717	162,988,522
Rhode Island.....	1900	210	97,444,185	1,116	2,034,498	49,877	17,863,957	5,222,431	42,458,004	77,938,396
	1890	204	70,699,470	646	821,685	47,426	16,018,599	4,260,785	37,911,493	67,005,615
	1880	194	46,989,447			36,622	10,127,287		27,708,649	51,383,569
Connecticut.....	1900	190	66,340,241	963	1,423,307	32,469	11,539,771	3,203,171	26,910,550	48,728,019
	1890	203	60,038,846	651	801,188	31,477	10,922,234	2,801,394	27,251,161	46,757,780
	1880	214	39,138,037			30,493	8,766,404		26,446,914	47,271,300
Middle states.....	1900	1,969	307,765,675	7,155	8,924,195	221,944	74,632,681	26,481,180	137,031,904	334,247,580
	1890	1,914	222,402,855	4,467	5,076,889	180,669	62,485,733	14,352,458	161,124,539	279,576,396
	1880	1,540	115,483,359			132,884	38,013,381		106,328,536	183,443,725
New York.....	1900	528	93,392,958	2,070	2,707,559	64,734	22,606,600	6,683,087	50,273,512	93,819,518
	1890	615	75,881,672	1,459	1,829,231	60,924	20,834,522	4,840,584	47,621,495	86,171,293
	1880	480	42,022,987			45,138	12,652,423		30,610,901	56,191,417
New Jersey.....	1900	323	76,183,937	1,740	2,478,193	46,985	17,188,137	7,309,634	38,795,102	72,933,823
	1890	240	43,321,016	778	954,171	33,984	12,750,224	2,952,104	29,682,210	52,831,023
	1880	186	16,028,770			24,111	7,652,833		17,456,679	31,865,348
Pennsylvania.....	1900	1,076	126,346,788	3,114	3,426,774	101,845	32,624,316	11,783,429	92,301,856	157,333,201
	1890	1,010	92,686,227	2,104	2,147,210	79,277	27,039,420	6,052,430	78,869,158	132,367,499
	1880	822	51,285,747			58,005	16,560,274		58,999,549	88,594,148
Delaware.....	1900	16	2,174,398	81	113,896	1,882	621,729	175,615	1,377,163	2,592,201
	1890	11	2,555,233	37	37,943	1,506	508,169	122,690	1,007,270	1,821,278
	1880	13	1,227,129			1,058	301,231		975,490	1,536,260
Maryland.....	1900	26	9,667,594	150	197,773	6,498	1,591,899	529,415	4,284,266	7,568,837
	1890	38	7,958,707	89	108,309	5,028	1,253,398	884,650	3,944,406	6,385,303
	1880	39	4,965,726			4,567	846,620		3,285,917	5,250,557
Southern states.....	1900	702	137,172,561	2,222	2,465,059	109,501	19,858,949	5,488,519	63,624,678	107,318,831
	1890	486	82,623,729	1,118	960,968	43,650	8,810,088	2,691,420	32,624,416	49,729,674
	1880	613	20,413,414			19,409	3,254,936		12,781,692	20,381,689
Virginia.....	1900	53	6,759,667	121	136,789	5,611	1,272,256	292,451	3,322,334	5,762,329
	1890	47	4,089,511	80	59,765	2,870	568,394	177,750	1,993,555	2,964,171
	1880	56	1,646,850			1,477	241,509		1,023,471	1,618,930
West Virginia.....	1900	38	1,212,971	31	82,830	924	211,782	97,913	584,417	987,622
	1890	33	408,881	37	13,282	291	66,098	27,708	225,961	395,700
	1880	67	328,170			365	51,361		290,343	413,586
North Carolina.....	1900	225	84,458,422	759	652,124	32,367	5,492,194	1,099,890	18,290,225	29,909,558
	1890	124	11,195,122	260	186,825	9,016	1,560,904	442,056	6,553,635	10,053,264
	1880	98	3,058,900			3,528	462,854		1,719,352	2,857,642
South Carolina.....	1900	88	39,767,684	448	564,863	30,686	5,162,931	1,556,500	17,602,500	30,274,086
	1890	25	11,144,233	121	186,080	8,072	1,610,609	528,236	6,320,132	9,801,956
	1880	25	2,784,000			2,066	382,017		1,827,755	2,919,844
Georgia.....	1900	98	25,606,170	397	491,604	20,117	3,872,313	1,145,149	12,207,425	20,266,712
	1890	72	18,171,990	244	216,276	10,866	2,274,945	751,515	8,088,042	12,450,998
	1880	74	6,543,390			6,529	1,166,654		4,203,557	6,749,784
Kentucky.....	1900	46	3,951,418	56	84,323	2,385	515,780	175,392	2,030,684	3,907,279
	1890	49	4,142,815	109	111,694	2,767	692,400	246,643	2,300,959	3,785,436
	1880	103	1,255,760			1,181	231,755		1,107,623	1,689,694
Tennessee.....	1900	72	6,384,194	123	137,337	4,251	790,031	239,289	2,266,543	3,907,279
	1890	69	4,322,386	121	99,485	3,051	635,610	230,116	2,525,198	3,724,138
	1880	122	1,564,264			1,446	228,134		976,816	1,495,441
Alabama.....	1900	45	11,944,308	172	211,251	8,592	1,526,759	530,323	4,973,680	8,414,020
	1890	22	2,965,713	55	47,318	2,510	467,818	158,734	1,673,933	2,393,646
	1880	30	1,275,400			1,508	243,085		833,072	1,291,764

¹ Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See detailed summary for each industry.)

² Not reported separately.

³ Includes 2,115 officers and clerks whose salaries were not reported.

⁴ Not reported.

⁵ Includes the reports from 1 establishment in Florida not reported separately.

TABLE 11.—COMPARATIVE SUMMARY, NOT INCLUDING FLAX, HEMP, AND JUTE, BY STATES ARRANGED GEOGRAPHICALLY: 1880 TO 1900—Continued.

STATES.	Year.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products.
				Number.	Salaries.	Average number.	Total wages.			
Southern states—Continued.										
Mississippi	1900	11	\$2,638,499	55	\$72,418	2,010	\$400,188	135,684	\$884,160	\$1,670,153
	1890	16	8,607,198	43	38,264	2,223	558,987	75,676	1,380,009	2,257,583
	1880	16	1,458,640			940	186,314		648,795	978,698
Arkansas	1900	15	293,353	11	7,428	198	36,290	4,985	111,498	199,471
	1890	8	164,236	12	5,250	103	15,856	8,775	46,557	71,913
	1880	27	160,550			154	20,565		119,277	177,430
Louisiana	1900	8	1,741,688	18	25,941	1,835	282,536	79,837	584,324	1,162,752
	1890	6	1,516,660	16	22,574	1,237	267,468	15,650	737,212	1,126,751
	1880	2	195,000			108	12,572		72,470	86,770
Texas	1900	8	2,514,097	31	47,151	1,125	295,889	181,056	761,888	1,403,330
	1890	5	895,034	20	24,155	644	190,999	28,561	424,218	700,018
	1880	3	147,500			107	28,166		59,262	102,100
Western states										
	1900	376	31,168,217	1,171	1,415,848	22,634	6,264,820	2,071,250	16,193,282	29,450,573
	1890	504	28,581,689	1,070	977,140	21,831	5,397,594	1,811,829	15,674,282	27,029,868
	1880	651	15,263,576			14,284	3,171,147		11,375,888	18,305,722
Ohio	1900	67	4,019,267	158	165,297	2,834	796,276	364,752	2,690,483	4,828,889
	1890	125	4,820,526	210	189,614	3,700	940,304	314,894	3,233,787	5,437,483
	1880	163	2,323,340			2,839	511,923		1,780,999	3,032,669
Michigan	1900	51	3,652,060	243	225,338	3,563	878,902	340,247	2,850,219	4,878,984
	1890	44	1,691,461	84	64,898	1,551	366,098	119,060	1,110,018	1,964,974
	1880	51	726,189			1,397	185,364		624,241	928,766
Indiana	1900	35	6,553,302	197	316,512	4,672	1,398,935	323,925	2,949,048	5,561,460
	1890	61	5,481,065	151	139,884	4,283	1,010,179	379,881	3,208,276	5,214,211
	1880	95	3,413,105			2,784	662,310		2,537,954	4,074,576
Wisconsin	1900	66	5,440,759	197	244,319	4,135	998,616	365,213	2,516,810	4,667,294
	1890	60	4,608,613	137	145,450	3,747	807,483	279,828	2,399,217	4,100,201
	1880	53	1,559,964			1,146	285,566		1,090,474	1,827,275
Illinois	1900	37	4,345,686	148	211,505	3,361	961,332	294,943	2,205,394	4,087,369
	1890	75	4,119,495	201	202,330	3,871	1,113,005	234,455	2,429,564	4,603,115
	1880	85	1,825,203			2,337	555,209		1,937,336	2,980,116
Minnesota	1900	27	1,246,829	41	50,107	593	168,251	67,648	493,667	905,904
	1890	25	815,144	36	35,421	439	135,282	70,917	338,300	730,453
	1880	15	203,500			263	55,327		190,867	303,378
Iowa	1900	14	620,164	38	29,321	366	82,825	24,722	213,769	385,055
	1890	20	896,741	45	35,470	494	146,170	53,069	629,832	869,918
	1880	37	555,700			505	118,252		437,301	682,812
Missouri	1900	29	702,309	25	28,628	441	112,521	27,472	325,785	568,028
	1890	45	896,020	71	41,052	733	163,215	38,608	452,068	793,736
	1880	109	1,665,550			1,350	235,107		1,105,497	1,563,641
Kansas	1900									
	1890									
	1880	6	141,425			126	26,075		107,401	212,035
Utah	1900	13	509,881	27	15,310	291	92,514	22,333	143,157	292,200
	1890	14	612,579	20	16,575	324	104,601	29,301	189,339	332,094
	1880	12	402,000			306	70,208		150,693	237,361
Oregon	1900	12	1,178,370	30	33,420	675	209,421	74,863	467,295	901,512
	1890	6	1,350,585	44	32,775	358	142,588	86,906	327,502	614,932
	1880	10	566,800			216	86,088		227,486	549,030
California	1900	14	1,819,481	40	51,568	922	340,420	100,821	886,260	1,463,936
	1890	20	3,235,263	61	68,366	1,733	448,224	199,373	1,238,067	2,080,215
	1880	14	1,840,800			986	375,718		1,078,534	1,794,033
All other Western states ²	1900	11	1,080,099	29	44,023	781	284,807	64,311	470,485	907,942
	1890	9	109,197	10	5,305	88	19,895	6,037	58,812	130,531
	1880	1	40,000			29	4,000		52,000	70,000

¹Included in "all other Western states."²Includes establishments distributed as follows: 1900—Colorado, 2; Idaho, 2; Kansas, 2; Montana, 1; Nebraska, 2; North Dakota, 1; Wyoming, 1. 1890—Colorado, 2; Idaho, 1; Kansas, 2; Nebraska, 1; South Dakota, 2; Washington, 1. 1880—Washington, 1.

A comparison of the facts relating to the textile industry by geographical divisions and states illustrates a condition that has existed from the beginning and which is undergoing a slow but steady change, namely, that the establishments engaged in this manufacture are concentrated most densely in the Northeastern part of the country, but that the Southern states are rapidly advancing in the number and importance of their establishments. The capital in the year 1900 reported by the New England states is slightly more than one-half

of the whole country; in 1890 it was 57.6 per cent, and in 1880 it was 63.4 per cent. A somewhat similar condition is shown in the number of wage-earners, the amount paid for wages, the cost of materials, and the value of products. The percentages differ from those given for capital, but in general the importance of New England, as shown by these items, is nearly or quite that of all the rest of the country, but is less than it was in 1890, and still less than the condition in 1880.

Among the New England states Massachusetts is, as

it has always been, conspicuously in the lead. Practically one-half of the capital, the employees, the wages paid, materials used, and products are to be credited to that state. Rhode Island is second among the New England states, and Connecticut is third, this order having been observed without variation ever since the textile manufacture existed in the United States.

Taking capital as the standard, the Middle states represent 30.7 per cent of the total for the country, Pennsylvania being first, New York second, and New Jersey third.

The sudden springing of the Southern states into prominence in this industry is shown strikingly by the total increase of capital from \$20,413,414 in 1880 to \$62,623,729 in 1890, and to \$137,172,561 in 1900.

Ten years ago, and also in 1880, Georgia was easily the leader among the Southern states, but it has now been surpassed by both South Carolina and North Carolina, in each of which states the value of products was not much less than in the states of Maine and New Hampshire, where the industry has been established for half a century; and in the number of hands employed both North and South Carolina surpass both of these two New England states. The growth in Alabama has been also very great, the amount of capital having almost exactly quadrupled in ten years.

The situation in the Western states is not different from that which has previously existed. The textile industry has never obtained a strong foothold in these states, and shows no great tendency to become important.

CENSUS BULLETIN.

No. 203.

WASHINGTON, D. C.

June 24, 1902.

AGRICULTURE.

MONTANA.

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 for the state of Montana, 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 Montana, June 1, 1900, numbered 13,370, and were valued at \$62,026,090. Of this amount, \$9,365,530, or 15.1 per cent, represents the value of buildings, and \$52,660,560, or 84.9 per cent, the value of land and improvements other than buildings. On the same date the value of farm implements and machinery was \$3,671,900, and of live stock, \$52,161,833. These values, added to that of farms, give \$117,859,823, 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 \$28,616,957, of which amount \$17,924,442, or 62.6 per cent, represents the value of animal products, and \$10,692,515, or 37.4 per cent, the value of crops, including forest products cut or produced on farms. The "total value of farm products" for 1899

was nearly five times as great as that for 1889, but a part of this gain is doubtless due to a more detailed enumeration in 1900 than in 1890. The most important item enumerated in 1900, but not in 1890, is the value of animals sold and animals slaughtered on farms, which for 1899 amounted to \$10,083,646, or nearly half the gain in value of farm products.

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 \$5,074,730, leaving \$23,542,227 as the gross farm income. The ratio which this amount bears to the "total value of farm property" is referred to in this bulletin as the "percentage of gross income upon investment." For Montana in 1899 it was 20.0 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.

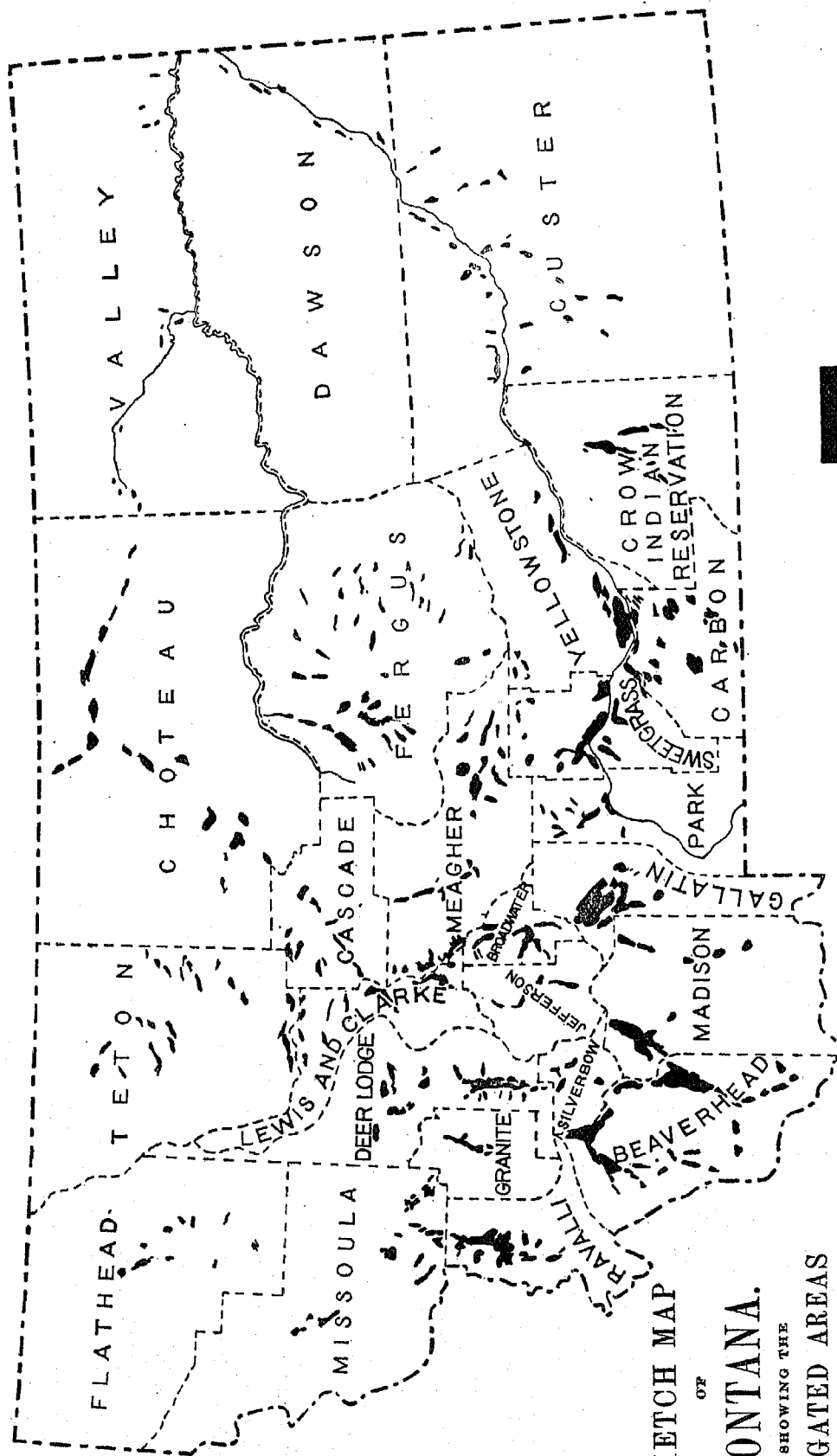
Special reports as to the dimensions and cost of the leading irrigation ditches and canals, the area of land under them, methods for the artificial application of water to the growing crops, and other facts relating to irrigation, were obtained by correspondence with farmers, engineers, and others. This 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 statistics presented in this bulletin will be treated in greater detail in the report on agriculture in the United States. The present publication is designed to present a summarized advance statement for Montana.

Very respectfully,

L. G. Powers.

Chief Statistician for Agriculture.



SKETCH MAP
OF
MONTANA.
SHOWING THE
IRRIGATED AREAS
ACCORDING TO THE CENSUS OF

1900.



Total Irrigated Area

951,154 Acres.

AGRICULTURE IN MONTANA.

GENERAL STATISTICS.

The total land area of Montana is 145,310 square miles, or 92,998,400 acres, of which 11,844,454 acres, or 12.7 per cent, are included in farms.

The state may be described as consisting of two divisions, eastern and western Montana, with the Rocky Mountains as the dividing line, the main range extending through the state in the form of a bow, with the arch toward the east.

Eastern Montana, which constitutes more than three-fifths of the total area of the state, is an extension of the "Great Plains," its surface being for the most part undulating, and broken at intervals by long, narrow valleys formed by the erosion of the rivers. The mean elevation of this part of the state above sea level is about 2,000 feet. In the extreme east lies a region known as the "Bad Lands," which is not only dry and unproductive, but practically nonirrigable, owing to the conformation of its surface. In the southwest are the valleys of the Gallatin, Jefferson, and Madison rivers, which contain large tracts of arable land, with a very productive soil.

The western part of the state is more rugged; the slope from the divide is abrupt, and the valleys, though numerous, are not extensive. Some very fertile lands are found in this region.

The agricultural lands are of three general classes—the bottom lands, lying near the streams, and possessing, as a rule, a rich, black, alluvial soil; the bench lands, whose soil is a sandy loam, capable of a wide range of cultivation; and the high bluff lands, which are suitable only for grazing purposes.

NUMBER AND SIZE OF FARMS.

The following table 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	13,370	11,844,454	1,736,701	10,107,753	385.9	14.7
1890	5,803	1,964,197	315,517	1,648,680	350.6	46.6
1880	1,519	405,683	262,611	143,072	267.1	64.7
1870	851	139,537	84,674	54,863	164.0	60.7

The number of farms in 1900 was almost sixteen times as great as in 1870, and more than twice as great as in 1890, while the total acreage in farms is almost eighty-five times that reported in 1870, and six times that in 1890. The average size of farms, therefore, increased rapidly during each decade. There was a slight gain in the per-

centage of farm land improved between 1870 and 1880, but for the next two decades large decreases are shown. The increases in average area, and the decreases in percentage of farm land improved, are due, largely, to the addition to the farm area of large tracts of grazing land, formerly a part of the public domain.

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	\$117,859,823	\$62,026,090	\$3,671,900	\$52,161,833	\$23,616,957
1890	48,489,037	25,512,340	1,356,010	21,620,687	5,273,415
1880	8,787,243	3,234,504	401,185	25,151,554	2,024,823
1870	2,693,324	729,193	145,438	21,818,693	1,676,660

¹ For year preceding that designated.

² Exclusive of the value of live stock 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.

In the last ten years the total value of farm property has increased \$69,370,786, or 143.1 per cent; that of farms, including improvements and buildings, \$36,513,750, or 143.1 per cent; that of implements and machinery, \$2,315,890, or 170.8 per cent; and that of live stock, \$30,541,146, or 141.3 per cent. The value of farm products for 1899 exceeds that reported for 1889 by \$22,343,542, or 356.2 per cent. A part of the large gain in the value of farm products shown for the last decade is due to the fact that the enumeration of 1900 was more detailed and complete than that made by any previous census. Among the items enumerated in 1900, but not in 1890, is the value of animals sold and animals slaughtered on farms, which in 1899 amounted to \$10,083,646, nearly half the gain shown in the table for the last decade.

In 1880 and in 1890 domestic animals on ranges were not enumerated, hence the values shown in the table are deficient for both these years. The value of animals on ranges in 1890 has been estimated at \$10,951,425, which would make the value of all live stock on farms and ranges \$32,572,112. Assuming this value to be comparable with that reported in 1900, there has been an increase in the last decade of 60.1 per cent.

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 build-ings.	Total.	Improved.	Land and improve-ments (ex-cept build-ings).	Buildings.	Imple-ments and machinery.	Live stock.		Labor.	Fertili-zers.
The State	13,370	12,878	11,841,454	1,736,701	\$52,660,560	\$9,365,580	\$3,671,900	\$52,161,838	\$23,542,227	\$5,077,340	\$3,940
Beaverhead	518	462	385,635	168,451	2,884,060	842,390	153,130	2,072,228	1,095,278	281,450	130
Broadwater	222	216	106,799	49,484	955,900	179,180	66,810	929,440	489,971	89,950	10
Carbon	871	851	151,983	77,165	1,528,240	896,020	188,860	1,545,622	844,542	111,380	30
Cascade	1,144	1,118	769,743	118,911	3,738,200	723,230	306,020	3,021,148	1,577,663	339,200	100
Choteau	762	725	546,236	90,242	2,347,680	574,380	224,440	5,977,041	1,828,068	543,780	25
Custer	804	706	642,563	90,359	1,915,430	428,780	170,610	7,137,325	2,454,061	387,850	300
Dawson	259	238	56,402	19,645	124,340	119,430	56,960	2,647,016	408,512	124,460	---
Deer Lodge	564	556	359,513	92,489	2,532,220	487,220	155,720	1,519,157	1,007,270	205,720	590
Fergus	732	718	704,860	121,389	3,227,100	584,630	237,930	4,464,657	1,891,934	534,890	50
Flathead	767	756	160,546	64,109	1,768,410	408,270	157,050	499,954	830,357	78,600	50
Gallatin	950	934	368,706	172,287	4,609,400	707,310	295,590	1,054,990	1,399,404	174,240	580
Granite	205	198	65,761	26,272	617,980	167,540	57,010	430,429	301,998	54,260	150
Jefferson	235	234	71,385	28,176	724,310	187,950	45,090	487,162	221,192	36,280	---
Lewis and Clarke	531	521	443,125	69,682	2,407,740	411,740	184,930	1,658,958	838,489	193,620	630
Madison	674	652	817,216	111,836	2,521,360	667,990	170,830	2,285,125	1,000,589	203,490	200
Meagher	198	189	599,204	52,419	1,666,620	272,180	75,190	2,265,271	946,541	223,320	---
Missoula	615	610	148,600	47,982	1,673,630	390,840	122,780	646,778	549,095	95,570	250
Park	532	521	258,810	44,566	1,410,760	276,640	112,650	1,109,548	699,442	106,620	100
Ravalli	891	880	177,652	81,012	2,888,510	711,630	178,130	1,466,608	900,386	287,780	---
Silverbow	215	215	47,814	13,383	434,560	163,670	39,490	316,890	316,198	73,550	20
Sweet Grass	402	383	380,188	39,495	1,398,720	327,040	100,460	1,922,485	795,848	236,960	550
Teton	317	325	274,074	49,768	1,336,340	260,130	99,350	3,035,450	928,111	270,480	75
Valley	226	198	66,326	21,278	244,230	197,970	22,990	1,944,605	402,058	109,720	50
Yellowstone	383	356	1,184,916	58,024	2,258,300	353,810	116,900	2,642,538	1,441,520	286,020	---
Blackfeet ¹	36	36	5,000	5,000	11,300	13,700	30,000	169,908	26,247	---	---
Crow ¹	1	1	3,500,000	10,981	6,975,000	25,000	300,000	334,400	141,025	---	---
Flathead ¹	150	146	27,960	13,420	250,470	72,060	26,950	492,425	179,030	23,280	---
Fort Peck ¹	119	117	9,698	7,433	92,410	33,420	23,240	83,276	11,372	690	---
Northern Cheyenne ¹	17	16	10,720	2,443	107,340	31,880	2,790	46,489	21,036	3,680	---

¹ Indian reservation.

On account of the many territorial changes in Montana during the last decade, it is impossible to make accurate comparisons of the variations between 1890 and 1900 in many of the counties. Except in one instance there have been no decreases reported in the last ten years in counties not undergoing territorial changes.

The average size of farms in Montana is 885.9 acres. This high average is due partly to the fact that the report includes a large farm acreage from the Crow Indian reservation, which has not yet been allotted and was reported as one farm. The average varies from 174.5 acres in Carbon county to 3,093.8 acres in Yellowstone county.

The average value of farms for the state is \$4,639. In Choteau, Custer, and Yellowstone counties the value of farms is approximately four times as large, and in Dawson and Fergus counties over twice as large, as in 1890. Jefferson, Missoula, and Park counties report decreases in the value of live stock.

The expenditure for labor on each farm in 1899 averaged \$380. It was much greater in the cattle-raising counties, in the eastern half of the state, than in those of the western part. The expenditure for fertilizers in 1899 was less

than in 1889, most counties reporting a very small amount.

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 groups designated as "owners," "part owners," "owners and tenants," and "managers." These terms denote, 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.....	13,370	12,140	624	606	90.8	4.7	4.5
1890.....	5,603	5,333	124	146	95.2	2.2	2.6
1880.....	1,519	1,439	17	63	94.7	1.1	4.2

¹Including "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.....	13,370	10,402	1,190	69	479	624	606
White.....	13,042	10,108	1,185	69	479	588	608
Colored.....	328	294	5			26	3
Chinese.....	26	1				23	2
Indian.....	281	275	5			1	
Negro.....	21	18				2	1

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

The State.....	100.0	77.8	8.9	0.5	3.6	4.7	4.5
White.....	100.0	77.5	9.1	0.5	3.7	4.6	4.6
Colored.....	100.0	89.7	1.5			7.9	0.9

In the last decade the number of farms operated by owners increased 6,807, or 127.6 per cent; the number operated by tenants increased 960, or nearly fourfold. In 1890, 4.8 per cent of farmers were tenants, and in 1900, 9.2 per cent were tenants. The percentages in Table 4 indicate that although the number of tenants is small, the increase in this group has been relatively more rapid than that for owners. Of the total number of farmers, 97.5 per cent are white, and 2.5 per cent, colored. The latter class includes 281 Indians, all but six of whom are owners. The farm land of the Crow Indian reservation was enumerated as one farm, with the agent in charge as manager, though many Indians were engaged in independent agricultural work on the land, and the operations were carried on primarily for their benefit.

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.....	13,370	885.9	11,844,454	100.0	\$117,859,823	100.0
White farmers.....	13,042	904.9	11,801,728	99.6	116,727,511	99.0
Negro farmers.....	21	210.0	4,410		46,672	
Indian farmers.....	281	130.1	36,554	0.4	1,010,158	1.0
Chinese farmers.....	26	67.8	1,762		75,482	
Owners.....	10,402	332.3	3,456,624	29.2	59,109,845	50.2
Part owners.....	1,190	1,784.9	2,124,071	17.9	21,654,416	18.4
Owners and tenants.....	69	731.7	50,489	0.4	675,152	0.6
Managers.....	479	11,171.2	5,351,005	45.2	28,693,380	24.3
Cash tenants.....	624	1,083.8	676,260	5.7	4,259,657	3.6
Share tenants.....	606	306.9	186,005	1.6	3,467,378	2.9

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 im- prove- ments (except build- ings).	Build- ings.	Imple- ments and ma- chinery.	Live stock.		
The State -----	\$3, 939	\$700	\$275	\$3, 901	\$1, 761	20.0
White farmers -----	4, 007	711	275	3, 957	1, 789	20.0
Negro farmers -----	1, 423	263	130	407	492	22.1
Indian farmers -----	1, 126	282	282	1, 024	590	16.4
Chinese farmers -----	2, 209	189	158	348	1, 343	46.3
Owners -----	2, 442	561	214	2, 466	1, 145	20.1
Part owners -----	7, 454	1, 294	442	9, 007	3, 569	19.6
Owners and tenants -----	4, 550	777	311	4, 147	1, 903	19.4
Managers -----	27, 619	2, 420	1, 313	28, 551	11, 926	19.9
Cash tenants -----	4, 176	630	211	1, 809	1, 304	19.1
Share tenants -----	3, 693	636	230	1, 163	1, 209	21.1

Of the total number of farms in Montana, 281 were operated by Indians, 26 by Chinese, and 21 by negroes. Collectively they controlled 0.4 per cent of the total farm acreage, and 1.0 per cent of the total value of farm property.

The average values of all forms of farm property are less for colored than for white farmers. The higher per cent of gross income for negro farmers does not indicate superior management, but is due to the very low average

values of their farms and the more intensive cultivation prevalent on smaller farms. The farms of the Indians are generally live-stock farms with little income, while those of the Chinese are small but intensively cultivated market gardens, located near cities or towns and yielding a high rate of gross income. Farms operated by managers have the highest average values of all forms of farm property, but the ratio which the gross income bears to the total value of the farm property does not vary widely from the state average.

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	18,370	885.9	11,844,454	100.0	\$117,859,823	100.0
Under 3 acres	417	1.0	421	(1)	3,894,291	3.3
3 to 9 acres	118	8.5	1,007	(1)	201,334	0.2
10 to 19 acres	118	18.8	2,216	(1)	177,028	0.2
20 to 49 acres	399	40.7	16,251	0.1	988,045	0.8
50 to 99 acres	563	77.2	43,476	0.4	1,923,697	1.6
100 to 174 acres	5,613	157.1	882,023	7.5	17,995,989	15.3
175 to 259 acres	878	219.6	192,813	1.6	5,165,584	4.4
260 to 499 acres	2,713	354.9	964,642	8.1	17,855,371	15.1
500 to 999 acres	1,257	716.1	900,121	7.6	14,514,488	12.3
1,000 acres and over	1,289	6,859.2	8,841,484	74.7	55,148,996	46.8

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--					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 -----	\$3,939	\$700	\$275	\$3,901	\$1,761	20.0
Under 3 acres -----	47	244	74	8,974	3,767	40.2
3 to 9 acres -----	859	484	85	278	394	23.1
10 to 19 acres -----	574	394	81	451	347	23.1
20 to 49 acres -----	976	371	111	1,018	618	24.7
50 to 99 acres -----	1,424	500	185	1,808	1,157	33.9
100 to 174 acres -----	1,894	377	159	1,276	641	20.0
175 to 259 acres -----	2,681	623	232	2,347	1,624	27.6
260 to 499 acres -----	3,226	673	270	2,400	1,256	19.1
500 to 999 acres -----	5,610	1,045	368	4,524	2,064	17.9
1,000 acres and over.-----	19,614	2,267	914	19,985	7,724	18.1

The group of farms comprising from 100 to 174 acres each includes the largest number of farms, showing the

frequency of quarter-section holdings, but the group containing 1,000 acres and over constitutes a far larger portion of the total acreage and value than any other.

With few exceptions, the average values of the several forms of farm property increase with the size of the farms. The high average value of live stock, and the large gross income for farms under 3 acres, are due to the fact that most of this group are live-stock farms, whose operators use public land for range purposes, and a few are market gardens and dairy farms. The incomes from these industries depend less upon the acreage of owned or rented land used, than upon the capital invested in buildings, implements, and live stock, and the expenditures for labor and fertilizers.

The average gross incomes per acre for the various groups classified by area are as follows: Farms under 3 acres, \$3,721.38; 3 to 9 acres, \$46.23; 10 to 19 acres, \$18.44; 20 to 49 acres, \$15.04; 50 to 99 acres, \$14.99; 100 to 174 acres, \$4.08; 175 to 259 acres, \$7.39; 260 to 499 acres, \$3.54; 500 to 999 acres, \$2.88; and 1,000 acres and over, \$1.13.

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 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 which yielded 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	18,370	885.9	11,844,454	100.0	\$117,859,823	100.0
Hay and grain	3,848	404.1	1,554,918	13.1	24,029,946	20.4
Vegetables	609	187.6	114,272	1.0	1,770,893	1.5
Fruits	79	270.3	21,352	0.2	418,095	0.3
Live stock	6,048	1,578.0	9,543,538	80.6	82,708,374	70.2
Dairy produce	1,153	242.6	279,759	2.3	4,416,310	3.7
Flowers and plants	11	1.0	(1)	(1)	61,375	0.1
Nursery products	5	150.8	754	(1)	60,605	0.1
Miscellaneous	1,617	204.0	329,850	2.8	4,399,225	3.7

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 build-ings).	Build-ings.	Imple-ments and ma-chinery.	Live stock.		
The State -----	\$3,939	\$700	\$275	\$3,901	\$1,761	20.0
Hay and grain -----	4,240	716	285	1,004	1,075	17.2
Vegetables -----	1,819	429	150	510	636	21.9
Fruits -----	3,669	822	178	560	827	15.8
Live stock -----	4,979	825	333	7,588	2,857	20.9
Dairy produce -----	1,842	557	200	1,281	790	20.6
Flowers and plants -----	3,809	2,182	64	25	2,744	49.2
Nursery products -----	9,000	2,620	113	488	3,977	32.8
Miscellaneous -----	1,625	378	139	579	444	16.3

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, \$2,743.82; nursery products, \$26.37; vegetables, \$3.39; dairy produce, \$3.25; fruits, \$3.06; hay and grain, \$2.66; miscellaneous, \$2.18; and live stock, \$1.81.

The variations shown in the averages and percentages of gross income are due, largely, to the fact that in computing gross incomes no deductions are made for expenditures. The average expenditure for such items as labor and fertilizers upon fruit and vegetable farms, 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 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 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 -----	13,370	885.9	11,844,454	100.0	\$117,859,823	100.0
\$0 -----	927	221.8	205,652	1.7	3,029,690	2.6
\$1 to \$49 -----	370	224.1	82,950	0.7	763,100	0.6
\$50 to \$99 -----	508	192.3	97,678	0.8	1,059,780	0.9
\$100 to \$249 -----	1,533	230.5	354,832	3.1	4,152,300	3.5
\$250 to \$499 -----	2,038	222.2	453,895	3.9	6,137,490	5.2
\$500 to \$999 -----	2,862	280.9	803,963	6.8	12,202,840	10.4
\$1,000 to \$2,499 -----	3,005	522.2	1,569,081	13.3	24,992,970	21.2
\$2,500 and over -----	2,027	4,073.2	8,256,423	69.7	65,471,653	55.6

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 invest- ment in farm property.
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	
	Land and im- prove- ments (except build- ings).	Build- ings.	Imple- ments and ma- chinery.	Live stock.		
The State -----	\$3,939	\$700	\$275	\$3,901	\$1,761	20.0
\$0 -----	942	209	80	2,037	48	2.3
\$1 to \$49 -----	1,034	210	94	724	58	2.8
\$50 to \$99 -----	1,018	235	166	667	119	6.1
\$100 to \$249 -----	1,402	313	119	789	160	11.7
\$250 to \$499 -----	1,522	395	145	901	590	13.8
\$500 to \$999 -----	2,283	498	202	1,281	1,515	18.2
\$1,000 to \$2,499 -----	4,445	897	333	2,642	8,031	24.9
\$2,500 and over -----	12,629	1,743	695	17,233		

Of the 927 farms reporting no income in 1899, 516 were farms of from 100 to 175 acres each, and 87.3 per cent of them were operated by owners. This would indicate that they were homesteads taken up too late for cultivation in 1899.

There were farms, also, from which no reports of the products of 1899 could be secured, as the persons in charge, June 1, 1900, did not operate the farms during the preceding year. To this extent the reports fall short of giving a complete statement of farm products 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 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 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.—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 OR RANGES.

LIVE STOCK.	Age in years.	ON FARMS AND RANGES.			NOT ON FARMS OR RANGES.
		Num-ber.	Value.	Average value.	Num-ber.
Calves.....	Under 1.....	187,533	\$2,229,419	\$11.89	1,301
Steers.....	1 and under 2.....	113,179	2,396,473	21.17	341
Steers.....	2 and under 3.....	113,368	3,875,211	29.81	207
Steers.....	3 and over.....	85,303	3,411,680	39.99	256
Bulls.....	1 and over.....	14,556	785,577	53.97	34
Helfers.....	1 and under 2.....	97,899	2,002,199	20.45	354
Cows kept for milk.....	2 and over.....	45,036	1,836,580	41.89	3,281
Cows and helfers not kept for milk.....	2 and over.....	311,513	9,270,977	29.76	680
Colts.....	Under 1.....	89,838	864,743	9.16	575
Horses.....	1 and under 2.....	44,850	839,334	18.71	650
Horses.....	2 and over.....	245,284	6,584,595	26.84	16,050
Mule colts.....	Under 1.....	576	12,506	21.36	34
Mules.....	1 and under 2.....	404	12,021	29.75	6
Mules.....	2 and over.....	1,749	77,914	44.55	321
Asses and burros.....	All ages.....	128	16,008	125.00	17
Lambs.....	Under 1.....	1,955,269	8,806,529	1.85	26
Sheep (ewes).....	1 and over.....	2,995,795	10,105,384	3.37	14
Sheep (rams and wethers).....	1 and over.....	1,219,419	4,259,491	3.49	57
Swine.....	All ages.....	49,496	281,402	5.69	933
Goats.....	All ages.....	1,713	7,870	4.59	10
Fowls: ¹					
Chickens ²		531,774			
Turkeys.....		12,637			
Geese.....		2,623	296,806		
Ducks.....		9,639			
Bees (swarms of).....		1,801	8,139	4.52	
Unclassified.....			132,775		
Value of all live stock.....			52,161,833		

¹ The number reported is of fowls over 3 months old. The value is for all, old and young.

² Including Guinea fowls.

The total value of all live stock on farms and ranges, June 1, 1900, was \$52,161,833, of which 45.0 per cent represents the value of neat cattle, exclusive of dairy cows; 34.8 per cent, that of sheep; 14.9 per cent, that of horses; 3.6 per cent, that of dairy cows; 0.6 per cent, that of poultry; and 1.1 per cent, the value of all other live stock.

The average value of horses is low, because the Indian ponies on four reservations are included in the report. These ponies number thousands and are valued at from \$3 to \$10 per head. The unusually high average value of calves is due in part to the great demand for beef cattle, which resulted in a thinning of the herds in the period just preceding the enumeration.

No reports were secured of the value of live stock not on farms or ranges, but it is probable such animals have higher average values than farm or range animals. Allowing the same averages, however, the total value of the domestic animals not on farms is \$677,287, or 1.3 per cent of the total value of farm live stock. Exclusive of poultry and bees not on farms, the total value of live stock in the state is approximately \$52,839,120.

CHANGES IN LIVE STOCK KEPT ON FARMS AND RANGES.

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 AND RANGES: 1870 TO 1900.

YEAR.	Dairy cows.	Other neat cattle.	Horses.	Mules and asses.	Sheep. ¹	Swine.
1900.....	45,036	923,351	329,972	2,857	4,215,214	49,496
1890 ²	24,143	667,755	142,959	959	1,859,016	17,132
1880.....	11,808	161,079	35,114	858	184,277	10,278
1870.....	12,452	24,306	5,289	475	2,021	2,599

¹ Not including lambs.

² Exclusive of live stock on ranges.

The live-stock enumeration in 1880 and 1890 did not include domestic animals on ranges, hence, the figures presented in the table for those years are not strictly comparable with the figures for 1900. The numbers of animals on ranges in 1890 were estimated by special agents to be as follows: All neat cattle, 750,619; horses, 32,939; mules and asses, 145; sheep, 493,870; swine, 19. In the following comparisons between the number of animals reported in 1900 and the number reported in 1890, these estimates are disregarded.

The number of dairy cows reported, June 1, 1900, was nearly four times as great as the number reported in 1870; the increase between 1890 and 1900 was 86.5 per cent. The number of other neat cattle in 1900 includes 187,533 calves, and, as it is uncertain whether any calves were reported under this head in 1890, the increase shown for "other neat cattle" in the last decade is probably somewhat less than the figures indicate.

The number of horses reported in 1900 was sixty-five times as great as in 1870, and more than twice as great as in 1890. Sheep received little attention before 1870, but between 1880 and 1890 the number increased ninefold, and in the next decade it more than doubled. In 1900 nearly three times as many mules and asses were reported as in 1890. The number of swine increased rapidly in each decade, nearly three times as many being reported in 1900 as in 1890.

Notwithstanding the fact that in 1900 the enumerators were instructed to report no fowls under three months old, and that no such limitation was made in previous census reports, the census of 1900 shows more than twice as many chickens, turkeys, and ducks, and more than three times as many geese, as were reported in 1890.

ANIMAL PRODUCTS.

Table 16 is a summarized exhibit 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 AND RANGES IN 1899.

PRODUCTS.	Unit of measure.	Quantity.	Value.
Wool.....	Pounds.....	30,437,829	\$5,136,658
Mohair and goat hair.....	Pounds.....	2,750	824
Milk.....	Gallons.....	115,696,214	\$1,669,978
Butter.....	Pounds.....	2,454,072	
Cheese.....	Pounds.....	30,924	
Eggs.....	Dozens.....	8,002,890	631,143
Poultry.....	Pounds.....		398,487
Honey.....	Pounds.....	19,940	3,706
Wax.....	Pounds.....	130	
Animals sold.....			9,176,890
Animals slaughtered.....			906,816
Total.....			17,924,442

¹ Includes all milk produced, whether sold, consumed, or made into butter or cheese.

² Includes the value of butter and cheese, and of all milk sold or consumed.

The value of animal products reported in 1899 was \$17,924,442. Of this value, 51.2 per cent represents the value of animals sold; 5.0 per cent, that of animals slaughtered; 28.7 per cent, that of wool, mohair, and goat hair; 9.3 per cent, that of dairy products; and 5.8 per cent, that of poultry, eggs, honey, and wax.

DAIRY PRODUCE.

The production of milk in 1899 was twice as great as in 1889. The production of butter on farms more than doubled, and that of cheese nearly trebled, in the decade.

Of the \$1,669,978 given in Table 16 as the value of all dairy products in 1899, \$727,803, or 43.6 per cent, represents the value of such products consumed on farms, and \$942,175, or 56.4 per cent, the amount realized from sales. Of the latter amount, \$611,496 was derived from the sale of 3,162,568 gallons of milk; \$291,907, from 1,204,339 pounds of butter; \$35,335, from 32,863 gallons of cream; and \$3,437, from 21,532 pounds of cheese.

ANIMALS SOLD AND ANIMALS SLAUGHTERED.

The value of animals sold and animals slaughtered on farms was \$10,083,646, or 42.8 per cent of the gross farm income. Of all farms reporting domestic animals, 6,689 farms, or 51.9 per cent, report sales of live animals, the average receipts per farm being \$1,371.93; and 5,616 farms, or 43.6 per cent of the total number, report animals slaughtered, the average value per farm being \$161.47. In obtaining these reports, the enumerators were instructed to secure from each farm operator a statement of the receipts from sales of live animals in 1899, less the amount paid for animals purchased during the year.

POULTRY AND EGGS.

The total value of the products of the poultry industry in 1899 was \$1,029,630, of which amount 38.7 per cent represents the value of fowls raised and 61.3 per cent, that of eggs produced. Nearly four times as many eggs were produced in 1899 as in 1889.

WOOL.

The production of wool has increased very rapidly since 1870. The clip of 1899 was 30,437,829 pounds, or about three times as great as in 1889.

BEEES AND HONEY.

The quantity of honey reported in 1890 was but 20 pounds, with no wax; while in 1899, 19,940 pounds of honey and 130 pounds of wax were produced.

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.....	12,464	329,972	26.5	9,523	45,036	4.7
White farmers.....	12,166	321,549	26.4	9,418	44,591	4.7
Colored farmers.....	298	8,423	28.3	105	445	4.1
Owners ¹	11,004	237,141	21.6	8,314	38,143	4.6
Managers.....	418	71,281	172.6	315	2,700	8.6
Cash tenants.....	477	14,631	30.7	441	2,591	5.9
Share tenants.....	570	6,919	12.1	456	1,582	3.5
Under 20 acres.....	526	18,823	35.8	302	1,614	5.3
20 to 99 acres.....	865	8,483	9.8	643	2,669	4.2
100 to 174 acres.....	5,152	76,429	14.8	3,718	14,563	3.9
175 to 299 acres.....	840	12,437	14.8	673	3,134	4.7
300 acres and over.....	5,078	213,795	42.1	4,190	23,056	5.5
Hay and grain.....	3,488	44,925	12.9	2,617	9,189	3.5
Vegetable.....	546	4,151	7.6	334	912	2.7
Fruit.....	67	392	5.9	52	128	2.5
Live stock.....	5,826	257,190	44.1	4,385	20,327	4.6
Dairy produce.....	1,104	11,512	10.4	1,153	11,293	9.8
Miscellaneous ²	1,433	11,802	8.2	985	3,187	3.2

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 of 1899.

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

CROPS.	Acres.	Unit of measure.	Quantity.	Value.
Corn.....	3,301	Bushels.....	75,838	\$41,626
Wheat.....	92,132	Bushels.....	1,899,683	1,077,210
Oats.....	133,938	Bushels.....	4,746,231	1,790,588
Barley.....	22,848	Bushels.....	844,140	841,808
Rye.....	2,003	Bushels.....	33,120	16,546
Buckwheat.....	9	Bushels.....	168	98
Flax seed.....	16	Bushels.....	220	268
Clover seed.....		Bushels.....	374	1,968
Grass seed.....		Bushels.....	852	1,719
Hay and forage.....	875,712	Tons.....	1,059,361	5,974,850
Tobacco.....	1	Pounds.....	200	60
Dry beans.....	101	Bushels.....	1,110	2,221
Dry peas.....	1,512	Bushels.....	32,265	88,273
Potatoes.....	9,618	Bushels.....	1,332,062	661,163
Onions.....	151	Bushels.....	29,113	22,612
Miscellaneous vegetables.....	4,121			356,180
Sorghum sirup.....	12	Gallons.....	100	70
Small fruits.....	554			79,891
Orchard fruits.....	25,571			359,414
Grapes.....	² 10	Centals.....	13	178
Forest products.....	17			176,134
Flowers and plants.....	62			33,630
Nursery products.....				17,825
Miscellaneous.....				83,348
Total.....	1,151,674			10,692,515

¹ Sorghum cane.

² Estimated from number of vines or trees.

³ Including value of elder, vinegar, etc.

⁴ Including value of wine, raisins, etc.

⁵ This value was derived from products for which no acreage was reported.

Of the total value of crops in 1899, hay and forage, with 76.0 per cent of the total acreage, contributed 55.9 per cent, while cereals, with but 22.1 per cent of the total acreage, furnished 30.6 per cent of the value. The percentages of the total value contributed by the remaining crops are as follows: Vegetables, including potatoes and onions, 9.7 per cent; fruits and forest products, 2.9 per cent; and all other products, 0.9 per cent.

The average values per acre for the various crops were as follows: Flowers and plants, \$1,978.24; nursery products, \$287.50; onions, \$149.75; small fruits, \$144.21; miscellaneous vegetables, \$86.43; potatoes, \$68.78; cereals, \$12.85; and hay and forage, \$6.82. The crops yielding the highest returns per acre were grown upon very highly improved land. Their production required a relatively great amount of labor, and large expenditures for fertilizers.

CEREALS.

Table 19 is an exhibit of the changes in cereal production since 1869.

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

PART 1.—ACREAGE.

YEAR. ¹	Barley.	Buck-wheat.	Corn.	Oats.	Rye.	Wheat.
1869.....	22,848	9	3,301	183,938	2,003	92,182
1889.....	4,652	13	1,019	52,768	14	18,696
1879.....	1,323	34	197	24,691	15	17,666

¹No statistics of acreage were secured prior to 1879.

PART 2.—BUSHELS PRODUCED.

YEAR.	Barley.	Buck-wheat.	Corn.	Oats.	Rye.	Wheat.
1869.....	844,140	168	75,838	4,746,231	33,120	1,899,683
1889.....	160,902	128	14,225	1,536,615	188	457,607
1879.....	39,970	437	5,049	900,815	430	469,688
1869.....	26,756	988	820	149,567	1,141	181,184

The development of agriculture in the western and southern parts of Montana during the past thirty years has resulted in a marked increase in the production of cereals. Since 1879 the total area devoted to cereals has increased from 43,925 acres to 254,231 acres. The total production increased from 418,756 bushels in 1869 to 7,599,180 bushels in 1899.

The largest acreages reported in 1900 were those of oats and wheat, each being more than five times as great in 1899 as in 1879. The acreages in barley and corn increased steadily, and, in 1899, were approximately seventeen times as great as in 1879. The area devoted to rye was nearly one hundred and thirty-four times as large as in 1879, but that under buckwheat decreased 73.5 per cent in the twenty years.

Oats, wheat, barley, and rye were reported in large quantities in the western and southern parts of the state, but the acreage under corn was greatest in the eastern counties. The few counties reporting buckwheat are in the southern part of the state.

HAY AND FORAGE.

In 1900, 10,656 farmers, or 79.7 per cent of the total

number, reported hay and forage crops. Exclusive of cornstalks and corn strippings, an average yield of 1.2 tons per acre was obtained. The acreage in hay and forage in 1899 was 191.9 per cent greater than ten years before.

In 1899 the acreages and yields of the various kinds of hay and forage were as follows: Wild, salt, or prairie grasses, 567,587 acres and 545,841 tons; millet and Hungarian grasses, 3,690 acres and 4,705 tons; alfalfa or lucern, 68,959 acres and 186,498 tons; clover, 12,498 acres and 22,630 tons; other tame and cultivated grasses, 180,178 acres and 237,950 tons; grains cut green for hay, 40,374 acres and 57,837 tons; forage crops, 2,426 acres and 3,807 tons; and cornstalks, 90 acres and 93 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 20.—ORCHARD TREES AND FRUITS: 1890 AND 1900.

FRUITS.	NUMBER OF TREES.		BUSHELS OF FRUIT.	
	1900.	1890.	1899.	1889.
Apples.....	530,976	10,960	43,939	5,896
Apricots.....	193		1	
Cherries.....	20,161	806	807	9
Peaches.....	1,670		17	
Pears.....	8,422	370	24	2
Plums and prunes.....	18,449	699	373	36

Orchard fruits were reported in 1900 by 597 farmers, or 4.5 per cent of the total number. Nearly eighty per cent of the farms reporting orchard fruits were in the four western counties of Flathead, Missoula, Ravalli, and Madison. The value of orchard products was not reported by the census of 1890, but in 1879 the value of such products was \$1,530. For 1899 the corresponding value was \$59,414, a gain in twenty years of \$57,884.

Apple trees constituted 91.6 per cent of the fruit trees shown in Table 20, and yielded 97.3 per cent of the fruit reported. The number of trees in 1900 was fifty times as great as in 1890. Cherries stand second to apples in importance, and plums and prunes third. Cherries, plums, and prunes, together constitute only 6.7 per cent of the total number of orchard trees in the state, and yielded but 2.6 per cent of the total crop in 1899, but show large gains since 1890.

The growing of peach and apricot trees is of comparatively recent origin in the state, having sprung up within the last decade. In 1890 Missoula was the only county that reported pears, while in 1900, 8,422 pear trees were reported from eleven counties.

In addition to the trees given in Table 20, there were 807 unclassified fruit trees, with a yield of 31 bushels of fruit. The value of orchard products given in Table 18 includes the value of 68 barrels of cider and 52 barrels of vinegar.

VEGETABLES.

The total area devoted to vegetables in 1899, including potatoes and onions, was 13,885 acres. Of this area, 69.2 per cent was devoted to the cultivation of potatoes, which were grown by almost one-half the farmers in the state, the average area per farm being 1.5 acres, and the average yield per acre, 138.6 bushels. In the decade from 1890 to 1900 the area devoted to potatoes increased from 4,204 to 9,613 acres, or 128.7 per cent.

The vegetables grown on 1,258 acres were reported in detail, but for 2,863 acres no detailed reports were received. The acreages of vegetables specifically reported were as follows: Cabbages, 418 acres; turnips, 198; carrots, 196; sweet corn, 142; pease, 103; and other vegetables, 201. As a rule vegetables were grown for home use only, but in the vicinity of the larger cities there are a few market gardens, some of them conducted by Chinese.

SMALL FRUITS.

The total area used in cultivation of small fruits in 1899 was 554 acres, distributed among 1,374 farms. Of this area, 281 acres, or 50.7 per cent, were devoted to strawberries, the total production of which was 532,260 quarts. They were grown principally in Ravalli and Missoula counties. The acreages and production of other berries were as follows: Currants, 120 acres and 252,860 quarts; raspberries and Logan berries, 80 acres and 110,795 quarts; gooseberries, 51 acres and 115,390 quarts; blackberries and dewberries, 18 acres and 17,970 quarts; and other berries, 4 acres and 4,610 quarts.

The value of the small fruits grown was \$79,891, an average of \$58.14 per farm. Of the total value, 62.0 per cent was contributed by Flathead, Ravalli, and Missoula counties.

FLORICULTURE.

The area devoted to the cultivation of flowers and ornamental plants in 1899 was 17 acres, and the value of the products sold therefrom, \$33,630. These flowers and plants were grown by 19 farmers and florists, of whom 11 made commercial floriculture their principal business. These 11 proprietors reported a glass surface of 107,100 square feet. They had invested in land, buildings, imple-

ments, and live stock, \$61,375, of which \$24,000 represents the value of buildings. Their sales of flowers and plants amounted to \$30,132, and of other products, \$50. They expended \$8,770 for labor and \$222 for fertilizers. The average gross income per farm was \$2,744.

In addition to the 11 principal florists' establishments, 50 farms and market gardens made use of glass in the propagation of flowers, plants, or vegetables. They had an area under glass of 36,155 square feet, making, with the 80,325 square feet belonging to the florists' establishments, a total of 116,480 square feet.

NURSERIES.

The total value of nursery products sold in 1899 was \$17,825, reported by the operators of 13 farms and nurseries. Of this number, 5 derived their principal income from the nursery business. They had 754 acres of land, valued at \$45,000, and buildings, implements, and live stock, valued at \$15,605. The value of their products not fed to live stock in 1899 was \$19,885, of which \$16,710 represents the value of nursery stock, and \$3,175 that of other products. The expenditure for labor was \$1,450, and for fertilizers, \$60. The average income for each farm reporting (including value of products fed to live stock) was \$3,998.

LABOR AND FERTILIZERS.

The total expenditure for labor on farms in 1899, including the value of board furnished, was \$5,077,340, an average of \$380 per farm. The average expenditure was \$797 for florists' establishments, \$634 for live-stock farms, \$290 for nurseries, \$228 for hay and grain farms, \$151 for dairy farms, \$120 for fruit farms, and \$108 for vegetable farms. "Managers" expended for labor an average of \$2,886 per farm; "cash tenants," \$253; "owners," \$215; and "share tenants," \$170. White farmers expended \$386 per farm, and colored farmers, \$122.

Fertilizers purchased in 1899 amounted to \$3,940, a decrease since 1890 of \$817. The average expenditure was \$20 for florists' establishments, \$12 for nurseries, \$2 for fruit farms, and \$1 for vegetable farms. The average for all farms was only about 30 cents.

INDIAN RESERVATIONS.

Montana, once the famous hunting ground and battlefield of many Indian tribes, is now the quiet home of many of these same tribes, which are slowly adopting the customs and occupations of the white man. Here are found the Piegan, Crow, Flathead, Sioux, Assiniboin, Grosventre, Northern Cheyenne, and a few small bands of other tribes. They are collected on six reservations, namely, Blackfeet, Crow, Flathead, Fort Belknap, Fort Peck, and Northern Cheyenne.

Their principal occupations are agriculture and stock raising; the latter industry is receiving the greater attention at present, as all the reservations have ample ranges, fairly well watered. But little of their land is cultivable

without irrigation, and, as the Crows alone have an adequate system, farming operations are limited, and progress in that industry is necessarily very slow.

BLACKFEET RESERVATION.

Blackfeet reservation, the most northern of all reservations, is located in the northwestern part of Montana and contains an area of 2,750 square miles. The Indians here are the Piegan; with a few Blood and Blackfeet, all of Algonquin stock, numbering 2,256. The land consists principally of foothills, valleys, and rolling prairies, naturally adapted to grazing. The seasons have proven too short, in this high altitude, for successful agriculture,

although there are a few sheltered spots where, in favorable seasons, vegetables and some cereals mature with irrigation.

Irrigation on this reservation has been neither systematic nor scientific; in some localities the Indians have done considerable ditch work, with the assistance of an engineer to run the lines, one ditch constructed in 1898 having a length of 7 miles. Many of the ditches are out of repair, while others are entirely worthless. The necessity for scientific irrigation grows more apparent each year.

Farming operations consist principally in cutting wild hay for stock-feeding purposes. The crop in 1899 was 5,000 tons, being short on account of heavy and continued rains during the harvesting season, which spoiled large quantities of new-mown hay. On the school farms and some protected tracts they have succeeded in raising vegetables, and wheat and oats, in favorable years.

The first issue of live stock made to the Blackfeet was in 1890, when they received 850 head; since that time several issues have been made them, and they are beginning to realize a profit from their herds. The stock is issued to the Indians individually, and they are required to care for it, each Indian having his particular brand; in this way better results are obtained than when cattle are owned by the tribe, and herded together. They met with severe losses during the blizzards of 1898, when 40 per cent of their stock perished from a lack of hay and shelter. Better facilities have since been provided, and cattle and ponies are fed at least during a portion of the winter. The Indians sell annually a large amount of beef to the Government. The reports show a large amount of stock owned by white men who have married Indian women, only 15 out of the 36 stockmen reporting being Indians. Dairy cows are owned by 8 Indians; a few, also, have chickens and swine.

CROW RESERVATION.

The Crow reservation, comprising, in 1900, an area of 5,475 square miles, is situated in the extreme southern part of Montana. The climate of this region is subject to long, dry spells, and irrigation is a necessity in order to carry on agriculture successfully. The valleys of the Big Horn and Little Big Horn contain immense areas of rich, agricultural land, upon which an unlimited supply of water is easily conveyed. The range also is of exceptional quality, bench lands affording excellent grazing facilities.

As a tribe the Crows are peaceable, and readily comply with instructions; agriculture, stock raising, work on irrigation ditches, and freighting government supplies, now constitute their general occupations. Agriculture is the principal pursuit, and in it they are making steady progress.

A most important step in the direction of civilization, and industrial improvement, is the irrigation system. This system ranks among the finest in the United States, and is one of the largest and most expensive. The total

length of the main ditches is 78 miles, covering approximately 70,000 acres of land.

The Big Horn Canal, now nearing completion, is the most extensive. Taken from the Big Horn River as it leaves a canyon in the mountains, it has a length of 32 miles, a width of 30 feet on the bottom, and covers approximately 47,000 acres. The headgate is a permanent structure of solid masonry, comparing favorably with any of its kind; the flow through the weir is controlled by five regulating gates of cast iron, which are raised by screws and hand wheels with ball-bearing attachments. Frequent landslides, and an excessive inflow into the excavation, have made the work on this structure very difficult and expensive. The Fort Smith cut on this canal was also an expensive piece of excavation, extending for three-fourths of a mile and containing 200,000 cubic yards of material, mostly loose rock, cemented gravel, and a strata of shale and solid rock.

Four ditches have been taken from the Little Big Horn River—the first, or Agency ditch, 10 miles in length, covers 5,000 acres; the second, also 10 miles in length, covers 5,000 acres; the third, 8 miles in length, covers 5,000 acres; and the fourth, 6 miles in length, covers 3,000 acres. A ditch has also been constructed on Pryor Creek, which waters about 5,000 acres.

All the ditch work of the system is of a substantial and permanent character. The expense has been borne by the Indians themselves, and is being paid from their annuity funds, and money received through grazing leases. The policy of the Government in employing Indian labor has been of great benefit and advantage to them; besides providing employment, it has taught them habits of industry, and has given them a knowledge of irrigation which they could have acquired in no other way.

The Crows raise wheat, oats, vegetables, and also cut large quantities of wild hay. The results of agricultural operations in 1899 amounted to 70,000 bushels of wheat, 10,000 bushels of oats, 5,145 bushels of vegetables, and 4,000 tons of hay. Farming is carried on by individual allottees, and also on the communal system under the management of Government farmers; the greater interest taken in individual farms, and the better results obtained, make that system preferable, and it will be adopted exclusively when allotments are completed. The communal system takes away all sense of responsibility and individual interest, which are essential elements of success. The abandonment of Fort Custer has cut off a large market for hay and oats, which they formerly supplied. The Indians own a steam-power flouring mill and from their wheat crop produced enough flour during the census year to supply their own needs, and sold 450,000 pounds to the Cheyenne Indians and the Government school and agency.

Stock raising is also an industry of considerable importance among this tribe; they have 3,510 range cattle owned by individuals and in common. Lack of shelter and frequent attacks by wolves during the winter months, have checked

the increase materially. But 10 dairy cows are owned by the Crows. As on many reservations, the Indian pony is a serious problem. There are 35,000 on the range, the larger number of them inbred and worthless. During the census year, 12,000 head were disposed of at prices ranging from \$3 to \$10. The tribe's sales of live stock amounted to \$58,750, and, in addition, the value of meat and other products of animals slaughtered, was \$29,775.

FORT BELKNAP RESERVATION.

Fort Belknap reservation is situated in Choteau county, in the north central part of Montana, and has an area of 840 square miles. This tract is adapted to stock raising, as the range is ample and well watered. Agriculture, in such an arid region, is practically impossible without irrigation, although only a comparatively small area would be cultivable even with a water supply.

Two tribes are represented here, the Grosventre (a division of the Arapahoe) of Algonquin stock, and the Assiniboin, of Siouan stock, with a total population of 1,312. Little or no farming operations were carried on in 1899, owing to a late, cold spring, which made it impossible to get seed into the ground in time for crops to mature. In favorable seasons, oats, wheat, and vegetables are grown, the patches of grain averaging in size from 5 to 10 acres. Some attempts have been made at irrigation, but so far results have been meager and unsatisfactory. Two small systems now in course of construction will water 8,000 acres, which will at least assure a hay crop sufficient to feed stock through the winter months. The Indians are fairly well supplied with farming implements and machinery.

Live-stock interests are paramount at Fort Belknap also, and every effort is being put forth to induce the Indians to care for their animals. Heretofore their cattle have grazed in common, but this method is being discouraged and small communities are beginning to close herd together in order to prevent losses by straying. They own some good horses in addition to the large herds of useless Indian ponies.

FORT PECK RESERVATION.

Fort Peck reservation, comprising an area of 2,775 square miles, is situated in Valley county in the north-eastern part of Montana, the Missouri River forming its southern boundary. This tract is principally a grazing country, well watered and containing an ample supply of timber. Agriculture is very uncertain without irrigation, owing to the light, dry soil and insufficient rainfall. Some of the bottom lands would produce well with irrigation, but, in spite of an abundant water supply, the difficulty of conducting it upon the land is very great.

This reservation is occupied by the Assiniboin and Brule, Santee, Teton, Hunkpapa, and Yanktonai Sioux, all of Siouan stock, having a total population of 1,946.

Farming operations consist principally in cutting wild hay for winter feeding, but the majority of the 113 Indian

farmers raised small patches of corn and potatoes, and two reported wheat and oats. The number of acres devoted to cereals and vegetables by individual farmers was very small, ranging usually from 1 to 5 and never exceeding 10 acres. There is but one irrigation ditch on the reserve; it is taken out of Poplar River and has a length of 7 miles. In favorable seasons the ditch will cover 200 acres of agricultural land, and considerable hay land, but in dry seasons it contains no water.

These Indians have considerable live stock, consisting of horses and cattle. In former years the Assiniboin raised sheep, but these have been sold and range cattle substituted. They take good care of their animals and the herds are rapidly increasing; many reported small sales of live stock. The horses owned at Fort Peck are a better grade than the average Indian pony. Dairy cows and chickens are found on some farms.

FLATHEAD RESERVATION.

Flathead reservation, embracing an area of 2,240 square miles, lies in Flathead and Missoula counties, in the western part of Montana. The reservation is divided into four mountain valleys, in which the land is well adapted to both agriculture and stock raising. The soil is a sandy loam and somewhat gravelly, but fertile, and with irrigation, produces fine crops of grain, fruit, and vegetables. Approximately 500,000 acres are cultivable, of which three-fourths will require irrigation. The mountain streams furnish a never-failing water supply, easily diverted. The ranges are in fair condition, although somewhat overtaxed. Camas Prairie, 8 miles long and 40 miles wide, is a natural meadow. There is also an abundance of timber here for the construction of houses and fences.

Five tribes inhabit this reservation, namely, Flathead, Pend-d'Oreille, Spokane, and Lower Kalispel, all of Salishan stock, and the Kutenai of Kitunahan stock, comprising a total population of 2,142. There are 128 Indian farmers; the area cultivated by individual Indians ranges from 5 to 375 acres, the majority cultivating less than 100 acres.

There is no regular system of irrigation on the reservation. Much of the land now under cultivation lies along the river and creek bottoms, requiring little or no irrigation to grow successful crops, or is land upon which water can be turned with but little labor, where individual ditches have been made. The Government has constructed two ditches, one 5 miles long covering 3,000 acres and the other 2½ miles long, covering 2,000 acres. Systematic irrigation is all important at the present time, and it is expected that the Government will build additional ditches in the near future.

Wheat, oats, and wild hay are the principal crops, some clover, alfalfa, and other tame grasses being cultivated. There is a flour mill on the reserve, and the wheat raised by the Indians furnishes flour enough for home consumption and also for the demand of traders and neighboring ranchmen. Most farms have small gardens in which are found potatoes, cabbages, onions, and sweet corn, and fre-

quently small fruits. Orchards of bearing apple trees are quite common, and a few cherry, plum, and pear trees are also found.

Of equal importance with agriculture are the stock-raising interests which are rapidly increasing. The high prices received during 1898 and 1899 caused unusually large sales, and the number of cattle on the range at present is less than in former years. The majority of Indian farmers reported sales of live stock and animal products, one Indian's sales during 1899 amounting to \$10,100. The larger number of sales were less than \$1,000, but 19 reported sales of \$1,000 or over, and 5, of \$4,000 or over. A large number of farmers own dairy cows and reported milk and butter; chickens and swine are also quite common. A herd of 25 buffaloes and a few sheep and goats constitute further possessions of live stock.

NORTHERN CHEYENNE RESERVATION.

Northern Cheyenne reservation, containing an area of 765 square miles, is located in Rosebud county, in south-eastern Montana. Most of the land is hilly and broken, but well adapted to grazing. Large areas of pine timber form a protection to the stock in stormy weather. Only the bottom lands of the four small creeks running through the reservation are suitable for agriculture. Approximately 20,000 acres would be cultivable with sufficient irrigation, but the water supply is very limited.

The Northern Cheyenne, of Algonquin stock, inhabit

this reservation, and number in all 1,454. Together with the Piegan they are the most western tribe of this stock in the United States.

At the time the census was taken, nearly all the available agricultural land was in the hands of a few white settlers who had taken up claims before the Cheyenne selected this tract as their home. Consequently, the Indians have had little opportunity to advance along agricultural lines. However, seed has been furnished every year, and many have planted small patches of corn and potatoes, but the drought often destroyed their crops before they matured. Great difficulty has been experienced in inducing some of the Indians to properly care for their gardens, as they plant the seed and simply await results without giving it further attention. Their crops in 1899 were a failure, with the exception of wild hay. The white farmers on the reservation have constructed a number of small irrigation ditches, which will water approximately 900 acres. With this irrigated land now in possession of the Indians, they should begin to make material progress in agriculture. The principal crops of the white men were wheat, oats, and wild hay; they also raised a small amount of barley, corn, and alfalfa.

The live stock of the Indians consists of Indian ponies and a few American horses. When they come to realize the relative value of range cattle and ponies, and substitute the former for the latter, they will have taken a step towards self-support.

IRRIGATION STATISTICS.

The necessity for irrigation in Montana is not so imperative as in states farther south. The table-lands, and cultivable areas of the state generally, are of low elevation, as the slope of the Great Plains which constitute a large part of the state, is toward the north. By reason of its diversified physical character, comprising lofty and detached mountain ranges, broad valleys, and vast table-lands, the western end of the state receives a larger precipitation than the eastern plains. The sketch map represents by areas in solid black the main regions in which irrigation has been successfully applied to any considerable extent.

The period between 1870 and 1900 has witnessed a remarkable change in agricultural values. The census of 1870 reported live stock on farms in Montana valued at \$1,818,693, and farm lands, including buildings and implements, valued at \$729,193, or about 40 per cent of the value of live stock. In that year no report was secured of the value of live stock on the range or public

domain. If account were taken of this fact, it would be seen that in 1870 the value of live stock in Montana was at least three times that of all farm land and buildings. In the thirty years succeeding, the live-stock interests gained enormously, and in 1900 had a value nearly forty times that in 1870, but the number and value of farms have increased so much more rapidly that in 1900 they were worth \$62,026,090, while the live stock had a value of \$52,161,833, or 15.9 per cent less. In 1870 farming was but an incident to live-stock raising, while in 1900 the conditions were reversed and the keeping of animals was less important than other agricultural operations. This tremendous increase in agriculture is largely due to the successful application of irrigation in the cultivation of hay and forage, cereals, fruits, and vegetables.

Table A shows by counties the changes between 1889 and 1899 in the number of irrigators and the acreage irrigated.

TABLE A.—NUMBER OF IRRIGATORS AND ACRES IRRIGATED IN 1889 AND 1899, WITH PERCENTAGES OF INCREASE.

COUNTIES.	NUMBER OF IRRIGATORS.			ACRES IRRIGATED.		
	1899.	1889.	Per cent of increase.	1899.	1889.	Per cent of increase.
The State ¹	8,043	3,706	117.0	951,154	350,582	171.3
Beaverhead.....	457	294	55.4	138,022	42,606	223.9
Broadwater ²	190			30,144		
Carbon ³	716			51,287		
Cascade ⁴	218	78	6198.6	27,593	4,411	525.5
Choteau ⁵	397	39	1,866.7	49,086	2,884	2,718.8
Teton ¹	175			30,784		
Custer.....	233	60	288.3	18,659	4,302	333.7
Dawson ⁸	20	12	433.3	999	194	5,506.7
Valley ⁹	50			9,878		
Deerlodge ¹⁰	495	470	5.3	78,118	50,948	53.3
Fergus.....	452	251	80.1	71,152	30,401	134.0
Flathead ¹¹	116			6,074		
Missoula ¹²	364	504	154.8	15,500	22,404	296.5
Ravalli ¹³	804			67,249		
Gallatin.....	659	434	51.8	60,267	40,901	28.5
Granite ¹⁴	168			18,518		
Jefferson ¹⁵	206	184	613.0	16,149	15,105	6.9
Lewis and Clarke ¹⁶	370	231	60.6	30,668	15,441	98.6
Madison.....	593	345	71.9	74,980	36,819	103.6
Meagher ¹⁷	173	260	61838.5	43,213	39,324	9.9
Park ¹⁹	415	330	625.8	29,917	19,735	51.6
Silverbow.....	161	75	114.7	10,049	5,968	68.4
Sweet Grass ²⁰	326			37,494		
Yellowstone ²¹	285	144	97.9	35,364	13,189	168.1

¹ Exclusive of Indian reservations.

² Organized from parts of Jefferson and Meagher counties in 1897.

³ Organized from parts of Park and Yellowstone counties in 1895.

⁴ Part of Meagher county annexed since 1890.

⁵ Comparison with figures of 1889 insufficient, as important changes in county lines have been made.

⁶ Part taken to form Teton county in 1893.

⁷ Organized from part of Choteau county in 1893.

⁸ Part taken to form Valley county in 1893.

⁹ Organized from part of Dawson county in 1893.

¹⁰ Part taken to form Granite county in 1893, and part annexed to Flathead, and Lewis and Clarke counties since 1890.

¹¹ Organized from part of Missoula in 1893; part of Deerlodge county subsequently annexed.

¹² Parts taken to form Flathead and Ravalli counties in 1893.

¹³ Organized from part of Missoula county in 1893.

¹⁴ Organized from part of Deerlodge county in 1893.

¹⁵ Part taken to form Broadwater county in 1897.

¹⁶ Parts of Deerlodge and Meagher counties annexed since 1890.

¹⁷ Parts taken to form part of Sweet Grass county in 1895, and part of Broadwater county in 1897; parts annexed to Cascade, and to Lewis and Clarke counties since 1890.

¹⁸ Decrease.

¹⁹ Parts taken to form parts of Carbon and Sweet Grass counties since 1890.

²⁰ Organized from parts of Meagher, Park, and Yellowstone counties in 1895.

²¹ Parts taken to form parts of Carbon and Sweet Grass counties since 1890.

A glance at Table 1 and Table A discloses the intimate relation between the growth of irrigation and the general development of agriculture. The number of farms outside of Indian reservations increased in ten years 132.9 per cent, the number of irrigators, 117.0 per cent, and the irrigated area, 171.3 per cent.

Table B gives certain statistics of irrigation in 1900 by counties, exclusive of Indian reservations.

TABLE B.—NUMBER OF IRRIGATED FARMS COMPARED WITH TOTAL NUMBER OF FARMS, AND IRRIGATED ACREAGE COMPARED WITH TOTAL IMPROVED ACREAGE, JUNE 1, 1900, WITH PERCENTAGES.

COUNTIES.	NUMBER OF FARMS.			NUMBER OF ACRES IN FARMS.		
	Total.	Irrigated.	Per cent irrigated.	Improved.	Irrigated.	Per cent improved land irrigated.
The State ¹	18,047	8,043	61.6	1,697,424	951,154	56.0
Beaverhead.....	518	457	88.2	168,451	138,022	81.9
Broadwater.....	222	190	85.6	49,484	30,144	60.9
Carbon.....	871	716	82.2	77,165	51,287	66.5
Cascade.....	1,144	218	19.1	118,911	27,593	23.2
Choteau.....	762	397	52.1	90,242	49,086	54.4
Custer.....	804	233	29.0	90,359	18,659	20.6
Dawson.....	259	20	7.7	19,645	999	5.1
Deerlodge.....	564	495	87.8	92,499	78,118	84.5
Fergus.....	732	452	61.7	121,389	71,152	58.6
Flathead.....	767	116	15.1	64,109	6,074	9.5
Gallatin.....	950	659	69.4	172,287	60,267	35.0
Granite.....	205	168	82.0	26,272	18,518	70.5
Jefferson.....	235	206	87.7	23,176	16,149	69.7
Lewis and Clarke.....	581	370	63.7	68,682	30,668	44.2
Madison.....	674	593	88.0	111,836	74,980	67.0
Meagher.....	198	173	87.4	52,419	43,213	82.4
Missoula.....	615	364	59.2	47,982	15,500	32.3
Park.....	532	415	78.0	44,566	29,917	67.1
Ravalli.....	891	804	90.2	81,012	67,249	83.0
Silverbow.....	215	161	74.9	13,383	10,049	75.1
Sweet Grass.....	402	326	81.1	39,495	37,494	94.9
Teton.....	347	175	50.4	49,768	30,784	61.9
Valley.....	226	50	22.1	21,278	9,878	46.4
Yellowstone.....	383	285	74.4	58,024	35,364	60.9

¹ Exclusive of Indian reservations.

Of the 18,047 farms in the state, excluding those in the Indian reservations, 8,043 are irrigated, and 5,004 are unirrigated. The acres in the irrigated farms number 5,822,995, in the unirrigated, 2,468,091. The value of all land in the irrigated farms, not including buildings, is \$36,057,373, and of the unirrigated, \$9,156,667. The value of all buildings on irrigated farms is \$6,948,616, and on unirrigated, \$2,241,354. Live stock on the irrigated farms has a value of \$32,884,654, on unirrigated, \$19,777,179. The irrigated farms are 61.6 per cent of the total number, and the corresponding percentage of acreage is 70.2; that of the value of land and improvements, exclusive of buildings, 79.7; buildings, 75.6; implements and machinery, 71.2; live stock, 62.1; and that of the total of all these forms of farm wealth is 67.9.

The average size of all farms, exclusive of the holdings of Indians, is 635 acres. The average size of irrigated farms is 724 acres, and the average amount of irrigated land on each irrigated farm is 118 acres. On the farms

making use of irrigation, the average value of products not fed to live stock is \$5.55 per acre. In the counties, omitting Indian reservations, the average value per acre of land, exclusive of buildings, is, for all farms, \$5.45; for unirrigated farms, \$3.71; and for irrigated farms, \$6.19. The average value of irrigated land per acre is \$19.66; while that of the best irrigated land, suitable for the growing of alfalfa, is from \$25 to \$100; irrigated fruit land is even more valuable.

COST AND EXTENT OF IRRIGATING SYSTEMS.

The following table gives, by counties, the principal statistics relating to the cost and extent of the irrigating systems of the state.

TABLE C.—NUMBER, COST OF CONSTRUCTION, AND LENGTH OF MAIN CANALS AND DITCHES, AND ACREAGE IRRIGATED IN 1899.

COUNTIES.	CANALS AND DITCHES.			NUMBER OF ACRES.		Average area irrigated per mile of ditch.
	Num-ber.	Cost of construction.	Length in miles.	Under ditches.	Irrigated.	
The State ¹	2,902	\$1,683,073	6,812	1,818,600	951,154	140
Beaverhead	403	239,100	600	150,450	138,022	230
Broadwater	108	141,300	235	33,100	30,144	124
Carbon	171	230,000	457	90,000	51,287	112
Cascade	59	179,520	225	228,610	27,593	123
Choteau	105	130,595	276	114,000	49,086	178
Custer	111	259,535	163	37,144	18,659	114
Dawson	7	8,050	6	1,270	999	166
Deerlodge	156	303,000	300	85,000	78,118	260
Fergus	175	159,000	512	100,000	71,152	139
Flathead	33	55,350	65	7,250	6,074	93
Gallatin	114	446,369	453	89,800	60,267	132
Granite	57	109,000	140	30,000	18,513	132
Jefferson	74	64,786	118	32,000	16,149	137
Lewis and Clarke	127	133,500	250	120,000	30,663	123
Madison	200	393,880	630	130,000	74,980	110
Meagher	95	114,800	240	50,000	43,213	180
Missoula	95	87,029	130	21,000	15,500	119
Park	208	188,446	496	49,305	29,917	60
Ravalli	277	574,498	395	106,155	67,249	170
Silverbow	37	43,500	108	12,500	10,049	93
Sweet Grass	174	221,865	349	71,815	37,491	107
Teton	43	153,050	234	166,221	30,784	132
Valley	21	80,000	197	32,000	9,878	50
Yellowstone	51	266,900	178	60,980	35,364	199

¹ Exclusive of Indian reservations.

The total amount invested in ditches in Montana, to June 1, 1900, is approximately \$4,683,073. The total value of irrigation products in 1899 was \$7,230,042. No reports were received concerning the cost of irrigation ditches in the Indian reservations. The number of acres of land irrigated for each mile of ditch reported is 140, as compared with 124 in Arizona. The number of acres under ditch for each mile is 267. In Arizona it is 591. The average cost of construction per mile is \$687.47, and per acre \$4.92, for land actually irrigated in 1899. In Arizona the average cost of constructing the ditches was \$2,954 per mile, and \$24 per acre, for the land actually

irrigated in the above year. This large difference in the cost of construction of irrigation systems is explained by the fact that the majority of the ditches in Montana are of private ownership, and without expensive dams and headgates. Most of the investments in irrigation ditches have been highly profitable, but few disappointments following the efforts of irrigators to reclaim the arid lands.

While it is known that Montana possesses considerable quantities of ground water, or so-called underflow, but few attempts have been made to utilize it for irrigation. The ample supply furnished by the streams and the comparatively inexpensive systems required to divert it upon the land, account for the fact that there were no reports of farms irrigated from wells.

VALUE OF LAND AND COST OF WATER.

The following table shows, by counties, the average values of farm land, with and without irrigation, and the cost of water.

TABLE D.—AVERAGE VALUE PER ACRE OF IRRIGATED AND UNIRRIGATED FARMS, AND OF IRRIGATED LAND, JUNE 1, 1900, WITH AVERAGE COST PER ACRE OF WATER RIGHT AND MAINTENANCE.

COUNTIES.	AVERAGE VALUE PER ACRE, EXCLUSIVE OF BUILDINGS, OF—				AVERAGE COST PER ACRE OF—	
	All farms.	Unirrigated farms.	Irrigated farms.	Irrigated land.	Water right.	Annual maintenance.
The State ¹	\$5.45	\$3.71	\$6.19	\$19.66	\$3.12	\$0.28
Beaverhead	7.48	3.38	7.69	13.24	2.01	0.20
Broadwater	8.94	5.43	9.27	16.74	4.49	0.16
Carbon	10.06	3.20	11.38	19.69	3.61	0.26
Cascade	4.83	4.09	5.87	15.04	1.41	0.31
Choteau	4.30	2.25	5.47	13.88	1.87	0.27
Custer	2.98	2.32	4.35	29.47	9.13	0.79
Dawson	2.20	2.04	3.06	12.19	7.19	0.39
Deerlodge	7.04	4.79	7.19	20.48	3.85	0.23
Fergus	4.58	2.16	4.91	12.70	1.60	0.21
Flathead	11.02	11.58	8.20	32.46	7.70	0.52
Gallatin	12.50	10.74	13.04	31.22	5.88	0.13
Granite	9.40	5.20	9.75	14.99	5.84	0.27
Jefferson	9.74	2.59	10.16	22.31	3.91	0.14
Lewis and Clarke	5.43	5.26	5.48	14.00	1.30	0.20
Madison	7.95	6.18	8.09	17.70	4.48	0.23
Meagher	2.78	1.25	2.32	12.49	2.61	0.14
Missoula	11.26	8.46	12.73	55.91	7.80	0.33
Park	5.45	4.73	5.54	15.73	3.57	0.33
Ravalli	16.26	6.44	17.17	37.46	5.92	0.12
Silverbow	9.09	5.54	9.58	23.77	4.32	0.17
Sweet Grass	3.68	2.32	3.84	21.31	3.32	0.68
Teton	4.88	4.22	5.33	14.82	1.03	0.32
Valley	3.68	3.52	3.91	18.47	2.80	0.15
Yellowstone	1.91	1.37	2.34	32.15	5.52	0.49

¹ Exclusive of Indian reservations.

IRRIGATED CROPS.

The relation of irrigation to the various agricultural operations can be noted in the following table, which shows the total and irrigated acreage and production of crops.

TABLE E.—TOTAL AND IRRIGATED ACREAGE, AND PRODUCTION OF CROPS, IN 1899, WITH PERCENTAGES.

CROPS.	ACRE.			PRODUCTION.			
	Total.	Irrigated.	Per cent irrigated.	Unit of measure.	Total.	Irrigated.	Per cent irrigated.
All crops	1,151,674	755,865	65.6				
Corn	3,801	929	28.1	Bushels	75,833	24,895	32.9
Wheat	92,132	37,710	40.9	Bushels	1,899,683	843,143	44.4
Oats	133,938	90,514	67.6	Bushels	4,746,231	3,367,671	71.0
Barley	22,848	18,666	81.7	Bushels	844,140	726,617	86.1
Rye	2,008	852	42.5	Bushels	33,120	16,210	48.9
Wild, salt, or prairie grasses	567,587	342,793	60.4	Tons	545,841	350,640	64.2
Millet and Hungarian grasses	3,690	3,419	92.7	Tons	4,705	4,396	93.4
Alfalfa or lucern	68,959	66,906	97.0	Tons	186,498	183,606	98.4
Clover	12,498	12,009	96.1	Tons	22,680	22,069	97.5
Other tame and cultivated grasses	180,178	142,635	79.2	Tons	237,950	195,654	82.2
Grains cut green for hay	40,374	21,255	52.6	Tons	57,837	32,885	57.0
Forage crops	2,426	1,783	73.5	Tons	13,900	3,045	78.1
Dry beans	101	65	64.4	Bushels	1,110	717	64.6
Dry peas	1,512	1,053	69.6	Bushels	32,265	21,912	67.9
Potatoes	9,613	6,976	72.6	Bushels	1,332,062	1,022,337	76.7
Onions	151	118	78.1	Bushels	29,113	22,767	78.2
Miscellaneous vegetables	4,121	2,645	64.2				
Small fruits	554	464	83.8				
Orchard fruits	25,571	24,978	89.4	Bushels	45,192	42,796	94.7
Other crops	117	95	81.2				

¹Includes corn strippings.²Estimated from number of trees.

The total number of acres of irrigated crops, as given above, is 755,865, while the total number of acres of land irrigated is 951,154, the difference, 195,289 acres, representing approximately, the area of pasture land irrigated. 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 F shows, by counties, the value of the irrigated crops in 1899.

TABLE F.—VALUE OF CROPS PRODUCED, IN 1899, ON IRRIGATED LAND, BY COUNTIES.

COUNTIES.	All crops.	Hay and forage.	Cereals.	Vegetables.	Orchard fruits.	Small fruits.	Other crops.
The State ¹	\$7,230,042	\$4,336,311	\$1,991,741	\$775,289	\$55,383	\$67,811	\$3,507
Beaverhead	617,067	481,015	119,623	16,425	4		
Broadwater	262,949	142,276	88,582	27,001	3,545	1,495	50
Carbon	475,722	200,386	219,485	51,604	2,744	1,172	331
Cascade	204,003	129,826	23,568	47,077	1,510	1,982	40
Choteau	239,700	193,677	20,494	16,091		238	200
Custer	144,508	127,255	8,291	8,772	76	115	
Dawson	12,137	5,686	3,856	3,043		52	
Deerlodge	602,598	415,420	105,652	78,054	77	3,395	
Fergus	467,097	319,190	120,176	25,995		1,282	474
Flathead	67,156	30,786	11,658	24,267	189	261	
Gallatin	783,149	186,478	558,199	34,645	451	3,314	62
Granite	159,103	111,531	29,116	18,211	13	232	
Jefferson	155,801	122,204	9,310	23,085	134	1,068	
Lewis and Clark	300,084	193,968	38,495	65,158	150	2,313	
Madison	569,561	348,758	132,869	76,602	2,709	8,626	
Meagher	226,268	189,086	22,697	14,208	21	251	
Missoula	216,239	104,001	32,943	43,701	21,706	13,888	
Park	265,011	167,363	68,035	26,437	307	2,609	360
Ravalli	643,056	271,006	231,587	96,042	20,992	23,479	
Silverbow	77,937	62,670	3,334	11,876	1	56	
Sweet Grass	256,276	194,870	43,199	18,110		97	
Teton	100,209	71,204	21,343	7,162			
Valley	36,334	29,839	920	5,575			
Yellowstone	348,082	237,316	69,364	36,148	758	2,006	1,990

¹Exclusive of Indian reservations.

DRAINAGE BASINS.

The main range of the Rocky Mountains crosses the northern boundary of the state about ninety miles east of its northwest corner, and in the form of a bow, with the center of the arch at Butte, extends southeasterly and then

southwesterly to the junction with the Bitter Root range, the latter forming almost the entire boundary between Montana and Idaho. The extremely rugged character of the western portion gave to the state its name—Montana—"mountainous." More than two-thirds of the state is on the eastern slope of the Rockies and consists of high plains, the greater portions of which are comprised in the drainage basins of the Missouri and Yellowstone rivers, and as the Yellowstone is a tributary of the Missouri, the Missouri River basin practically includes two-thirds of the state. This basin has a total area at the head waters of 95,093 square miles, of which 13,315, or 14.0 per cent, are within the Dominion of Canada, leaving 81,778 acres, all of which, with the exception of a few square miles in Yellowstone National Park, are in the state of Montana. In the southwestern part of the state the basin attains its highest elevation, and its slope is gradual toward the north and east.

Three important streams, having their sources in the mountains, unite at different points in the state to form the Missouri River—the Jefferson, Madison, and Gallatin rivers.

The Jefferson River, formed by the union of the Big Hole and Beaverhead rivers, flows in a general north-easterly direction for about sixty miles. This drainage basin comprises a large area of irrigable lands, which, owing to low elevation and favorable position, are very highly cultivable. Many of its smaller branches flow through broad, open, and fertile valleys, excellently adapted to agriculture. The valley of the main stream is from 40 to 50 miles long and several miles wide. The drainage basin of this river includes all of Beaverhead, the southern part of Silverbow, the western part of Madison, and the southern part of Jefferson counties.

The Madison River rises in the National Park, flows westerly and northwesterly for about thirty miles through canyons, and then turns to the north and enters Madison Valley, from is from thirty to thirty-five miles long, by

eight to ten miles wide in the center, gradually narrowing at both ends. The elevation of the valley is about 5,000 feet, and agriculture is practiced therein to a marked degree.

The Gallatin River has its sources in the northwestern portion of the Yellowstone National Park and vicinity, and flows in a general northerly course, through a succession of narrow valleys and canyons, for a distance of about fifty miles from its head waters, and finally enters the Gallatin Valley, one of the finest agricultural areas of Montana, or any of the Western states. Its flow is augmented by that of the East Gallatin, which enters the valley at the lower end, draining the short range of mountains of the same name. The soil is very fertile, the climate temperate, and the farms in the valleys are among the most highly cultivated in the West.

Among the lesser affluents of the Missouri are the Teton, Marias, Judith, Musselshell, Sun, and Milk rivers.

The Yellowstone River rises in the National Park, to which it has given its name, and flows northward through wonderful canyons into the state of Montana, forming two noted cascades on the way. At Livingston it turns abruptly eastward and flows in a general easterly and northeasterly direction, to a junction with the Missouri at Fort Buford in North Dakota, near the eastern boundary of Montana.

The area of the Yellowstone Basin in Montana is approximately 86,312 square miles, and its general outline is

triangular, the main stream flowing near the long side of the northern boundary of the basin. Almost the entire water supply comes from the streams heading in the Absaroka and Big Horn ranges in the southern part of the basin, Wyoming furnishing the greater part of it. These ranges, having an altitude of 10,000 feet or more, are snow clad, and furnish a large and perennial supply of water. The Yellowstone, where it joins the Missouri, carries nearly the same volume as the latter.

The Absaroka, Snowy, Big Horn, and Wind River ranges, in their great extent, elevation, and heavy precipitation, are important features of this basin, when irrigation is considered. The streams which drain their timbered slopes receive a late summer supply in the form of melting snows, which is available when most needed for irrigation.

On the mountain slopes, as a rule, are heavy forests, some of marketable value, and others suitable only for fuel. The timber area is estimated to be 11,320 square miles, and the firewood, 13,580 square miles; the remainder, 44,788 square miles, affords excellent grazing, only a small portion of it being cultivated.

The northeastern portion of the basin is an extension of the Great Plains, in which the streams have cut deep channels. On the eastern edge, the erosion is very marked, and the region is known as the Bad Lands—the country being similar to that in the vicinity of the Black Hills, wholly unfit for anything except grazing, and worth but little for that.

Twelfth Census of the United States.

CENSUS BULLETIN.

No. 206.

WASHINGTON, D. C.

June 24, 1902.

MANUFACTURES.

COTTON GINNING.

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

SIR: I transmit herewith a report on the quantity of cotton ginned in the United States, of the crops of 1899, 1900, and 1901, prepared under my direction by Mr. Daniel C. Roper, of South Carolina, expert special agent.

This report is a condensation of Manufactures Bulletins Nos. 58 and 98 containing reports of the cotton crops of 1899 and 1900, respectively, together with a report of the cotton crop of 1901. The cotton-ginning report of this census is the first of its kind ever issued by a United States census, and is a distinct departure from other census reports in that it presents statistics gathered subsequent to the census year. The statistics of the census year (growth of 1899) were taken upon a special schedule, collected both through the enumerators and by correspondence, while for the two crops subsequent thereto the mails were relied upon exclusively. Whenever there was failure on the part of the ginners to respond to the circulars of the Census Office, the cooperation of the local postmasters was secured, through the courtesy of the Postmaster-General, and in this way the product of every ginney was obtained, or the fact ascertained that it had not been in operation for the crop in question. The Census Office possesses a complete list of the cotton ginneries of the country, with the quantity of cotton ginned by each establishment for

each of the seasons reported, and this list has been kept in perfect condition by the elimination of abandoned establishments and the addition of new ones. The success of the mail inquiry is due mainly to the direct appeal, made to the ginners by the Census Office, for individual cooperation in this work. They have been made to see that their interests will be promoted by an annual official report of the volume of the cotton crop upon the accuracy of which they can depend. From hundreds of them the office has received most flattering testimonials as to the value of its reports, and the great advantages which must accrue from a regular continuance of the collection of these statistics.

There has been a universal demand among the ginners for the collection and publication of these statistics at more frequent intervals during the marketing season. In recognition of this there was incorporated in the Congressional enactment, creating a permanent Census Bureau, a provision for the collection and publication of statistics of the cotton crop at intervals during the ginning season. Every effort will be made on the part of this office to conform to the requirements of Congress, but very much depends upon the assistance furnished from the field.

This report shows the distribution of the cotton crop by states and territories, and by counties. The statistics of the three crops are presented in parallel columns in the several tables, thus enabling the reader to deter-

mine the exact localities where the crop has increased or decreased. The crop of 1899 was reported at 9,645,974 commercial bales, that of 1900 at 10,486,148 bales, and that of 1901 at 9,954,945 bales. The crop of 1901 exceeded that of 1899 by 308,971 commercial bales, while the crop of 1900 exceeded that of the preceding year by 840,174 bales. The most significant feature of the report is found in the remarkable fluctuation in the crop of Texas. In 1899 this state produced 27.6 per cent of the country's crop; in 1900, 34 per cent, being one-fourth of the world's crop for that year; while in 1901 that state grew only 26.1 per cent of this country's production.

The accompanying report concludes with historical and descriptive data regarding the commercial importance of the cotton crop, and maps of the important cotton-growing states upon which the crop grown in 1901 is distributed by counties. It is seen from these maps that, of the 767 counties reporting cotton ginning, 47.5 per cent produced 83.5 per cent of the entire crop.

Very respectfully,



Chief Statistician for Manufactures.

REPORT OF THE QUANTITY OF COTTON GINNED IN THE UNITED STATES.

[Crops of 1899, 1900, and 1901.]

By DANIEL C. ROPER, *Expert Special Agent.*

Table 1 presents a summarized statement of the cotton crops of 1899, 1900, and 1901, as ascertained from the reports of ginner. In this table are shown, by states and territories, the amount of cotton ginned, the per

cent which the state crop forms of the total crop, and the increase or decrease in the crops of 1900 and 1901 as compared with that of 1899.

TABLE 1.—QUANTITY OF COTTON GINNED FROM THE CROPS OF 1899, 1900, AND 1901: COMPARATIVE SUMMARY, BY STATES AND TERRITORIES, WITH PER CENT, WHICH QUANTITY GINNED BY EACH STATE AND TERRITORY, FORMS OF THE TOTAL CROP AND PER CENT OF INCREASE SINCE 1899.

STATES AND TERRITORIES.	CROP OF 1899.					CROP OF 1900.				
	Commercial bales.				Equivalent 500-pound bales.	Commercial bales.				Equivalent 500-pound bales. ¹
	Total.	Square.	Round.	Sea-island.		Total.	Square.	Round.	Sea-island.	
United States.....	9,645,974	9,043,231	505,464	97,279	9,345,391	10,486,148	9,620,762	768,092	88,294	10,123,027
Alabama.....	1,103,690	1,069,644	34,046	.....	1,078,519	1,061,673	995,602	66,076	.....	1,023,802
Arkansas.....	713,453	685,570	83,883	.....	705,583	828,820	773,247	55,573	.....	812,984
Florida.....	56,821	25,683	.....	31,238	49,350	55,696	27,630	.....	28,065	48,616
Georgia.....	1,296,844	1,220,117	18,915	57,812	1,231,060	1,270,597	1,191,125	27,393	52,079	1,203,308
Indian Territory.....	160,224	121,785	38,539	.....	143,603	288,114	197,704	90,410	.....	249,935
Kansas.....	121	121	.....	.....	121	151	.....	.....	.....	151
Kentucky.....	84	84	.....	.....	79	133	.....	.....	.....	133
Louisiana.....	708,508	694,816	13,692	.....	700,352	714,073	696,049	18,024	.....	705,767
Mississippi.....	1,264,048	1,214,699	49,349	.....	1,237,666	1,055,963	1,018,090	37,873	.....	1,046,700
Missouri.....	19,377	19,377	.....	.....	20,275	27,980	25,712	2,268	.....	27,871
North Carolina.....	473,155	472,385	770	.....	440,400	503,341	507,263	2,078	.....	477,269
Oklahoma.....	84,035	53,077	30,958	.....	71,933	116,875	89,782	27,093	.....	100,707
South Carolina.....	876,545	864,714	3,602	8,229	837,105	780,782	770,707	1,866	8,149	743,726
Tennessee.....	215,175	199,926	15,249	.....	211,641	227,601	203,149	24,452	.....	221,619
Texas.....	2,658,555	2,392,094	266,461	.....	2,609,018	3,536,506	3,121,525	414,981	.....	3,438,336
Utah.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31
Virginia.....	9,239	9,239	.....	.....	8,622	11,833	11,833	.....	.....	11,022

STATES AND TERRITORIES.	CROP OF 1901.					INCREASE OVER 1899 CROP.				PER CENT OF TOTAL GINNED. ³		
	Commercial bales.				Equivalent 500-pound bales. ²	1900.		1901.		1899	1900	1901
	Total.	Square.	Round.	Sea-island.		Equivalent 500-pound bales.	Per cent.	Equivalent 500-pound bales.	Per cent.			
United States.....	9,954,945	9,132,215	744,851	77,879	9,509,745	777,636	8.3	164,354	1.8	100.0	100.0	100.0
Alabama.....	1,156,812	1,068,972	87,840	.....	1,101,227	451,717	45.1	22,708	2.1	11.5	10.1	11.6
Arkansas.....	738,080	686,903	51,177	.....	718,315	107,401	15.2	12,735	1.8	7.6	8.0	7.6
Florida.....	57,144	29,379	.....	27,765	49,991	1,743	41.5	632	1.3	0.5	0.5	0.5
Georgia.....	1,406,092	1,300,125	62,470	43,497	1,314,881	427,752	42.3	83,821	6.8	13.2	11.9	13.8
Indian Territory.....	284,170	199,049	85,121	.....	247,073	106,327	74.0	103,465	72.0	1.5	2.5	2.6
Kansas.....	170	170	.....	.....	157	30	24.8	36	29.8	.....	.....	.....
Kentucky.....	140	140	.....	.....	122	54	68.4	93	117.7	.....	.....	.....
Louisiana.....	860,848	807,248	53,600	.....	840,476	5,415	0.8	140,124	20.0	7.5	7.0	8.8
Mississippi.....	1,275,439	1,230,016	45,423	.....	1,254,868	4190,936	413.4	17,197	1.4	13.2	10.3	13.2
Missouri.....	30,837	28,445	2,392	.....	30,890	7,596	37.5	10,615	52.4	0.2	0.3	0.3
North Carolina.....	451,441	448,814	2,627	.....	415,808	36,869	8.4	424,592	45.6	4.7	4.7	4.4
Oklahoma.....	149,064	109,776	39,288	.....	131,413	34,724	48.2	59,430	82.6	0.8	1.0	1.4
South Carolina.....	732,719	722,786	2,316	7,617	692,261	488,379	410.6	414,844	417.3	9.0	7.4	7.3
Tennessee.....	204,538	185,157	19,381	.....	197,133	9,978	4.7	414,508	46.9	2.3	2.2	2.1
Texas.....	2,594,442	2,301,226	293,216	.....	2,502,166	829,838	31.8	4106,852	44.1	27.9	34.0	26.3
Utah.....	.....	.....	.....	.....	.....	81	.....	.....	.....	.....	.....	.....
Virginia.....	14,009	14,009	.....	.....	12,916	2,400	27.8	4,294	49.8	0.1	0.1	0.1

¹ Number of commercial bales does not include 10,000 pounds in Tennessee and 15,560 pounds in Utah not baled.

² Sixteen thousand pounds in Kentucky, 5,000 pounds in North Carolina, 11,050 pounds in Tennessee, and 6,000 pounds in Virginia not baled.

³ Percentages calculated on basis of 500-pound bales.

⁴ Decrease.

⁵ No report of cotton ginned in 1899 and 1901.

As shown by this table, the crop of 1901 exceeded that of 1899 by 308,971 commercial bales, while the crop of 1900 exceeded that of the preceding year by 840,174. Compared with 1899 the crop of 1900 increased by 8.3 per cent, and that of 1901 by 1.8 per cent. East of the Mississippi River production decreased from 5,094,451 bales in 1899 to 4,781,195 in 1900, or 313,256 commercial bales. This was more than offset by the increased production west of the Mississippi, where the yield in commercial bales was 5,341,832 in 1900, against 4,250,940 in 1899, an increase of 1,090,892, or 25.7 per cent.

Texas is the great marvel of the cotton belt. It has shown an ability to increase or decrease its crop by practically a million bales without any grave disturbance of its equilibrium in the commercial community. In 1899 the crop of this state was 2,609,018 bales (500-pound standard); that of 1900 was 3,438,386 bales, an increase of 829,368 bales. This increase is the more noteworthy when the great disaster resulting from the storm of September, 1900, is taken into consideration.

In the 31 counties lying in the wake of this storm, the production fell off from 491,236 bales in 1899 to 273,866 bales in 1900, a loss of 217,370 bales as compared with the crop of 1899. It thus appears that in the remaining counties of Texas, the actual increase was 1,046,738 bales. In 1900 Texas produced 34 per cent, or more than one-third of the entire American cotton crop, and about one-fourth of all the cotton grown in the world. The conditions which affected the crop east and west of the Mississippi River in 1901 were quite the reverse of those in 1900. In 1901 there was excessive rainfall in the territory east of the Mississippi, and insufficient rainfall west of the Mississippi, and to this, for Texas, must be added the destructive effects of the boll weevil in 1901. Texas in 1901 lost 942,064 commercial bales, as compared with its production in 1900.

Table 2 presents, by states and territories, the quantity in pounds of cotton ginned from the crops grown in 1899, 1900, and 1901, and the average weight of square, round, and sea-island bales.

TABLE 2.—TOTAL WEIGHT OF COTTON GINNED FROM CROPS OF 1899, 1900, AND 1901, WITH AVERAGE WEIGHT OF BALES, BY STATES AND TERRITORIES.

STATES AND TERRITORIES.	CROP OF 1899.				CROP OF 1900.				CROP OF 1901.			
	Aggregate gross weight in pounds.	Average gross weight of bale (pounds).			Aggregate gross weight in pounds.	Average gross weight of bale (pounds).			Aggregate gross weight in pounds.	Average gross weight of bale (pounds).		
		Square.	Round.	Sea-island.		Square.	Round.	Sea-island.		Square.	Round.	Sea-island.
United States.....	4,672,695,500	498	259	388	5,061,513,294	501	263	385	4,754,872,521	496	258	384
Alabama.....	589,259,644	495	276	.....	511,900,714	496	278	.....	550,613,616	494	261	.....
Arkansas.....	352,791,736	502	263	.....	406,491,933	506	268	.....	359,158,831	503	264	.....
Florida.....	24,679,337	492	.....	387	24,338,127	491	.....	383	24,995,285	487	.....	385
Georgia.....	615,529,844	482	256	394	601,654,189	482	261	392	657,440,666	481	250	389
Indian Territory.....	71,803,832	508	259	.....	124,967,428	515	257	.....	123,536,505	510	258	.....
Kansas.....	60,500	500	.....	.....	75,500	500	.....	.....	78,500	462	.....	.....
Kentucky.....	39,600	471	.....	.....	66,500	500	.....	.....	86,000	500	.....	.....
Louisiana.....	350,176,196	499	263	.....	352,883,228	500	261	.....	420,238,220	504	255	.....
Mississippi.....	618,883,461	499	258	.....	523,350,037	503	289	.....	627,431,459	500	269	.....
Missouri.....	10,137,502	523	.....	.....	13,935,257	518	270	.....	15,445,118	522	250	.....
North Carolina.....	220,199,727	466	253	.....	238,634,615	469	270	.....	207,908,968	462	255	.....
Oklahoma.....	35,991,448	518	274	.....	53,353,661	513	269	.....	65,706,521	506	258	.....
South Carolina.....	418,552,594	491	257	347	374,362,722	481	250	354	346,130,687	474	249	352
Tennessee.....	105,820,457	510	254	.....	110,809,694	514	264	.....	98,566,265	506	255	.....
Texas.....	1,304,508,782	517	256	.....	1,719,193,091	516	259	.....	1,251,083,134	511	256	.....
Utah.....	15,500	.....	.....	.....	15,500	.....	.....	.....	.....	.....	.....	.....
Virginia.....	4,310,840	467	.....	.....	5,511,040	466	.....	.....	6,467,766	461	.....	.....

In the preparation of the tables of this bulletin, the following method has been employed: The number of pounds of cotton ginned by an establishment is obtained by multiplying the number of bales by the average bale weight reported by that establishment. The average bale weight for the United States, and the state, is then obtained by dividing the total number of pounds by the total number of bales. The average weight of the square bale for the United States, as found by this method, was 498 pounds in 1899, 501 pounds in 1900, and 496 pounds in 1901; that of the sea-island bale for 1899, 1900, and 1901 was, respectively, 388, 385, and 384 pounds; while the average weight of the round bale for the same years was respectively 259, 263, and 258 pounds. The average weight for the entire

country was 485 pounds in 1899, 483 in 1900, and 478 in 1901.

The number of round bales ginned from the crop of 1899 was 505,469, exclusive of sea-island cotton; in 1900 the number was 768,092, and in 1901 it was 744,851. Because of the introduction of round-bale systems in some states and the retention of light square bales in others, the number of commercial bales (bales as reported by ginners) does not credit the several states with their proper quota of the cotton crop. In view of this condition, while the number of commercial bales is given in each instance, the crop of every county, for each state, and for the United States, is given also in equivalent bales of a 500-pound standard. Where bales are mentioned in the comparative statements of this report,

without giving the standard it will be understood that this standard is employed. However, in stating the average number of bales handled per establishment, given in Table 3, the commercial bale is employed as the unit.

Table 3 presents a summarized statement, by states, of the number of ginneries reported for the three crops mentioned and the average number of bales handled per establishment.

TABLE 3.—ACTIVE GINNERIES, AND AVERAGE NUMBER OF BALES GINNED PER ESTABLISHMENT, 1899, 1900, AND 1901, WITH AVERAGE NUMBER OF MONTHS IN OPERATION AND AVERAGE COST PER BALE FOR GINNING AND BALING IN 1899: BY STATES AND TERRITORIES.

STATES AND TERRITORIES.	CROP OF 1899.						CROP OF 1900.		CROP OF 1901.	
	Total number.	Average number of months in operation.	Average cost per bale for ginning and baling.			Average number of bales ginned per establishment.	Total number.	Average number of bales ginned per establishment.	Total number.	Average number of bales ginned per establishment.
			Square.	Round.	Sea-Island.					
United States.....	29,620	3	\$2.03	\$1.15	\$4.90	326	29,214	359	29,254	340
Alabama.....	4,034	3	1.47	0.90	.....	274	4,044	263	4,161	278
Arkansas.....	2,630	3	1.98	1.24	.....	274	2,578	321	2,393	308
Florida.....	236	3	1.62	.....	3.78	241	246	226	272	210
Georgia.....	4,729	4	1.26	0.90	3.59	274	4,670	272	4,793	293
Indian Territory.....	237	4	2.61	1.15	.....	540	301	957	823	880
Kansas.....	2	2	3.00	.....	.....	61	1	151	2	85
Kentucky.....	2	1	2.25	.....	.....	42	2	67	1	140
Louisiana.....	2,148	3	1.75	1.32	.....	330	2,089	342	2,207	390
Mississippi.....	3,976	4	1.73	1.14	.....	318	3,984	268	4,145	308
Missouri.....	56	3	2.66	.....	.....	346	66	424	68	463
North Carolina.....	2,573	3	1.63	0.83	.....	184	2,659	192	2,573	175
Oklahoma.....	133	3	2.09	1.52	.....	632	137	853	155	962
South Carolina.....	3,363	3	1.29	1.00	7.34	260	3,193	245	3,018	243
Tennessee.....	834	3	2.63	1.41	.....	253	826	276	810	253
Texas.....	4,514	4	2.19	1.19	.....	589	4,370	809	4,232	613
Utah.....	.....	.....	.....	.....	.....	.....	1	(¹)	.....	.....
Virginia.....	88	3	2.30	.....	.....	105	97	122	96	146

¹ Cotton not baled.

Table 3 shows the active ginneries in the United States to have been 29,620 in 1899, 29,214 in 1900, and 29,254 in 1901. In excess of the number annually reported as active, there are about 1,000 private plantation establishments which fluctuate between active and idle, as light or heavy production influences their operations. From 5 to 10 per cent of the active number must be revised annually as to ownership or operation. The loss from season to season, by establishments going out of business, is considerable, but is offset by those reported as new or revived for the current crop.

The average number of bales ginned per establishment from the crop of 1899 was 326, in 1900 the average was 359, and in 1901 it was 340 bales. The size of the ginning establishments in Texas and the territories as compared with those of other states is noteworthy. For example, the average capacity of establishments in Texas for the crop of 1899 was 589 bales; in the Indian Territory, 540 bales; and in Oklahoma, 632 bales; while

in North Carolina and Georgia it was 184 and 274 bales, respectively. The scarcity of labor in Texas and the territories has had an important bearing on the introduction into those sections of modern systems of handling seed cotton. With 4,514 active ginneries in 1899, or 15.2 per cent of the number reported for the United States, Texas handled 27.6 per cent of the entire American crop of 1899, expressed in commercial bales, while Georgia, with 4,729, or 16 per cent of the entire number of the United States, handled only 13.4 per cent of the crop. The ginneries east of the Mississippi River handled 54.9 per cent from the crop of 1899, 47.4 per cent from the crop of 1900, and 53.2 per cent from the crop of 1901.

Table 4 presents a comparative summary, by states, of the quantity of sea-island cotton ginned in the United States from the crops grown in 1899, 1900, and 1901, the average gross weight of bale, and the per cent each state ginned of the total.

TABLE 4.—QUANTITY OF SEA-ISLAND COTTON GINNED FROM CROPS OF 1899, 1900, AND 1901, WITH AVERAGE GROSS WEIGHT OF BALES, BY STATES, WITH PERCENTAGE OF TOTAL.

STATES.	CROP OF 1899.			CROP OF 1900.			CROP OF 1901.			PER CENT OF TOTAL.		
	Total gross weight in pounds.	Number of bales.	Average gross weight of bale (pounds).	Total gross weight in pounds.	Number of bales.	Average gross weight of bale (pounds).	Total gross weight in pounds.	Number of bales.	Average gross weight of bale (pounds).	1899	1900	1901
United States.....	37,723,308	97,279	388	34,037,152	88,294	385	29,901,808	77,879	384	100.0	100.0	100.0
Florida.....	12,083,847	31,238	387	10,740,340	28,066	383	10,676,521	27,765	385	32.1	31.8	35.6
Georgia.....	22,776,852	57,812	394	20,411,288	52,079	392	16,541,649	42,497	389	59.4	59.0	54.6
South Carolina.....	2,862,609	8,229	347	2,885,524	8,149	354	2,683,688	7,617	352	8.5	9.2	9.8

The sea-island cotton crop of 1900 is shown to have been 8,985 bales less than that of 1899. This loss was practically confined to Florida and Georgia, where losses of 3,172 and 5,733 bales, respectively, were reported. In 1901 the sea-island cotton crop is shown to have been 19,400 less than that of 1899, the loss for this year being again confined to Florida and Georgia, where losses of 3,473 and 15,315 bales, respectively, were reported.

The question is often asked why more long cotton is not produced in the United States. The answer that the territory adapted to its culture is very limited, and that its yield per acre is less than that of short cotton, is not entirely satisfactory when it is known that the producing capacity of the sea-island belt is not at present greatly taxed, and when the difference in price of long and short cotton is taken into consideration. Probably the most satisfactory explanation of this condition is found in the fact that cotton growers have been reluctant to grow this cotton, for the reason that no gin of the desired capacity has ever been invented which would separate the lint from the seed without injuring the fiber.

The ancient roller gin, which is now employed only for

the treatment of sea-island cotton, has the disadvantage of lack of capacity. The best of these gins yield less than one-tenth of the quantity of cotton turned out by the saw gin. On the other hand, the application of the saw gin to the treatment of sea-island cotton is not satisfactory, as it tends to break and otherwise injure the fiber, a matter of especial importance in the preparation of this staple for market. Much effort has recently been made to invent a gin which will overcome the objections mentioned and combine the advantages of both machines. There exists at this time some promise of thus revolutionizing the roller gin by greatly increasing its capacity without detriment to the product, and at the same time making it equally applicable to the treatment of all cottons. It is conceded that such an improvement would have important economic results in enhancing the value of all cotton treated by such a machine, and in inducing growers to plant sea-island and other superior varieties.

Table 5 shows, by states, the value and quantity of upland and sea-island cottons and of the cottonseed of the crops of 1899 and 1900. The value of the cotton and seed combined gives the total value of the cotton crop, which appears in the first column of the table.

TABLE 5.—QUANTITY AND VALUE OF UPLAND AND SEA-ISLAND COTTON AND SEED, AND TOTAL VALUE OF CROPS GROWN IN 1899 AND IN 1900: BY STATES AND TERRITORIES.

STATES AND TERRITORIES.	Year.	Total value of cotton crop.	COTTON.						COTTONSEED.	
			Total value.	Upland.		Sea-Island.		Quantity (tons).	Value.	
				Quantity (pounds). ¹	Value.	Quantity (pounds). ¹	Value.			
United States.....	1899	\$870,556,253.37	\$324,602,952.37	4,434,504,718	\$319,284,339.70	36,750,518	\$5,318,612.07	4,471,247	\$51,958,301	
	1900	515,828,431.33	438,285,023.33	4,813,317,102	431,694,377.59	33,154,212	6,590,645.74	4,846,463	77,543,408	
Alabama.....	1899	43,173,305.34	37,125,024.34	515,625,338	37,125,024.34			515,625	6,048,281	
	1900	51,705,653.52	43,928,869.52	489,799,242	43,928,869.52			489,799	7,886,784	
Arkansas.....	1899	23,293,258.38	24,307,743.38	337,607,547	24,307,743.38			337,607	3,990,515	
	1900	41,145,587.64	34,916,579.64	389,313,780	34,916,579.64			389,313	6,229,008	
Florida.....	1899	2,910,578.86	2,632,071.86	12,032,664	866,351.81	11,771,467	1,765,720.05	23,804	278,507	
	1900	3,628,983.45	3,254,279.45	12,959,927	1,162,343.45	10,459,680	2,091,936.00	23,419	374,704	
Georgia.....	1899	50,759,634.28	43,738,298.28	565,853,673	40,741,404.46	22,198,732	2,996,828.82	588,052	7,021,341	
	1900	62,749,344.36	53,551,808.36	554,955,972	49,772,613.74	19,890,498	3,779,194.62	574,846	9,197,526	
Indian Territory.....	1899	5,747,054.04	4,968,644.04	69,008,945	4,968,644.04			69,008	778,410	
	1900	12,719,131.37	10,793,595.37	120,346,708	10,793,595.37			120,346	1,925,536	
Kansas.....	1899	4,831.34	4,164.34	57,838	4,164.34			57	667	
	1900	7,625.47	6,473.47	72,178	6,473.47			72	1,152	
Kentucky.....	1899	3,151.14	2,718.14	37,752	2,718.14			37	433	
	1900	6,709.79	5,701.79	63,574	5,701.79			63	1,008	
Louisiana.....	1899	27,889,585.10	24,109,140.10	334,849,168	24,109,140.10			334,849	3,780,445	
	1900	35,671,229.25	30,270,973.25	337,516,078	30,270,973.25			337,516	5,400,256	
Mississippi.....	1899	49,488,025.59	42,621,266.59	591,962,036	42,621,266.59			591,962	6,866,759	
	1900	52,932,354.06	44,918,946.06	500,838,423	44,918,946.06			500,838	8,018,408	
Missouri.....	1899	812,825.98	699,206.98	9,711,208	699,206.98			9,711	113,619	
	1900	1,412,267.14	1,198,475.14	13,362,789	1,198,475.14			13,362	213,792	
North Carolina.....	1899	17,455,761.18	15,105,956.18	209,804,947	15,105,956.18			209,804	2,349,805	
	1900	24,040,577.62	20,401,089.62	227,463,595	20,401,089.62			227,463	3,639,488	
Oklahoma.....	1899	2,826,043.36	2,500,623.36	34,730,880	2,500,623.36			34,730	325,420	
	1900	5,421,467.65	4,600,715.65	51,297,178	4,600,715.65			51,297	820,752	
South Carolina.....	1899	34,691,370.71	29,115,257.71	396,655,471	28,559,193.91	2,780,319	556,063.80	399,435	5,576,113	
	1900	38,232,142.61	32,515,054.61	354,514,726	31,795,539.49	2,804,034	719,515.12	357,318	5,717,038	
Tennessee.....	1899	8,412,204.34	7,299,096.34	101,376,338	7,299,096.34			101,376	1,113,108	
	1900	11,231,098.94	9,530,826.94	106,267,060	9,580,826.94			106,267	1,700,272	
Texas.....	1899	103,789,825.83	90,077,999.83	1,251,063,331	90,077,999.83			1,251,088	13,661,826	
	1900	174,307,699.51	147,919,315.51	1,649,274,598	147,919,315.51			1,649,274	26,388,384	
Utah.....	1899									
	1900	1,635.54	1,395.54	15,500	1,395.54			15	240	
Virginia.....	1899	343,797.90	295,745.90	4,107,582	295,745.90			4,107	48,052	
	1900	554,923.41	470,923.41	5,250,714	470,923.41			5,250	84,000	

¹Exclusive of weight of bagging and ties.

In ascertaining the value of the cotton crops, the quantities of cotton produced, as reported by the ginners, have been multiplied by the average prices per pound, 7.2 cents for upland and 15, 13.5, and 20 cents for sea-island in Florida, Georgia, and South Carolina, respectively, for the crop of 1899,¹ and \$0.0896875² for middling upland and \$0.20, \$0.19, and \$0.2566 for sea island in Florida, Georgia, and South Carolina,³ respectively, for the crop of 1900. It is impossible to show the value of the crop of 1901, as the commercial year for that crop does not end until August 31, 1902.

The quantity of seed produced has been determined by multiplying the number of pounds of lint cotton by 2, it being an authenticated fact that seed cotton on an average "thirds itself" at the gin; that is, one-third of the cotton's weight before it is ginned is lint cotton and the remaining two-thirds seed. The value of the seed has been determined by multiplying the total quantities produced by the average prices at which the portions marketed in the respective states were purchased by the cotton-seed oil mills, as shown in the report on "cottonseed products" (Census Bulletin, No. 129).

¹ "The Cotton Crop of 1899-1900," issued by the United States Department of Agriculture, p. 30.

TABLE 6.—COTTON-PRODUCING STATES, TOTAL NUMBER OF COUNTIES, AND NUMBER REPORTING COTTON GINNING, WITH QUANTITY AND PERCENTAGE OF TOTAL CROP GINNED, BY COUNTIES REPORTING 5,000 BALES AND OVER AND 10,000 BALES AND OVER, RESPECTIVELY, 1901.

STATES AND TERRITORIES.	Total number counties.	COUNTIES REPORTING COTTON GINNING.		COUNTIES REPORTING 5,000 BALES AND OVER.			COUNTIES REPORTING 10,000 BALES AND OVER.		
		Number.	Quantity ginned (bales).	Number.	Quantity ginned (bales).	Per cent of total ginned.	Number.	Quantity ginned (bales).	Per cent of total ginned.
United States	1,408	767	9,954,945	532	9,515,168	95.6	364	8,316,292	83.5
Alabama.....	66	66	1,156,812	62	1,149,836	99.4	51	1,070,881	92.6
Arkansas.....	75	71	788,080	48	676,084	91.6	33	576,495	78.1
Florida.....	45	24	57,144	5	40,816	71.4	1	12,575	22.0
Georgia.....	137	126	1,405,092	102	1,361,524	96.9	59	1,084,694	78.6
Indian Territory.....	9	5	284,170	4	282,570	99.4	4	282,570	99.4
Kansas.....	106	1	170						
Kentucky.....	119	2	1140						
Louisiana.....	59	48	860,848	44	854,516	99.3	30	761,784	87.3
Mississippi.....	75	78	1,275,489	68	1,268,695	99.5	48	1,116,215	87.5
Missouri.....	115	9	30,887	1	19,760	64.1	1	19,760	64.1
North Carolina.....	97	70	2,451,441	33	371,523	82.3	17	200,788	57.8
Oklahoma.....	23	15	140,064	8	137,242	92.1	7	130,700	87.7
South Carolina.....	40	40	732,719	38	686,892	95.1	30	663,576	90.6
Tennessee.....	96	41	204,538	16	181,813	88.6	8	124,285	60.8
Texas.....	246	166	2,594,442	103	2,475,000	95.4	75	2,272,129	87.6
Virginia.....	100	10	14,009						

¹ Does not include 16,000 pounds ginned in Graves county but not baled.

² Does not include 5,000 pounds ginned in Caldwell county but not baled.

³ Does not include cotton ginned, but not baled, as follows: Bledsoe county, 1,500 pounds; Dickson county, 2,500 pounds; Monroe county, 1,150 pounds; and White county, 6,000 pounds.

⁴ Does not include 5,000 pounds ginned in Pittsylvania county but not baled.

From Table 6 it is seen that of the 1,408 counties forming the 16 cotton-producing states for the crop of 1901, 767, or 54.5 per cent, are cotton-producing counties. Five hundred and thirty-two counties, or 69.4 per cent of the total number producing cotton, reported 5,000 commercial bales and over, and a total crop of 9,515,168 bales, or 95.6 per cent of the entire crop; and 364 counties, or 47.5 per cent of the cotton-producing counties, reported a production of 10,000

The average price of cottonseed in 1900 was \$16 per ton of 2,000 pounds delivered at the mills.⁴ In the reports of ginners the gross weight of the bale was given, and in ascertaining the net quantity of cotton produced, as shown in Table 5, 22 pounds per bale for square bales have been deducted to cover the weight of bagging and ties; and for sea-island and round bales 10 and 3 pounds per bale, respectively, have been deducted to cover the weight of wrapping, as reported by the ginners themselves.

Table 6 shows the number of counties forming the cotton-producing states, number of cotton-producing counties, and production and per cent of total crop ginned by counties of 5,000 and 10,000 bales, respectively.

² The Census Office is indebted to Messrs. Latham, Alexander & Co., of New York city, for the average price of middling upland cotton in the New York market for the year ending August 31, 1901, and to the following sea-island cotton factories for valuable information as to the prices of this cotton in the three states producing it: Mr. R. M. Butler, of Savannah, Ga.; Mr. L. Gourdin Young, of Savannah, Ga.; and Messrs. Henry W. Frost & Co., of Charleston, S. C.

³ "The Cotton Crop of 1899-1900," issued by the United States Department of Agriculture, page 30.

⁴ The price of cottonseed for the crop of 1900 has been determined from information furnished by the Oil, Paint and Drug Reporter, and the American Cotton Oil Company, as well as by various cotton-seed oil mills located in the several cotton states.

bales and over, and a total production of 8,316,292 bales, or 83.5 per cent of the total crop.

On pages 24 to 38, inclusive, will be found maps of the principal cotton-producing states, upon which the crop is distributed by counties.

Table 8, pages 12 to 23, inclusive, shows the distribution of the cotton crops of 1899, 1900, and 1901, by counties, expressed both in commercial and equivalent 500-pound bales.

HISTORICAL AND DESCRIPTIVE.

Since the introduction of cotton into the commercial world as a product of importance the crop as marketed has been accepted as identical with that grown, except for census years when an enumeration was made through a personal canvass of the farms. An adequate conception of the commercial method of making the count is obtained from the plan of the "Commercial and Financial Chronicle," an accepted authority, which computes the crop from three sources: First, receipts at United States ports; second, shipments from the interior direct to the United States consumers and to Canada; and third, cotton consumed by mills located in the Southern states. The Chronicle counts the port receipts only, taking it for granted that the amount of cotton in the interior at the end of each season, whether in the towns or in the hands of the farmers, is a fixed and unvarying quantity. It is obvious, however, that unless the amount of cotton remaining in the interior towns, and in the hands of the farmers at the end of the season, is the same each year, this method of counting the crop is likely to be erroneous, and the error is necessarily measured by the variation in the quantity of cotton left at the end of the season in the hands of the planters, and in the interior towns.

The first item which enters this count is what is known as net port receipts. With a view of avoiding liability of duplication, the various cotton exchanges try to keep an accurate record of the shipments from one port to another, and thus differentiate port receipts as "net" and "gross." The gross port receipts include all cotton received at the ports, whether shipped from the interior or coastwise from other ports, and the net receipts are those shipped directly from the interior to the ports. The cotton exchanges and the various bureaus that keep count of the cotton movement are dependent upon the fidelity and accuracy of transportation companies to discriminate between gross and net shipments. It is readily seen that in making this discrimination considerable liability to error must arise.

The next factor in this count is "shipments from the interior direct to northern consumers and to Canada." The portion of the crop so counted is technically known as the "overland movement," and is arrived at by taking the shipments passing out of the cotton belt across a theoretical cordon drawn about it, the points of railroad intersection selected for the count being St. Louis, Cairo, Paducah, Rock Island, Louisville, Cincinnati, and minor towns. It is obvious that the cotton shipped via St. Louis to New York will, upon its arrival at New York, be counted as part of the port receipts, and if it is again counted as part of the overland movement there will be duplication. To avoid this there is deducted from the gross overland movement "shipments to ports and from ports to inland mills," and the remainder which is called the "net overland movement" is

reckoned as an integral part of the crop. It is needless to point out the difficulties involved in keeping accurately such a complicated record. It becomes necessary to devise machinery that will accurately count all the cotton moved by rail out of the cotton belt, and to differentiate between the cotton so shipped which is designated for interior or seaboard points. It is further necessary to keep an accurate record of all cotton which is shipped from seaboard points by rail to the interior, and which, in so being shipped, may again pass the arbitrary and theoretical cordon drawn around the cotton belt. While credit is given to the authorities for their conscientiousness of purpose in attempting to keep this record, it is impracticable for them to get the facts accurately.

The third item in this count is southern consumption, which, of necessity, is estimated. There are many reasons why it is impossible to secure from each southern mill its actual cotton consumption during a given season.

In addition to the factors already enumerated, there should be taken into consideration the quantity of linters obtained from re-ginning the cottonseed by the oil mills and reported to the various exchanges in the commercial movement by the transportation companies. Again, there is a clear case of duplication in the rebaling of cotton samples, known as "city crop." A bale of cotton is sampled several times in its progress from the producer to the consumer. These samples, with the cotton torn from the bales, either at the compresses or in handling, are gathered up and rebaled. From a careful inquiry into this subject, it would appear that as much as 150,000 bales are thus duplicated annually.

It is safe to assume that the disparagement between the quantity of cotton grown in 1901 and that commercially moved between September 1, 1901, and August 31, 1902, might equal 450,000 bales, distributed as follows: Reduction in the reserve of cotton produced in previous years, but marketed with this crop on account of scarcity of cotton and advance in prices, 150,000 bales; rebaled samples, 150,000; linters, 150,000, making a total of 450,000 bales.

Statistics collected through this commercial system, however accurately compiled, fall short of the demands of both the producer and manufacturer, first, in that they cover the quantity of cotton marketed between September 1 of one year and August 31 of the following year, and are not statistics of a crop grown in any one year; and, second, the liability to error involved in the count. It is evident that nothing short of an annual census of the crop grown, taken sufficiently early to form a basis of prices, will entirely satisfy the cotton grower or manufacturer. The manner of attaining this end received careful consideration in taking the Twelfth Census.

Believing that reports of cotton ginneries, showing the number and average weight of the bales passing through their hands during a given year, would afford trustworthy statistics of the crop of that year, the Census Office had its special agents and enumerators visit every cotton-ginning establishment in the country and obtain a report from each of the cotton ginned from the crop of 1899. The report of the crop of 1899 satisfactorily determined the trustworthiness of ginneries' returns as to the volume of the cotton crop. But as the data for this first report were gathered by the enumerators, it remained to be demonstrated whether it would be possible to obtain similar facts through the mails. The Census Office, in its reports of the crops of 1900 and 1901, has twice demonstrated that this is a possible method of canvass. Every ginning establishment in the United States, as shown by the mailing list made up from the enumerators' returns of the crop of 1899, has been heard from either directly or indirectly. Wherever there was failure on the part of the ginneries to respond to the inquiries of the Census Office, the cooperation of the local postmasters was secured through the courtesy of the Postmaster-General, and in this way the product of every ginnery was obtained or the fact ascertained that it had not been in operation. The Census Office, through the individual cooperation of the ginneries, has been able to keep its mailing list in perfect condition; by the elimination of abandoned establishments and the addition of new ones.

Conformity between the statistics as reported by the ginneries and those measuring the commercial movement of the crop is not possible. The ginneries are requested to report only the quantity of cotton ginned from the growth of one year, while statistics of the commercial movement have to do with the cotton marketed between September 1 of one year and August 31 of the following year, thus touching portions of at least two actual crops.

The Agricultural Division of the Census Office, collecting data through a personal canvass of the farms by the enumerators, reported the cotton crop of 1899 at 9,434,345 bales of an equivalent standard of 500 pounds, which is a variance from the crop as reported by the ginneries of only 88,939 bales, or nine-tenths of 1 per cent. This is a remarkable verification of the reliability of ginneries' reports in ascertaining the volume of the cotton crop. The county distribution made by the two reports differs, because large and important ginneries, located near county lines, attract cotton from adjoining counties, or because cotton is grown only to a limited extent in some counties and their entire production is ginned and reported in a neighboring county.

The recent development of cotton manufacture, by mills located near the cotton fields, becomes an important factor in the demand for a change in the methods heretofore employed in estimating the annual American

production of cotton. Thousands of bales which never touch a transportation line are consumed by these mills, and the annual consumption through this source is rapidly increasing. In this connection the following statistics are of value:

COTTON PRODUCTION AND CONSUMPTION OF THE UNITED STATES, 1870 TO 1890, BY DECADES, AND PER CENT CONSUMED IN SOUTHERN MILLS.

CROP OF—	TOTAL CROP.	MILL CONSUMPTION.			PER CENT CONSUMED IN SOUTHERN MILLS.	
		North.	South.	Total.	Of total crop.	Of total American consumption.
1869	2,650,556	687,915	68,702	756,617	2.60	9.08
1879	5,214,355	1,381,680	169,058	1,550,738	3.24	11.27
1889	7,128,391	1,734,217	501,676	2,235,892	7.04	22.44
1899	9,345,390	2,219,603	1,415,684	3,635,287	15.15	38.94

The statistics of the above table, covering both the crop and the mill consumption, have been obtained by reducing census figures to an equivalent standard of 500 pounds. The crop given is of the growth of the year indicated, while the consumption statistics are for the year ending May 31, following.

In the census classification, the following states constitute the division known as "Southern states:" Alabama, Arkansas, Florida, Georgia, Indian Territory, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. All other cotton-consuming states, for the purpose of this comparison, are classed as "Northern."

In 1870 the consumption of cotton by southern mills was 68,702 bales, or 9.08 per cent of the American consumption, being only 2.6 per cent of the American production. The consumption of these mills in 1900, as shown by this table, was 1,415,684 bales, or 38.94 per cent of the total consumption and 15.15 per cent of the total American crop.

TABLE 7.—QUANTITY OF COTTON GROWN IN THE UNITED STATES IN THE YEARS GIVEN, BETWEEN 1790 AND 1900.

CROP OF—	Production (bales).	Average weight of bale (pounds).	Total gross weight (pounds).	Increase in gross weight over preceding year given (pounds).
1790	8,889	225	2,000,025	—
1800	177,778	226	40,000,050	38,000,025
1810	320,000	226	80,000,000	39,999,950
1820	681,819	264	180,000,216	100,000,216
1830	1,312,685	399	445,000,215	264,999,799
1840	2,053,168	385	790,479,305	345,479,090
1850	2,469,083	400	987,637,200	197,157,895
1860	5,387,052	445	2,397,238,140	1,409,600,940
1870	8,011,996	440	3,525,278,240	1,071,959,900
1880	5,755,359	453	2,607,177,627	1,281,899,887
1890	7,472,511	477	3,564,887,747	957,210,120
1899	9,645,974	485	4,672,695,500	1,108,307,753

¹Decrease.

The preceding table is interesting as showing the rapid increase in the cotton production of the United States during the past century and the gradual growth of the cotton bale.

The census of 1840, collecting statistics of the crop of 1839, marked the beginning of the inclusion of agricultural statistics in census inquiries. The statistics given in Table 7 for 1839, and for years subsequent thereto, are the results of special census investigations. The cotton production of the United States from 1790 to 1829, inclusive, as shown in this table, is based upon a report to the Speaker of the House of Representatives in 1836, by the Hon. Levi Woodbury, Secretary of the Treasury.

Early settlers north of the Ohio River planted cotton for domestic uses between 1849 and 1880. The census of 1860 found in Illinois 1,482 bales, or 659,490 pounds of cotton. Stimulated by the high prices following the civil war, the cultivation of cotton was conducted to a limited extent in California, Illinois, Indiana, Nevada, Utah, and West Virginia. With the coming of low prices cotton culture gradually disappeared from these sections not peculiarly adapted to it, and censuses after 1870 credited none to California, Illinois, Indiana, Nevada, Utah, or West Virginia. Natural selection continues to eliminate the industry from sections less favored by climatic conditions. To illustrate, Kentucky is credited by the censuses of 1880 and 1890 with 1,367 and 873 bales, respectively, but at the census of 1900 the ginners reported for this state only 84 bales.

The loss of these states lying along the northern border of the cotton belt is more than offset by the increase found in the territory west and southwest of the Mississippi River. According to the Eleventh Census, 2,872,524 bales, or 38 per cent of the entire American crop of 1889, was grown in that region, while in the census of 1900, in the same territory the production, according to the ginners, reached 4,250,940 bales, or 45 per cent of the whole crop. This increase was practically confined to Texas, Oklahoma, and Indian Territory, Texas alone producing 28 per cent of the entire cotton crop. The census of 1890 credited the Indian Territory with 34,115 bales and Oklahoma with 425 bales. The census of 1900 gave these territories respectively 143,608 and 71,983 bales (500-pound standard).

Prior to the invention of the cotton gin by Eli Whitney in 1794 the separation of the seed from the lint cotton was so difficult as to limit the cultivation of cotton. This separation of the seed from the lint had to be done by hand, a task being 4 pounds of lint cotton per week for each head of the family, working at night in addition to the usual field work. Thus it would take one person two years to turn out the quantity of cotton contained in one average standard bale. One machine will gin from three to fifteen 500-pound bales per day, dependent upon its power and saw capacity. While

several machines had been invented for the seeding of cotton, it was reserved for Eli Whitney to inaugurate, by his invention, the era which was to perfect the industry of "cotton ginning" and revolutionize the culture and commerce of the staple.

The primitive saw gin was operated by hand and of necessity exceedingly limited in capacity. The first very substantial advancement, resulting from years of research, was the horse-power attachment for ginning and baling, which brought the old fashioned cotton gin and screw. The motive power for this gin was consisted of 2, 4, or more horses or mules. The cotton was hauled in wagons to the gin house, unloaded by hand into bins, carried again by hand to a platform, and thence fed by hand into the gin. By the old fashioned gin and screw the lint cotton was blown by a brush from the saw gin into a lint room, where it was often allowed to accumulate, awaiting a rainy day or other opportune occasion for baling. It was then conveyed in baskets or sheets to the single press box of the old "wooden screw," which was located some 30 or 40 feet from the ginhouse. There it was dumped into the box and trampled by foot until a sufficient quantity was inclosed to make a bale. By means of a horse at the lever or wing of the press the follow block, upon which the screw was pivoted, was forced down or up, as the case might be, until the desired bale density was attained. Jute bagging was generally used as a wrapping, and the shape of the bale was preserved, at first by the use of rope, and later by means of iron bands, called "ties."

A few of these "landmarks" are yet found throughout the country, though they are now curiosities. It is scarcely necessary to say that this old method of handling cotton at the gin was exceedingly laborious, wasteful, and unhealthy, and that nothing but cheap labor and high prices for the staple allowed it to continue as long as it did.

Much time, labor, and money have been expended in efforts to combine ginning and baling plants, to the end that greater speed might be gained, labor economized, and other desired reforms attained in handling seed cotton. The outcome is automatic ginneries, practically doing away with labor, and yielding from five to ten times as much lint cotton per day as was possible by the earlier processes.

A modern gin containing 4 gins of 70 saws each with a double square-bale press and suction apparatus attached requires an 80-horsepower engine. Such a plant in constant operation will yield from 40 to 60 bales of cotton per day. The wagon, loaded with seed cotton, is driven under a flexible slip of a joint pipe, and the cotton is drawn up by the suction created by an exhaust fan which is connected with the rear of the vacuum separator and cleaner. By this separator and cleaner the dust, sand, and leaf trash are sifted and drawn through by suction, and thus freed from impurities the cotton is conveyed through a distributor

to the automatic gin feeders. After filling all of the feeders the surplus cotton falls out at the end of the automatic tube and drops upon the floor or into a bin. When the cotton is all out of the wagon or bin, as the case may be, the ginner, by means of a simple lever, cause the suction to change from the direction of the wagon to that of the overflow, and the overflow cotton is conveyed to the gin feeders. From all the gins the cotton is conducted by a flue system to a condenser, and fed into one box of the self-packing revolving double press. In this way lint is ginned into one box while the bale is being pressed out of the other. Thus, the cotton need not be touched by hand from the time it leaves the wagon or bin until it is delivered, a perfect bale, upon the platform where it is loaded ready for market.

Thus, from the "hand seeder," yielding about 4 pounds of lint cotton per week, advance has been made to the saw gin, which, with a 40-saw capacity and horsepower, yielded about 2,000 pounds per day, and finally to the complete battery ginnery, carrying in some instances as many as 15 70-saw gins, operated by steam and having a possible capacity of 150 bales, or 75,000 pounds, in twelve hours. The condenser and automatic press feed have superseded the old "wooden screw." The laborious handling of the seed is avoided, it being blown either into a distant seed room or into the waiting wagon of the owner. In this way the life and value of the seed are preserved in conformity with the requirements of the oil mill. Thus, the arduous labor heretofore attached to the cotton ginnery has been wonderfully reduced, and life, limb, and property marvelously protected.

Possibly no invention ever caused so rapid a development of the industry with which it was associated as that brought through the saw cotton gin. In 1793 the exportation of cotton from the United States was 487,500 pounds, or 975 bales of an average weight of 500 pounds. In 1794, the year in which the Whitney gin was patented, the number of pounds of cotton exported from the United States was 1,600,000, equivalent to 3,200 bales of a 500-pound standard. This large production so frightened the cotton farmers, in anticipation of an overproduction of the crop, as to cause them to pledge themselves to desist from its production. One of these farmers, looking upon his crop gathered for that year, exclaimed, "I have done with the cultivation of cotton; there is enough in that gin-house to make stockings for all the people in America." And yet within one hundred years, 1800 to 1900, the production of cotton in the United States has increased from, approximately, 80,000 to 9,345,391 bales, 500-pound standard.

The art of pressing cotton has presented to inventors unusual difficulties. Among the recent and more economic methods of baling cotton is the introduction of a bale of uniform size and weight, and possessing greater density. With many of those who advocate

the square bale there is a belief that the density of that package may be so increased as to avoid the present necessity of recompression. Already inventions have been made promising this result, but none have as yet come into general use. The present accepted square bale of commerce is 54 inches in length, varying in breadth from 24 to 27 inches, and pressed down to a thickness of 28 to 30 inches.

Out of the efforts to devise superior systems of preparing lint cotton for market have come a great number of inventions for producing packages of various shapes and weights. But of the scores of presses invented during the past five years for baling cotton in cylindrical form, there have been only two put into practical operation. One of these is called the Bessonette, or Round Lap system. By this system, the lint, as it comes from the gin, is blown into a storage reservoir and bat former, where it is converted into a continuous bat of even thickness, and wound around a cone under a pressure which, light at first, is gradually increased automatically by two rollers operating at opposite sides, until the bale attains its full density. By this steady exertion of an even pressure gradually applied to all the cotton in detail, bales are produced 22 inches in diameter, and 35 and 48 inches in length, weighing on an average 270 and 425 pounds, respectively. The bales require no further compression, as they possess a density of 35 pounds per cubic foot as compared with a density of 22.5 pounds in the old compressed square bale. This package is self-containing, holding its form and density by adhesion of fiber to fiber and layer to layer, thus avoiding the necessity of iron bands to preserve its shape. The first round lap bale press was set up in the United States in 1894. Its product was much heavier than the present bale, reaching as great a weight as 500 pounds.

The other round bale press which has come into practical use is known as the Lowry system, and consists in feeding the lint cotton loose from the gin into a tube surrounded by a cap plate with a number of slots therein radiating from the center to the circumference. The bale is first started in the tube by packing cotton therein by hand. When this is done, and a relative revolution of the cap plate and tube is established, the loose cotton thrown on top comes in contact with that inside the tube and is drawn in through the slots, and the bale is thus built up endwise. In the Bessonette system, pressure is applied from end to end of the bale at two points along the outside circumference, while in the Lowry system pressure is applied only to the end of the bale. The bale turned out by the Lowry press, in its earlier history, like that of the Bessonette press, reached a weight of 500 pounds, but with this press also there has been a gradual tendency toward the lighter-weight package, until at this time the average weight of the bale of its new pattern is but 250 pounds. The bale is of uniform size, 18 inches in

diameter and 36 inches in length, and possesses a density of about 45 pounds per cubic foot, against 22.5 pounds attained in the compressed square bale.

It is interesting to note that this press is being advantageously employed for baling hay and other fibrous

commodities. There have also been other more or less successful experiments in ginning cotton with the device, converting the press into a roller gin. Its successful cotton-packing history may be said to be confined to the past three seasons.

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901, BY STATES AND COUNTIES.

ALABAMA.

COUNTIES.	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				Equiva- lent 500- pound bales.	Commercial bales.				Equiva- lent 500- pound bales.	Commercial bales.				Equiva- lent 500- pound bales.
	Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.	
The State.....	1,103,690	1,069,644	34,046	.....	1,078,519	1,061,678	995,602	66,076	.....	1,023,802	1,156,812	1,068,972	87,840	.....	1,101,927
Antauga.....	13,555	12,521	1,034	.....	13,210	12,135	11,981	154	.....	12,101	15,334	15,053	281	.....	14,773
Baldwin.....	509	509	.....	.....	511	501	301	.....	.....	306	476	476	.....	.....	482
Barbour.....	32,022	32,022	.....	.....	32,503	29,141	27,649	1,492	.....	28,115	28,673	27,673	1,000	.....	27,773
Bibb.....	5,418	5,418	.....	.....	5,515	5,340	5,340	.....	.....	5,467	6,710	6,710	.....	.....	6,616
Blount.....	11,443	11,443	.....	.....	11,295	12,155	12,155	.....	.....	11,987	12,255	12,255	.....	.....	11,936
Bullock.....	33,126	33,126	.....	.....	33,101	30,313	27,059	3,254	.....	28,898	27,555	25,293	2,262	.....	26,667
Butler.....	20,793	14,979	5,814	.....	18,273	19,518	18,544	5,974	.....	16,824	23,172	16,292	6,880	.....	20,102
Calhoun.....	13,870	13,870	.....	.....	13,585	12,995	12,995	.....	.....	12,837	18,737	18,737	.....	.....	18,374
Chambers.....	34,127	34,127	.....	.....	34,015	30,252	30,252	.....	.....	28,092	33,326	33,326	.....	.....	31,902
Cherokee.....	14,492	14,492	.....	.....	14,072	14,115	14,115	.....	.....	13,460	13,351	13,351	.....	.....	13,353
Chilton.....	10,036	10,036	.....	.....	10,085	12,003	12,003	.....	.....	12,030	15,560	15,226	334	.....	16,290
Choctaw.....	12,181	12,181	.....	.....	12,193	11,374	11,374	.....	.....	11,374	13,193	13,193	.....	.....	13,353
Clarke.....	13,112	13,112	.....	.....	13,123	16,068	16,068	.....	.....	16,159	17,463	17,463	.....	.....	17,421
Clay.....	10,819	10,819	.....	.....	10,901	11,874	11,874	.....	.....	11,875	12,147	12,147	.....	.....	11,422
Cleburne.....	5,513	5,513	.....	.....	4,948	6,161	6,161	.....	.....	5,630	6,834	6,834	.....	.....	6,099
Coffee.....	18,646	18,646	.....	.....	18,409	18,870	17,897	973	.....	17,951	18,901	18,898	3	.....	17,821
Colbert.....	10,272	7,732	2,540	.....	9,284	10,394	8,001	2,393	.....	9,447	10,309	9,158	1,151	.....	10,056
Conecuh.....	9,070	9,070	.....	.....	9,085	10,383	8,881	1,502	.....	9,741	13,022	10,698	3,024	.....	12,474
Coosa.....	12,385	12,385	.....	.....	11,868	12,762	12,762	.....	.....	12,210	14,457	14,457	.....	.....	13,713
Covington.....	6,310	6,310	.....	.....	6,119	4,949	4,244	705	.....	4,484	7,537	5,886	1,651	.....	6,719
Crenshaw.....	17,963	17,963	.....	.....	17,958	18,241	17,473	768	.....	17,811	20,578	19,073	1,500	.....	19,868
Cullman.....	9,248	7,247	2,001	.....	8,135	10,851	8,747	2,104	.....	9,768	13,881	13,193	3,788	.....	11,828
Dale.....	17,002	17,002	.....	.....	16,070	15,702	15,702	.....	.....	15,042	18,439	18,439	.....	.....	18,051
Dallas.....	43,850	43,850	.....	.....	43,503	42,208	42,208	.....	.....	42,208	38,299	38,299	.....	.....	38,369
Dekalb.....	10,358	10,358	.....	.....	9,915	12,133	12,133	.....	.....	11,615	12,800	12,800	.....	.....	12,078
Elmore.....	17,142	17,142	.....	.....	16,802	18,561	18,561	.....	.....	18,272	22,916	22,916	.....	.....	22,285
Escambia.....	540	540	.....	.....	547	990	930	.....	.....	921	2,125	2,125	.....	.....	2,102
Etowah.....	11,058	11,058	.....	.....	10,667	11,185	11,185	.....	.....	10,789	12,928	12,928	.....	.....	13,104
Fayette.....	7,883	7,883	.....	.....	7,034	5,859	5,859	.....	.....	5,911	7,684	7,684	.....	.....	7,589
Franklin.....	6,506	6,506	.....	.....	6,553	8,129	8,129	.....	.....	8,173	7,797	7,797	.....	.....	7,833
Geneva.....	9,587	9,587	.....	.....	9,287	8,520	8,520	.....	.....	8,294	12,588	12,588	.....	.....	12,240
Greene.....	21,661	20,161	1,500	.....	20,604	14,118	13,891	227	.....	13,620	21,475	19,128	2,347	.....	20,163
Hale.....	27,601	27,601	.....	.....	27,480	27,424	27,424	.....	.....	27,225	24,671	24,671	.....	.....	23,898
Henry.....	26,287	26,287	.....	.....	26,068	25,510	23,106	2,405	.....	24,060	29,764	27,883	2,871	.....	27,825
Jackson.....	5,202	5,202	.....	.....	5,166	7,009	7,009	.....	.....	7,097	6,945	6,945	.....	.....	7,017
Jefferson.....	7,303	7,303	.....	.....	7,324	6,965	6,965	.....	.....	7,005	7,716	7,716	.....	.....	7,527
Lamar.....	11,722	11,722	.....	.....	11,502	8,622	8,622	.....	.....	8,622	10,580	10,580	.....	.....	10,553
Laurel.....	9,567	9,567	.....	.....	9,432	10,959	9,141	1,818	.....	10,048	12,056	9,753	2,303	.....	10,742
Lawrence.....	14,358	14,358	.....	.....	13,514	16,092	12,762	3,330	.....	14,872	13,594	9,959	3,635	.....	11,984
Lee.....	23,458	23,458	.....	.....	23,034	26,149	26,149	.....	.....	25,957	30,610	30,610	.....	.....	30,012
Limestone.....	13,799	12,798	1,001	.....	13,598	16,457	14,491	1,966	.....	16,088	16,360	15,185	1,175	.....	16,087
Lowndes.....	37,556	35,106	2,450	.....	36,478	39,023	30,534	5,489	.....	33,854	35,229	28,468	6,761	.....	31,624
Macon.....	21,565	21,185	380	.....	21,245	21,045	20,025	1,020	.....	20,362	23,595	21,143	2,452	.....	22,171
Madison.....	16,692	16,790	2,902	.....	15,824	20,255	15,923	4,332	.....	18,906	23,962	18,278	5,684	.....	21,687
Marengo.....	34,487	32,254	2,133	.....	32,911	32,460	28,170	4,290	.....	30,957	31,981	25,481	6,500	.....	29,496
Marion.....	5,805	5,805	.....	.....	5,832	5,378	5,378	.....	.....	5,454	6,910	6,910	.....	.....	7,005
Marshall.....	18,795	18,795	.....	.....	13,284	16,808	16,808	.....	.....	16,090	18,293	14,475	3,818	.....	15,286
Mobile.....	360	360	.....	.....	360	20	20	.....	.....	20	2,924	60	2,864	.....	1,572
Monroe.....	17,214	17,214	.....	.....	18,475	15,837	15,837	.....	.....	16,206	19,354	19,354	.....	.....	19,837
Montgomery.....	43,158	38,408	4,750	.....	41,183	47,002	32,760	14,242	.....	40,717	45,190	33,079	12,111	.....	40,259
Morgan.....	10,578	8,742	2,236	.....	10,870	12,822	9,200	3,622	.....	12,465	13,316	10,811	2,505	.....	12,211
Perry.....	30,990	30,990	.....	.....	31,556	27,321	27,321	.....	.....	27,849	25,844	24,495	1,660	.....	25,514
Pickens.....	19,230	19,230	.....	.....	19,227	17,443	17,443	.....	.....	17,807	18,172	18,172	.....	.....	17,546
Pike.....	34,768	34,768	.....	.....	34,927	27,353	25,673	1,710	.....	26,756	29,715	26,914	2,801	.....	28,270
Randolph.....	18,038	18,038	.....	.....	16,866	17,943	17,943	.....	.....	16,909	18,326	18,326	.....	.....	16,689
Russell.....	23,725	23,725	.....	.....	23,535	23,964	23,739	225	.....	23,291	24,495	24,495	.....	.....	23,852
St. Clair.....	9,605	9,605	.....	.....	9,408	10,128	10,128	.....	.....	10,031	9,896	9,896	.....	.....	9,744
Shelby.....	11,628	11,628	.....	.....	11,604	9,510	9,510	.....	.....	9,535	11,542	10,484	1,058	.....	11,015
Sumter.....	32,994	32,994	.....	.....	32,892	20,475	20,475	.....	.....	20,726	23,123	23,123	.....	.....	23,006
Talladega.....	26,746	26,746	.....	.....	24,478	22,501	22,501	.....	.....	22,014	27,910	27,128	782	.....	26,612
Tallapoosa.....	28,323	28,323	.....	.....	27,188	28,084	28,084	.....	.....	26,951	31,001	31,001	.....	.....	29,485
Tuscaloosa.....	19,578	16,773	2,800	.....	18,288	14,626	13,261	1,365	.....	14,149	21,599	18,560	3,039	.....	20,493
Walker.....	5,207	5,207	.....	.....	5,200	4,520	4,520	.....	.....	4,592	5,051	5,051	.....	.....	5,084
Washington.....	1,793	1,793	.....	.....	1,820	1,786	1,786	.....	.....	1,793	1,951	1,951	.....	.....	1,869
Wilcox.....	34,690	34,690	.....	.....	34,725	32,154	31,448	706	.....	31,946	28,700	26,600	2,100	.....	27,325
Winston.....	4,826	4,826	.....	.....	4,781	3,463	3,463	.....	.....	3,036	5,375	5,375	.....	.....	5,080

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901, BY STATES AND COUNTIES—
Continued.

ARKANSAS.

COUNTIES.	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				Equiva- lent 500- pound bales.	Commercial bales.				Equiva- lent 500- pound bales.	Commercial bales.				Equiva- lent 500- pound bales.
	Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.	
The State.....	719,453	685,570	33,883	.....	705,583	828,820	778,247	55,573	.....	812,984	738,080	686,903	51,177	.....	718,318
Arkansas.....	8,014	8,014	.....	.....	8,057	7,207	7,207	.....	.....	7,837	4,799	4,799	.....	.....	4,858
Ashley.....	26,790	23,207	3,583	.....	25,037	21,925	18,621	3,304	.....	20,787	23,126	20,065	3,061	.....	22,402
Baxter.....	1,891	1,891	.....	.....	1,922	2,393	2,393	.....	.....	2,448	1,560	1,560	.....	.....	1,563
Boone.....	585	585	.....	.....	587	629	629	.....	.....	649	346	346	.....	.....	345
Bradley.....	4,360	4,360	.....	.....	4,386	4,641	4,641	.....	.....	4,686	5,256	5,256	.....	.....	5,198
Calhoun.....	3,853	3,853	.....	.....	3,815	4,454	4,454	.....	.....	4,390	4,406	4,406	.....	.....	4,300
Chicot.....	25,832	25,832	.....	.....	23,859	24,363	24,294	69	.....	24,247	24,399	24,399	.....	.....	24,805
Clark.....	10,330	10,330	.....	.....	10,375	15,352	15,352	.....	.....	15,542	15,276	15,276	.....	.....	15,402
Clay.....	5,580	3,681	1,899	.....	4,739	6,988	4,826	2,162	.....	6,182	5,305	4,321	984	.....	4,869
Cleburne.....	3,846	3,846	.....	.....	3,830	4,608	4,608	.....	.....	4,696	2,919	2,919	.....	.....	2,949
Cleveland.....	4,754	4,754	.....	.....	4,637	6,978	6,978	.....	.....	6,840	4,716	4,716	.....	.....	4,595
Columbia.....	18,370	18,370	.....	.....	18,216	23,139	23,139	.....	.....	22,674	19,708	19,708	.....	.....	19,471
Conway.....	16,790	12,117	4,673	.....	14,671	28,080	17,218	10,812	.....	22,591	18,888	12,880	5,958	.....	16,352
Craighead.....	4,889	4,889	.....	.....	4,931	5,833	5,833	.....	.....	5,987	5,131	5,131	.....	.....	5,200
Crawford.....	9,325	9,325	.....	.....	9,489	16,484	16,484	.....	.....	16,992	19,091	19,091	.....	.....	19,350
Crittenden.....	22,943	22,943	.....	.....	22,773	20,333	20,333	.....	.....	20,561	17,609	17,609	.....	.....	17,447
Cross.....	4,407	4,407	.....	.....	4,430	4,687	4,687	.....	.....	4,738	4,030	4,030	.....	.....	4,065
Dallas.....	4,585	4,585	.....	.....	4,512	5,738	5,738	.....	.....	5,701	4,464	4,464	.....	.....	4,418
Desha.....	18,857	18,857	.....	.....	19,196	17,399	17,399	.....	.....	17,521	17,294	17,294	.....	.....	17,544
Drew.....	15,252	15,252	.....	.....	14,955	18,123	17,846	777	.....	17,810	13,798	13,798	.....	.....	13,606
Faulkner.....	16,220	15,024	1,196	.....	15,909	18,013	17,325	688	.....	18,109	14,386	13,716	620	.....	14,099
Franklin.....	8,009	8,009	.....	.....	8,097	11,852	11,852	.....	.....	11,606	13,235	13,235	.....	.....	13,424
Fulton.....	1,860	1,860	.....	.....	1,863	2,233	2,233	.....	.....	2,268	1,188	1,188	.....	.....	1,170
Garland.....	700	700	.....	.....	681	1,303	1,303	.....	.....	1,302	958	958	.....	.....	958
Grant.....	2,590	2,590	.....	.....	2,495	3,288	3,288	.....	.....	3,170	3,858	3,858	.....	.....	3,162
Greene.....	2,961	2,961	.....	.....	3,017	5,670	5,670	.....	.....	5,743	5,066	5,066	.....	.....	5,213
Hempstead.....	16,481	16,481	.....	.....	16,459	21,824	21,824	.....	.....	21,695	19,698	19,698	.....	.....	19,937
Hot Spring.....	3,678	3,678	.....	.....	3,615	4,177	4,177	.....	.....	4,193	4,888	4,888	.....	.....	4,903
Howard.....	8,659	8,659	.....	.....	8,696	10,346	10,346	.....	.....	10,464	10,304	10,304	.....	.....	10,463
Independence.....	13,873	13,683	190	.....	13,915	13,155	12,202	953	.....	12,947	8,181	7,794	387	.....	7,990
Izard.....	4,848	4,848	.....	.....	4,859	5,626	5,626	.....	.....	5,717	3,336	3,336	.....	.....	3,330
Jackson.....	18,301	18,051	250	.....	18,346	18,570	15,715	2,855	.....	17,541	16,250	13,454	2,796	.....	15,088
Jefferson.....	43,392	43,072	320	.....	43,820	45,225	45,225	.....	.....	45,748	42,462	39,062	3,400	.....	41,137
Johnson.....	7,021	7,021	.....	.....	7,001	10,700	10,700	.....	.....	10,910	10,502	10,502	.....	.....	10,543
Lafayette.....	8,158	8,158	.....	.....	8,185	9,521	9,521	.....	.....	9,637	8,991	8,991	.....	.....	8,913
Lawrence.....	7,576	5,574	2,002	.....	6,775	9,389	6,348	3,041	.....	8,243	11,580	6,989	4,591	.....	9,817
Lee.....	21,635	21,249	386	.....	22,017	20,911	20,057	854	.....	21,517	18,185	17,244	941	.....	18,091
Lincoln.....	16,076	16,076	.....	.....	16,029	16,975	16,975	.....	.....	17,120	18,255	18,255	.....	.....	18,246
Little River.....	10,627	10,627	.....	.....	10,804	14,997	14,997	.....	.....	14,989	14,270	14,270	.....	.....	14,328
Logan.....	9,168	9,168	.....	.....	9,272	13,696	13,696	.....	.....	13,994	14,392	14,392	.....	.....	14,532
Lonoke.....	25,830	19,303	6,527	.....	23,172	34,004	20,585	13,419	.....	23,348	30,041	18,810	11,231	.....	24,975
Marion.....	2,049	2,049	.....	.....	2,091	2,386	2,386	.....	.....	2,447	1,461	1,461	.....	.....	1,481
Miller.....	9,163	9,163	.....	.....	9,158	11,178	11,178	.....	.....	11,239	7,898	7,898	.....	.....	7,883
Mississippi.....	20,506	19,406	1,100	.....	20,566	19,865	19,721	144	.....	20,268	20,385	20,243	142	.....	20,110
Monroe.....	16,244	18,823	2,421	.....	15,171	18,855	16,655	2,200	.....	16,905	13,539	8,836	4,703	.....	11,562
Montgomery.....	2,391	2,391	.....	.....	2,357	3,811	3,811	.....	.....	3,850	4,626	4,626	.....	.....	4,642
Nevada.....	10,232	10,232	.....	.....	10,102	14,504	14,435	69	.....	14,446	12,542	12,342	200	.....	12,282
Newton.....	577	577	.....	.....	578	1,294	1,294	.....	.....	1,340	508	508	.....	.....	523
Ouachita.....	7,776	7,776	.....	.....	7,651	8,361	8,361	.....	.....	8,327	7,529	7,529	.....	.....	7,347
Perry.....	5,473	5,473	.....	.....	5,549	5,505	5,505	.....	.....	5,656	4,540	4,540	.....	.....	4,512
Phillips.....	33,554	33,502	52	.....	33,560	28,537	28,537	.....	.....	28,819	22,453	22,453	.....	.....	22,727
Pike.....	5,013	5,013	.....	.....	5,049	6,295	6,295	.....	.....	6,408	5,904	5,904	.....	.....	6,046
Poinsett.....	2,303	2,303	.....	.....	2,344	1,382	1,382	.....	.....	1,443	1,183	1,183	.....	.....	1,197
Polk.....	1,163	1,163	.....	.....	1,155	1,670	1,670	.....	.....	1,697	1,385	1,385	.....	.....	1,377
Pope.....	11,000	11,000	.....	.....	11,290	15,421	15,421	.....	.....	16,090	12,869	12,869	.....	.....	13,217
Prairie.....	6,791	6,791	.....	.....	6,982	7,201	7,201	.....	.....	7,394	5,588	5,588	.....	.....	5,669
Pulaski.....	20,684	20,684	.....	.....	20,737	24,109	24,109	.....	.....	23,990	22,754	22,754	.....	.....	22,735
Randolph.....	2,963	2,963	.....	.....	3,035	4,251	4,251	698	.....	4,820	5,026	4,858	668	.....	4,756
St. Francis.....	15,028	15,028	.....	.....	15,202	13,444	11,274	2,170	.....	12,739	10,771	8,184	2,587	.....	9,648
Saline.....	3,684	3,684	.....	.....	3,646	5,170	5,170	.....	.....	5,210	6,178	6,178	.....	.....	6,176
Scott.....	3,492	3,492	.....	.....	3,491	5,935	5,935	.....	.....	6,144	6,669	6,669	.....	.....	6,736
Searcy.....	1,519	1,519	.....	.....	1,517	2,515	2,515	.....	.....	2,547	1,191	1,191	.....	.....	1,192
Sebastian.....	6,828	6,828	.....	.....	6,936	9,329	9,329	.....	.....	9,678	12,611	12,611	.....	.....	12,851
Sevier.....	7,024	7,024	.....	.....	7,042	8,094	8,094	.....	.....	8,197	7,262	7,262	.....	.....	7,305
Sharp.....	3,579	3,579	.....	.....	3,573	3,117	3,117	.....	.....	3,161	2,461	2,461	.....	.....	2,456
Stone.....	2,084	2,029	5	.....	2,027	2,054	2,054	.....	.....	2,065	1,128	1,128	.....	.....	1,117
Union.....	14,420	14,420	.....	.....	12,800	15,712	15,712	.....	.....	15,684	14,382	14,382	.....	.....	14,246
Van Buren.....	3,122	3,122	.....	.....	3,201	3,478	3,478	.....	.....	3,608	2,605	2,605	.....	.....	2,664
White.....	11,714	11,369	345	.....	11,495	12,377	12,377	.....	.....	12,647	9,615	9,615	.....	.....	9,597
Woodruff.....	19,741	11,404	8,337	.....	16,155	21,980	12,216	9,764	.....	18,188	15,789	7,781	8,008	.....	11,722
Yell.....	12,578	11,976	597	.....	12,299	20,518	18,924	1,594	.....	20,472	20,701	19,801	900	.....	20,490

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901, BY STATES AND COUNTIES—
Continued.

FLORIDA.

COUNTIES.	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				Equiv- alent 500- pound bales.	Commercial bales.				Equiv- alent 500- pound bales.	Commercial bales.				Equiv- alent 500- pound bales.
	Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.	
The State.....	56,821	25,588	.....	31,238	49,359	55,696	27,630	.....	28,066	48,616	57,144	29,879	.....	27,765	49,991
Alachua.....	5,648	775	.....	4,868	4,501	6,070	.....	.....	6,070	4,671	6,920	.....	.....	6,920	5,199
Baker.....	985	.....	.....	985	741	569	.....	.....	569	425	891	.....	.....	891	651
Bradford.....	3,793	.....	.....	3,793	2,733	3,773	.....	.....	3,773	2,701	2,962	.....	.....	2,962	2,235
Calhoun.....	199	169	.....	40	191	261	236	.....	25	237	375	360	.....	25	368
Columbia.....	4,490	.....	.....	4,490	3,509	2,555	.....	.....	2,555	2,218	2,486	.....	.....	2,486	1,935
Escambia.....	125	125	.....	.....	125	103	103	.....	.....	103	123	123	.....	.....	121
Gadsden.....	636	404	.....	232	549	804	648	.....	156	723	1,243	1,120	.....	123	1,135
Hamilton.....	2,978	.....	.....	2,978	2,778	2,988	50	.....	2,933	2,265	1,272	7	.....	1,265	957
Holmes.....	411	373	.....	38	407	513	483	.....	30	505	675	650	.....	25	659
Jackson.....	9,366	8,862	.....	504	9,387	9,491	9,188	.....	303	9,564	12,575	12,200	.....	375	12,399
Jefferson.....	5,844	5,424	.....	420	5,637	6,065	5,827	.....	238	5,837	5,771	5,570	.....	201	5,411
Lafayette.....	421	.....	.....	421	321	256	.....	.....	256	205	150	.....	.....	150	115
Leon.....	6,184	6,184	.....	.....	5,983	5,965	5,965	.....	.....	5,805	5,728	5,728	.....	.....	5,510
Levy.....	112	.....	.....	112	78	825	.....	.....	825	600	545	.....	.....	545	397
Madison.....	11,077	2,094	.....	8,983	9,046	9,099	3,458	.....	5,641	7,667	9,822	1,360	.....	8,462	7,921
Marion.....	389	8	.....	386	251	531	20	.....	511	401	495	25	.....	470	377
Nassau.....	10	.....	.....	10	8	16	.....	.....	16	13	31	.....	.....	31	24
Putnam.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35	.....	.....	35	22
Santa Rosa.....	24	24	.....	.....	22	95	95	.....	.....	88	165	105	.....	.....	164
Suwannee.....	2,860	.....	.....	2,860	2,294	3,145	.....	.....	3,145	2,512	2,149	.....	.....	2,149	1,741
Taylor.....	168	.....	.....	168	185	720	.....	.....	720	576	460	.....	.....	460	362
Wakulla.....	20	20	.....	.....	18	107	107	.....	.....	96	292	102	.....	190	249
Walton.....	497	497	.....	.....	496	659	659	.....	.....	613	754	754	.....	.....	748
Washington.....	639	639	.....	.....	649	791	791	.....	.....	791	1,225	1,225	.....	.....	1,288

GEORGIA.

The State.....	1,296,844	1,220,117	18,915	57,812	1,231,060	1,270,597	1,191,125	27,393	52,079	1,203,306	1,405,092	1,300,125	62,470	42,497	1,314,881
Appling.....	4,046	268	.....	3,778	3,160	2,800	572	.....	2,228	2,196	2,557	644	.....	1,913	2,098
Baker.....	4,039	4,039	.....	.....	3,938	3,419	.....	.....	.....	3,260	4,473	4,473	.....	.....	4,407
Baldwin.....	10,119	10,119	.....	.....	9,666	6,534	6,128	406	.....	6,185	10,708	10,210	498	.....	10,116
Banks.....	8,791	8,791	.....	.....	7,915	9,704	.....	.....	.....	8,839	9,382	9,382	.....	.....	8,390
Bartow.....	12,802	12,802	.....	.....	12,540	12,930	.....	.....	.....	12,672	16,072	12,773	3,894	.....	14,288
Berrien.....	6,086	1,142	.....	4,944	4,955	6,061	1,318	.....	5,643	5,660	6,378	2,468	.....	4,380	5,519
Bibb.....	6,568	6,568	.....	.....	6,475	6,033	6,033	.....	.....	5,014	8,095	8,095	.....	.....	8,274
Brooks.....	8,731	6,396	.....	2,335	8,241	7,675	4,872	.....	2,803	7,064	8,743	6,461	.....	2,282	8,188
Bryan.....	479	227	.....	252	393	504	337	.....	167	452	762	695	.....	67	633
Bulloch.....	9,792	1,924	.....	7,868	8,132	7,470	1,993	.....	5,607	6,267	6,999	2,471	.....	4,528	5,928
Burke.....	46,152	43,327	2,650	175	44,269	37,881	33,625	4,112	144	33,937	35,740	29,881	5,829	30	31,563
Butts.....	14,415	14,415	.....	.....	14,369	18,761	18,761	.....	.....	18,919	18,045	18,045	.....	.....	17,785
Calhoun.....	9,472	9,472	.....	.....	13,420	13,420	.....	.....	.....	13,323	12,121	12,121	.....	.....	12,050
Campbell.....	9,614	9,614	.....	.....	9,192	9,556	9,556	.....	.....	9,226	9,166	9,166	.....	.....	8,802
Carroll.....	28,504	29,715	1,789	.....	25,747	28,055	26,139	1,916	.....	25,117	30,683	29,278	1,405	.....	27,116
Catoosa.....	810	810	.....	.....	680	1,133	1,133	.....	.....	1,034	947	947	.....	.....	821
Charlton.....	302	.....	.....	302	242	205	.....	.....	205	163	86	.....	.....	86	67
Chattahoochee.....	5,039	5,039	.....	.....	4,970	5,317	5,317	.....	.....	5,185	4,846	4,846	.....	.....	4,739
Chattooga.....	7,079	7,079	.....	.....	6,451	6,772	6,772	.....	.....	6,119	7,517	7,517	.....	.....	6,917
Cherokee.....	6,760	6,760	.....	.....	5,922	6,935	6,935	.....	.....	6,133	8,208	8,208	.....	.....	7,157
Clarke.....	3,532	3,532	.....	.....	3,119	6,683	6,683	.....	.....	6,347	8,083	8,083	.....	.....	7,607
Clay.....	9,345	9,345	.....	.....	9,360	7,334	7,334	.....	.....	7,343	9,063	9,013	50	.....	9,024
Clayton.....	8,079	8,079	.....	.....	7,851	8,657	8,657	.....	.....	8,407	10,591	10,591	.....	.....	10,195
Clinch.....	592	.....	.....	592	462	950	.....	.....	950	716	592	.....	.....	592	422
Cobb.....	14,979	14,979	.....	.....	13,379	14,047	14,047	.....	.....	12,752	15,191	15,191	.....	.....	13,155
Coffee.....	3,369	19	.....	3,350	2,801	4,369	568	.....	3,811	3,540	5,196	943	.....	4,253	4,137
Colquitt.....	4,347	1,785	.....	2,562	3,625	5,493	3,091	.....	2,345	4,578	5,365	3,518	.....	1,847	4,704
Columbia.....	9,354	9,354	.....	.....	9,134	7,612	7,612	.....	.....	7,323	8,363	8,363	.....	.....	8,090
Coweta.....	24,680	23,480	1,200	.....	23,700	21,456	20,905	1,150	.....	20,211	27,818	26,332	1,486	.....	26,337
Crawford.....	7,158	7,158	.....	.....	7,177	7,319	7,319	.....	.....	7,289	7,423	7,423	.....	.....	7,280
Dawson.....	1,297	1,297	.....	.....	1,123	1,084	1,084	.....	.....	988	1,362	1,362	.....	.....	1,185
Decatur.....	4,581	4,551	.....	340	4,691	5,578	5,106	.....	472	5,151	7,404	6,951	.....	453	6,334
Dekalb.....	6,981	6,981	.....	.....	6,370	6,716	6,716	.....	.....	6,197	9,493	9,493	.....	.....	8,662
Dodge.....	10,739	10,729	.....	.....	10,705	11,510	11,510	.....	.....	11,447	13,011	13,011	.....	.....	13,009
Dooley.....	18,573	18,573	.....	.....	18,465	23,122	21,424	1,698	.....	22,141	24,366	20,014	4,352	.....	22,126
Dougherty.....	12,535	12,493	.....	842	13,995	17,027	17,027	.....	.....	16,251	15,259	15,259	.....	.....	14,808
Douglas.....	8,091	8,091	.....	.....	7,384	7,216	7,216	.....	.....	6,478	6,436	6,436	.....	.....	5,732
Early.....	6,392	6,392	.....	.....	6,352	7,535	7,535	.....	.....	7,645	9,415	9,415	.....	.....	9,577
Echols.....	795	.....	.....	795	618	413	.....	.....	418	319	407	.....	.....	407	320
Effingham.....	429	429	.....	.....	422	683	683	.....	.....	669	857	857	.....	.....	803
Elbert.....	14,945	14,580	365	.....	12,683	13,510	13,510	.....	.....	11,793	16,425	15,710	715	.....	14,210
Emanuel.....	13,587	9,525	.....	4,062	11,845	13,580	9,903	.....	3,627	12,159	12,020	10,796	.....	1,224	10,835
Fayette.....	9,449	9,449	.....	.....	9,502	9,502	.....	.....	.....	9,384	11,133	11,133	.....	.....	10,769
Floyd.....	11,364	10,532	1,332	.....	10,787	12,721	11,821	1,400	.....	11,655	12,831	11,631	1,200	.....	11,678
Forsyth.....	7,449	7,449	.....	.....	6,389	7,656	7,656	.....	.....	6,782	7,601	7,601	.....	.....	6,561
Franklin.....	13,983	13,971	17	.....	12,809	14,222	14,222	.....	.....	13,069	14,771	14,471	800	.....	12,175
Fulton.....	1,604	1,604	.....	.....	1,398	1,377	1,315	.....	62	1,272	1,041	1,041	.....	.....	935
Glasseck.....	3,302	3,302	.....	.....	3,379	2,272	2,272	.....	.....	2,197	2,956	2,956	.....	.....	2,920
Gordon.....	6,609	6,609	.....	.....	6,292	6,179	6,179	.....	.....	5,877	7,587	7,587	.....	.....	7,303
Greene.....	11,533	11,573	10	.....	11,563	10,466	10,466	.....	.....	10,719	13,820	11,855	1,965	.....	12,754

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901, BY STATES AND COUNTIES—
Continued.

GEORGIA—Continued.

COUNTIES.	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				Equiva- lent 500- pound bales.	Commercial bales.				Equiva- lent 500- pound- bales.	Commercial bales.				Equiva- lent 500- pound bales.
	Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.	
Gwinnett.....	17,667	17,559	108	.....	15,736	18,604	17,444	1,160	.....	16,634	22,127	20,127	2,000	.....	19,354
Habersham.....	1,435	1,435	.....	.....	1,278	1,834	1,834	.....	.....	1,680	1,603	1,603	.....	.....	1,409
Hall.....	9,586	9,586	.....	.....	8,378	11,469	11,469	.....	.....	10,248	11,682	11,682	.....	.....	9,846
Hancock.....	14,371	13,888	483	.....	13,719	16,001	15,112	889	.....	15,052	13,069	12,107	962	.....	12,162
Harrison.....	5,597	5,597	.....	.....	4,817	6,159	6,159	.....	.....	5,261	6,928	6,928	.....	.....	6,187
Harris.....	22,852	21,330	1,522	.....	22,008	22,484	19,315	3,169	.....	20,749	23,343	21,033	2,310	.....	21,864
Hart.....	12,519	12,421	98	.....	11,261	12,170	12,170	.....	.....	11,180	11,783	11,783	.....	.....	10,801
Heard.....	13,422	13,422	.....	.....	12,996	10,966	10,966	.....	.....	10,531	11,805	11,805	.....	.....	10,727
Henry.....	20,056	19,856	200	.....	19,408	19,975	19,975	.....	.....	19,421	22,392	22,392	.....	.....	21,462
Houston.....	20,782	20,782	.....	.....	20,727	21,637	21,345	192	.....	21,375	22,696	21,503	1,193	.....	21,961
Irwin.....	2,929	1,891	.....	1,038	2,605	3,450	2,276	.....	1,174	3,296	6,163	5,551	.....	612	5,907
Jackson.....	22,866	22,816	50	.....	20,379	25,003	25,003	.....	.....	22,904	25,006	25,006	.....	.....	22,909
Jasper.....	15,320	15,320	.....	.....	15,189	16,517	16,517	.....	.....	16,359	19,308	17,068	1,340	.....	18,243
Jefferson.....	21,182	21,182	.....	.....	19,887	15,622	15,423	199	.....	14,416	18,713	18,140	573	.....	17,890
Johnson.....	8,386	8,386	.....	.....	8,016	6,907	6,708	199	.....	6,403	7,403	6,700	1,703	.....	6,361
Jones.....	11,130	11,130	.....	.....	11,165	10,358	10,358	.....	.....	10,340	11,995	11,995	.....	.....	11,855
Laurens.....	22,080	21,380	700	.....	21,298	18,526	18,167	364	55	18,058	23,398	21,917	1,291	100	23,814
Lee.....	8,651	8,651	.....	.....	8,195	7,968	7,968	.....	.....	7,486	8,480	8,370	110	.....	8,137
Liberty.....	450	30	.....	420	360	271	113	.....	158	209	630	837	.....	293	510
Lincoln.....	5,132	5,132	.....	.....	5,053	6,606	6,606	.....	.....	6,557	7,758	7,758	.....	.....	7,683
Lowndes.....	7,691	114	.....	7,577	6,162	5,853	404	.....	5,449	4,799	5,504	819	.....	4,085	4,507
Lumpkin.....	75	75	.....	.....	58	144	144	.....	.....	115	111	111	.....	.....	92
McDuffie.....	8,635	6,901	1,731	.....	7,678	6,821	6,480	341	.....	6,612	6,991	6,693	298	.....	6,812
Macon.....	16,713	16,713	.....	.....	16,761	14,977	14,977	.....	.....	14,905	16,660	16,660	.....	.....	17,085
Madison.....	11,448	11,448	.....	.....	10,259	12,034	12,034	.....	.....	10,990	13,556	13,556	.....	.....	12,340
Marion.....	9,681	9,681	.....	.....	9,336	6,886	6,886	.....	.....	6,092	8,257	8,257	.....	.....	7,996
Meriwether.....	22,452	22,452	.....	.....	22,401	21,208	21,208	.....	.....	21,111	23,524	23,524	.....	.....	23,185
Miller.....	2,075	2,025	.....	50	2,083	1,881	1,850	.....	31	1,924	2,303	2,773	.....	30	2,821
Milton.....	6,407	6,407	.....	.....	5,447	4,759	4,759	.....	.....	4,258	6,219	6,219	.....	.....	5,484
Mitchell.....	10,049	7,863	.....	2,186	9,520	12,374	9,736	.....	2,638	11,882	11,314	10,097	.....	1,217	10,877
Monroe.....	18,724	18,724	.....	.....	18,348	17,513	17,047	466	.....	17,104	20,151	19,106	1,045	.....	19,453
Montgomery.....	5,392	4,858	.....	534	4,892	5,044	4,650	.....	394	4,626	6,710	6,342	.....	368	6,388
Morgan.....	16,453	15,220	1,233	.....	15,637	18,736	16,883	1,853	.....	17,762	24,431	21,390	3,041	.....	22,632
Murray.....	2,586	2,586	.....	.....	2,345	2,115	2,115	.....	.....	1,980	1,921	1,921	.....	.....	1,784
Muscogee.....	7,042	7,042	.....	.....	6,989	5,937	5,662	275	.....	5,676	8,439	7,326	1,113	.....	7,784
Newton.....	14,373	14,348	25	.....	14,037	15,926	15,926	.....	.....	15,872	17,689	17,577	112	.....	16,400
Oconee.....	7,840	7,840	.....	.....	6,992	8,530	8,530	.....	.....	8,343	10,331	10,331	.....	.....	10,168
Oglethorpe.....	19,276	19,256	20	.....	17,859	18,245	18,245	.....	.....	17,244	22,340	22,340	.....	.....	20,535
Paulding.....	9,154	9,154	.....	.....	8,181	7,587	7,587	.....	.....	6,844	8,559	8,559	.....	.....	7,568
Pickens.....	1,851	1,851	.....	.....	1,634	2,172	2,172	.....	.....	1,964	2,102	2,102	.....	.....	1,881
Pierce.....	3,657	.....	.....	3,657	2,598	4,381	27	.....	4,304	3,133	5,423	82	.....	5,341	4,015
Pike.....	14,281	14,268	13	.....	14,211	13,582	13,582	.....	.....	13,298	15,189	15,189	.....	.....	14,950
Polk.....	8,852	8,852	.....	.....	8,163	10,811	9,535	1,276	.....	9,609	12,937	9,242	3,745	.....	10,633
Pulaski.....	16,431	15,134	1,297	.....	15,813	17,400	17,400	.....	.....	17,426	19,592	17,445	2,147	.....	18,497
Putnam.....	9,609	9,609	.....	.....	9,384	11,015	11,015	.....	.....	10,877	12,666	12,666	.....	.....	12,631
Quitman.....	6,243	6,243	.....	.....	6,184	5,600	5,600	.....	.....	5,494	6,636	6,636	.....	.....	6,387
Randolph.....	18,558	18,558	.....	.....	18,330	15,003	15,003	.....	.....	15,250	17,882	17,882	.....	.....	17,440
Richmond.....	8,764	8,764	.....	.....	8,734	4,717	4,717	.....	.....	4,548	5,421	5,421	.....	.....	5,364
Rockdale.....	7,368	7,368	.....	.....	7,239	12,499	12,499	.....	.....	12,475	6,943	6,943	.....	.....	6,776
Schley.....	5,760	5,760	.....	.....	5,683	5,080	4,747	333	.....	5,197	7,038	4,762	2,276	.....	5,332
Scriven.....	17,963	17,656	.....	297	16,884	14,213	14,136	.....	77	13,367	11,719	11,551	.....	168	11,049
Spalding.....	11,890	11,390	.....	.....	11,365	12,499	12,499	.....	.....	12,475	14,158	14,158	.....	.....	14,131
Stewart.....	17,875	17,875	.....	.....	17,687	16,200	15,803	397	.....	15,974	17,482	14,522	2,960	.....	15,946
Sumter.....	25,164	25,164	.....	.....	24,890	24,251	24,251	.....	.....	23,920	24,845	24,845	.....	.....	24,508
Talbot.....	8,893	8,893	.....	.....	8,467	12,785	12,785	.....	.....	12,696	11,541	11,541	.....	.....	11,245
Tallapoosa.....	6,487	6,020	467	.....	6,176	6,009	5,559	450	.....	5,782	7,106	7,106	.....	.....	7,179
Tattall.....	7,309	952	.....	6,357	5,900	6,478	1,323	.....	5,155	5,338	6,564	1,891	.....	4,673	5,335
Taylor.....	8,371	8,371	.....	.....	8,309	7,968	7,968	.....	.....	7,913	7,576	7,576	.....	.....	7,603
Telfair.....	2,541	2,324	.....	217	2,434	2,936	2,914	.....	22	2,819	4,254	4,254	.....	.....	4,045
Terrell.....	25,719	25,719	.....	.....	25,585	22,996	22,996	.....	.....	23,188	25,139	25,139	.....	.....	25,301
Thomas.....	12,473	10,923	.....	1,550	11,620	11,664	9,569	.....	2,095	10,457	11,056	9,493	.....	1,563	10,247
Troup.....	21,550	21,515	35	.....	21,433	18,494	18,494	.....	.....	18,469	19,646	19,646	.....	.....	19,614
Twiggs.....	9,484	9,484	.....	.....	9,149	10,677	10,677	.....	.....	10,223	13,962	13,962	.....	.....	13,356
Upson.....	9,765	9,765	.....	.....	9,661	10,117	10,117	.....	.....	10,011	11,561	11,561	.....	.....	11,389
Walker.....	8,631	8,631	.....	.....	8,267	8,103	8,103	.....	.....	8,207	8,884	8,884	.....	.....	8,454
Walton.....	19,665	19,665	.....	.....	19,053	19,963	19,963	.....	.....	19,634	22,357	22,357	.....	.....	21,691
Ware.....	123	.....	.....	123	91	14	.....	.....	14	11	.....	.....	.....	.....	.....
Warren.....	9,659	9,007	652	.....	9,338	8,825	8,369	456	.....	8,532	9,675	9,430	245	.....	9,414
Washington.....	29,544	29,194	350	.....	28,644	24,171	24,009	162	.....	23,278	26,768	26,339	429	.....	27,080
Wayne.....	965	110	.....	855	793	1,338	121	.....	1,212	1,092	1,308	282	.....	1,026	997
Webster.....	4,116	4,116	.....	.....	4,001	5,313	5,313	.....	.....	5,191	5,037	5,037	.....	.....	4,953
White.....	150	150	.....	.....	120	240	240	.....	.....	210	335	335	.....	.....	294

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901, BY STATES AND COUNTIES—Continued.

INDIAN TERRITORY.

COUNTIES.	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				Equiv- alent 500- pound bales.	Commercial bales.				Equiv- alent 500- pound bales.	Commercial bales.				Equiv- alent 500- pound bales.
	Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.	
The Territory.	160,324	121,785	33,539	.....	143,607	288,114	197,704	90,410	.....	249,935	284,170	199,049	85,121	.....	247,073
Cherokee nation	24,219	16,284	7,935	.....	20,594	36,583	24,013	12,570	.....	31,203	33,680	22,644	11,036	.....	28,655
Chickasaw nation	79,696	64,099	15,597	.....	72,275	140,108	106,032	34,076	.....	124,985	127,789	104,981	22,808	.....	118,345
Choctaw nation	81,513	28,239	8,274	.....	30,796	61,757	50,130	11,627	.....	57,949	62,332	49,155	13,177	.....	56,583
Creek nation	24,770	13,037	11,733	.....	19,792	44,688	17,404	27,284	.....	33,087	58,769	20,669	38,100	.....	41,789
Seminole nation	126	126	.....	.....	150	4,978	125	4,853	.....	2,761	1,600	1,600	.....	.....	1,701

KANSAS.

The State.....	121	121	.....	.....	121	151	151	.....	.....	151	170	170	.....	.....	157
Montgomery	121	121	.....	.....	121	151	151	.....	.....	151	170	170	.....	.....	157

KENTUCKY.

The State.....	84	84	.....	.....	79	133	133	.....	.....	133	140	140	.....	.....	172
Fulton	60	60	.....	.....	60	130	130	.....	.....	130	140	140	.....	.....	140
Graves	24	24	.....	.....	19	3	3	.....	.....	3	.....	.....	.....	.....	132

LOUISIANA.

The State.....	708,508	694,816	13,692	.....	700,352	714,073	696,049	18,024	.....	705,767	860,848	807,248	53,600	.....	840,476
Acadia	5,080	5,080	.....	.....	4,944	6,106	6,106	.....	.....	5,869	10,349	5,499	4,850	.....	7,802
Ascension	5,009	5,009	.....	.....	4,976	4,878	4,878	.....	.....	4,972	7,072	7,072	.....	.....	7,215
Avoyelles	38,586	38,570	16	.....	39,713	32,573	32,573	.....	.....	33,174	42,290	40,486	1,804	.....	42,372
Bienville	11,775	11,775	.....	.....	11,636	14,574	14,574	.....	.....	14,500	14,424	14,424	.....	.....	14,228
Bossier	27,639	25,655	1,984	.....	27,287	35,788	32,855	2,933	.....	35,641	39,849	36,586	2,763	.....	39,203
Caddo	30,213	29,620	593	.....	30,592	43,332	42,726	606	.....	43,907	40,287	40,287	.....	.....	41,413
Calcasieu	825	825	.....	.....	754	916	916	.....	.....	891	1,678	1,678	.....	.....	1,626
Caldwell	3,428	3,428	.....	.....	3,261	5,412	5,412	.....	.....	5,246	6,432	6,432	.....	.....	6,095
Cameron	621	621	.....	.....	646	440	440	.....	.....	412	662	662	.....	.....	638
Catahoula	12,979	12,979	.....	.....	12,005	13,092	13,092	.....	.....	12,175	16,650	16,650	.....	.....	15,992
Claiborne	20,270	20,270	.....	.....	19,718	24,667	24,667	.....	.....	24,859	23,830	23,830	.....	.....	23,391
Concordia	24,096	24,096	.....	.....	24,084	19,686	19,686	.....	.....	20,825	28,125	28,125	.....	.....	30,820
De Soto	18,990	18,990	.....	.....	18,910	26,188	26,188	.....	.....	26,755	21,116	21,002	114	.....	21,172
East Baton Rouge	22,476	22,080	396	.....	21,128	19,981	19,114	867	.....	18,753	30,819	28,851	1,968	.....	28,919
East Carroll	18,970	18,970	.....	.....	19,223	15,308	15,308	.....	.....	15,914	17,461	17,461	.....	.....	18,252
East Feliciana	24,615	22,042	2,573	.....	21,752	25,120	23,869	1,757	.....	23,078	29,660	26,779	2,881	.....	27,070
Franklin	6,990	6,858	132	.....	6,772	11,259	10,736	523	.....	10,795	11,923	11,118	805	.....	11,409
Grant	8,651	8,651	.....	.....	8,689	7,671	7,671	.....	.....	7,780	8,912	8,912	.....	.....	8,909
Iberia	3,406	3,406	.....	.....	3,509	4,163	2,002	2,161	.....	3,251	7,427	3,802	4,125	.....	5,600
Iberville	4,149	4,149	.....	.....	4,204	3,584	3,584	.....	.....	3,591	7,865	6,155	1,710	.....	7,156
Jackson	6,679	6,679	.....	.....	6,850	7,922	7,922	.....	.....	7,643	8,174	8,174	.....	.....	7,802
Lafayette	14,935	13,744	1,191	.....	14,486	14,610	14,610	.....	.....	14,358	25,346	14,546	10,800	.....	20,064
Lincoln	11,137	11,137	.....	.....	11,027	14,426	14,426	.....	.....	14,217	15,501	15,501	.....	.....	15,215
Livingston	3,100	3,100	.....	.....	2,923	4,368	4,368	.....	.....	3,981	5,495	5,495	.....	.....	5,232
Madison	14,274	14,274	.....	.....	14,400	15,799	15,799	.....	.....	16,614	19,484	19,484	.....	.....	20,881
Morehouse	32,763	32,163	600	.....	32,165	25,557	25,885	172	.....	25,810	28,936	28,814	122	.....	28,713
Natchitoches	28,187	28,187	.....	.....	28,350	27,785	27,785	.....	.....	27,971	31,072	31,072	.....	.....	31,300
Ouachita	22,466	22,466	.....	.....	22,232	18,440	18,440	.....	.....	18,098	22,326	22,326	.....	.....	22,355
Pointe Coupee	41,672	41,672	.....	.....	42,682	32,859	32,859	.....	.....	33,032	46,402	46,402	.....	.....	46,999
Rapides	33,015	36,729	1,280	.....	33,155	22,778	18,346	4,432	.....	20,681	43,984	32,808	11,176	.....	33,871
Red River	15,063	15,063	.....	.....	15,283	20,154	19,729	425	.....	20,897	16,982	16,982	.....	.....	17,571
Richland	13,079	13,079	.....	.....	13,210	17,935	17,935	.....	.....	18,189	15,871	15,871	.....	.....	16,062
Sabine	10,426	10,426	.....	.....	10,453	12,318	12,318	.....	.....	12,371	9,829	9,829	.....	.....	9,882
St. Helena	6,325	6,325	.....	.....	6,063	7,213	7,213	.....	.....	6,981	8,858	8,858	.....	.....	8,542
St. Landry	44,729	44,726	3	.....	43,951	37,420	37,420	.....	.....	36,522	50,928	49,777	1,151	.....	49,852
St. Martin	11,612	7,102	4,510	.....	9,606	10,185	6,037	4,148	.....	8,387	15,679	6,348	9,331	.....	11,854
St. Tammany	1,137	1,137	.....	.....	1,048	1,439	1,439	.....	.....	1,806	1,748	1,748	.....	.....	1,648
Tangipahoa	4,111	4,111	.....	.....	4,071	3,702	3,702	.....	.....	3,577	5,302	5,302	.....	.....	5,450
Tensas	32,297	31,889	408	.....	34,041	26,345	26,345	.....	.....	27,869	34,278	34,278	.....	.....	36,018
Union	12,391	12,391	.....	.....	12,242	17,541	17,541	.....	.....	17,478	17,019	17,019	.....	.....	16,761
Vermilion	3,594	3,594	.....	.....	3,701	4,017	4,017	.....	.....	4,264	6,509	6,509	.....	.....	7,093
Vernon	1,493	1,493	.....	.....	1,478	1,606	1,606	.....	.....	1,538	2,249	2,249	.....	.....	2,159
Washington	9,809	9,809	.....	.....	9,967	8,482	8,482	.....	.....	8,048	11,150	11,150	.....	.....	10,537
Webster	8,911	8,911	.....	.....	8,813	12,793	12,793	.....	.....	12,776	12,536	12,536	.....	.....	12,446
West Baton Rouge	8,168	8,168	.....	.....	8,062	4,262	4,262	.....	.....	4,161	7,685	7,685	.....	.....	7,399
West Carroll	8,527	8,527	.....	.....	8,546	4,034	4,034	.....	.....	4,062	5,312	5,312	.....	.....	5,409
West Feliciana	19,618	19,618	.....	.....	18,776	17,035	17,035	.....	.....	16,599	17,957	17,957	.....	.....	17,952
Winn	5,747	5,747	.....	.....	5,518	8,304	8,304	.....	.....	7,999	7,910	7,910	.....	.....	7,602

¹Includes 16,000 pounds in Graves county not baled.

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901, BY STATES AND COUNTIES—
Continued.

MISSISSIPPI.

COUNTIES.	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				Equiv- alent 500- pound bales.	Commercial bales.				Equiv- alent 500- pound bales.	Commercial bales.				Equiv- alent 500- pound bales.
	Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.	
The State.....	1,264,048	1,214,699	49,349	.....	1,237,666	1,055,968	1,018,090	37,878	.....	1,046,700	1,275,439	1,230,016	45,423	.....	1,254,863
Adams	23,971	23,971	.....	.....	22,600	22,404	22,319	85	.....	21,415	26,696	28,196	500	.....	25,012
Alcorn	5,219	5,219	.....	.....	5,229	5,221	5,221	.....	.....	5,224	5,165	5,165	.....	.....	5,175
Amite	21,352	21,352	.....	.....	21,057	20,167	19,550	617	.....	19,812	25,709	25,769	.....	.....	25,203
Attala	18,906	18,906	.....	.....	18,561	14,130	14,130	.....	.....	13,950	17,242	17,242	.....	.....	17,200
Benton	7,391	7,391	.....	.....	7,383	6,307	6,307	.....	.....	6,346	5,437	5,437	.....	.....	5,393
Bolivar	53,976	53,976	.....	.....	55,463	67,307	67,307	.....	.....	71,188	63,492	63,492	.....	.....	67,021
Calhoun	9,447	9,447	.....	.....	9,444	6,671	6,671	.....	.....	7,025	7,833	7,833	.....	.....	7,816
Carroll	21,251	18,513	2,738	.....	19,600	19,078	16,619	2,459	.....	17,718	20,681	18,684	2,047	.....	19,462
Chickasaw	16,841	12,809	4,032	.....	15,194	13,653	13,017	636	.....	13,790	14,373	14,373	.....	.....	14,016
Choctaw	8,113	8,113	.....	.....	8,170	5,827	5,827	.....	.....	5,854	7,694	7,694	.....	.....	7,771
Claiborne	13,232	13,232	.....	.....	12,156	12,979	12,979	.....	.....	12,204	13,255	13,255	.....	.....	12,297
Clarke	10,056	10,056	.....	.....	10,116	6,484	6,484	.....	.....	6,390	8,015	8,015	.....	.....	8,855
Clay	16,080	16,080	.....	.....	16,505	10,564	10,564	.....	.....	10,742	11,482	11,482	.....	.....	11,717
Coalhoma	43,164	41,831	1,333	.....	43,167	44,213	43,939	274	.....	44,922	40,784	40,320	464	.....	41,424
Copiah	25,223	25,223	.....	.....	24,761	25,404	25,404	.....	.....	24,975	35,081	35,081	.....	.....	34,215
Covington	7,249	7,249	.....	.....	6,912	6,440	6,440	.....	.....	6,151	9,540	9,540	.....	.....	9,147
De Soto	25,935	22,289	3,646	.....	24,197	23,180	20,655	2,525	.....	22,361	21,966	20,885	1,081	.....	20,745
Franklin	13,335	13,335	.....	.....	12,830	12,269	12,269	.....	.....	11,888	14,131	14,131	.....	.....	13,731
Greene	175	175	.....	.....	175	255	255	.....	.....	255	434	434	.....	.....	433
Grenada	16,450	13,359	3,091	.....	14,890	11,745	8,122	3,623	.....	10,139	13,608	7,532	6,076	.....	10,376
Hancock	180	180	.....	.....	180	.....	.....	.....	.....	.....	2	2	.....	.....	2
Hinds	46,022	36,615	9,407	.....	41,021	27,347	25,764	1,583	.....	25,739	41,934	40,206	1,728	.....	40,146
Holmes	38,914	35,009	3,905	.....	37,328	26,869	24,695	2,204	.....	26,146	42,959	37,848	5,111	.....	40,762
Issaquena	17,315	17,315	.....	.....	17,525	16,358	16,358	.....	.....	16,829	18,350	18,350	.....	.....	19,142
Itawamba	4,940	4,940	.....	.....	4,981	3,723	3,723	.....	.....	3,706	5,397	5,397	.....	.....	5,491
Jackson	3	3	.....	.....	3	.....	.....	.....	.....	.....	2	2	.....	.....	2
Jasper	11,188	11,188	.....	.....	11,187	8,276	8,276	.....	.....	8,225	10,541	10,541	.....	.....	10,400
Jefferson	28,195	28,195	.....	.....	26,817	25,139	23,976	1,163	.....	24,459	29,053	27,466	1,587	.....	28,270
Jones	7,222	7,222	.....	.....	6,995	6,209	6,209	.....	.....	6,036	9,143	9,143	.....	.....	8,868
Kemper	15,940	15,940	.....	.....	15,987	10,578	10,578	.....	.....	10,581	13,606	13,606	.....	.....	13,621
Lafayette	16,118	16,118	.....	.....	15,852	11,160	10,611	549	.....	11,014	12,891	12,891	.....	.....	12,684
Lauderdale	15,034	15,034	.....	.....	14,952	10,202	10,202	.....	.....	9,782	15,432	15,432	.....	.....	15,185
Lawrence	12,486	12,486	.....	.....	11,491	10,433	10,433	.....	.....	10,061	14,663	14,663	.....	.....	13,992
Leake	13,000	13,000	.....	.....	13,293	8,207	8,207	.....	.....	8,045	12,329	12,329	.....	.....	12,162
Lee	16,302	16,302	.....	.....	16,771	12,196	12,196	.....	.....	12,616	14,395	14,395	.....	.....	14,739
Lefflore	39,397	39,397	30	.....	39,470	31,403	31,403	.....	.....	30,843	30,272	30,272	.....	.....	30,374
Lincoln	11,542	11,542	.....	.....	11,454	10,309	10,309	.....	.....	9,981	14,941	14,941	.....	.....	14,903
Lowndes	20,920	20,920	.....	.....	20,907	15,708	15,708	.....	.....	15,651	18,696	18,696	.....	.....	18,422
Madison	27,096	25,753	1,343	.....	26,682	20,308	18,729	1,579	.....	19,680	31,352	26,554	4,798	.....	29,408
Marion	5,052	5,052	.....	.....	4,823	5,179	5,179	.....	.....	5,068	6,482	6,482	.....	.....	6,423
Marshall	22,806	22,806	.....	.....	22,270	16,992	16,990	302	.....	16,906	16,469	15,873	596	.....	16,084
Monroe	26,184	24,221	1,963	.....	26,035	16,101	15,087	1,104	.....	16,133	19,969	19,736	233	.....	20,203
Montgomery	13,584	10,986	2,648	.....	11,911	9,048	8,008	1,040	.....	8,961	10,813	10,813	.....	.....	10,640
Neshoba	7,877	7,877	.....	.....	7,690	6,410	6,410	.....	.....	6,290	8,205	8,205	.....	.....	8,110
Newton	16,533	16,533	.....	.....	16,362	11,406	11,406	.....	.....	11,310	17,814	17,814	.....	.....	17,652
Nexabee	25,025	22,325	2,700	.....	23,843	21,764	20,629	1,135	.....	21,243	21,071	18,985	2,086	.....	20,178
Oktibbeha	12,322	12,322	.....	.....	12,442	7,468	7,140	328	.....	7,496	8,640	8,135	505	.....	8,564
Panola	28,230	28,230	.....	.....	27,198	23,082	20,980	2,052	.....	22,243	26,839	23,939	2,900	.....	25,410
Pearl River	170	170	.....	.....	165	162	162	.....	.....	162	362	362	.....	.....	333
Perry	1,287	1,287	.....	.....	1,292	1,122	1,122	.....	.....	1,109	1,441	1,441	.....	.....	1,429
Pike	9,849	9,849	.....	.....	9,590	12,875	12,875	.....	.....	12,521	18,680	18,680	.....	.....	17,901
Pontotoc	12,602	12,602	.....	.....	12,756	10,916	10,494	422	.....	10,916	9,572	9,130	442	.....	9,816
Prentiss	10,099	10,099	.....	.....	10,247	7,218	7,218	.....	.....	7,412	7,594	7,594	.....	.....	7,726
Quitman	6,310	6,310	.....	.....	6,384	6,758	6,758	.....	.....	6,724	8,912	8,912	.....	.....	8,635
Rankin	14,273	14,273	.....	.....	14,228	10,088	10,088	.....	.....	9,937	14,881	14,881	.....	.....	14,725
Scott	8,346	8,346	.....	.....	8,194	5,755	5,755	.....	.....	5,645	10,775	10,775	.....	.....	10,520
Sharkey	21,576	21,576	.....	.....	23,474	19,493	19,493	.....	.....	21,370	20,664	20,664	.....	.....	22,446
Simpson	9,187	9,187	.....	.....	8,742	7,369	7,369	.....	.....	7,133	9,442	9,442	.....	.....	9,179
Smith	9,056	9,056	.....	.....	8,643	6,956	6,956	.....	.....	6,806	9,426	9,426	.....	.....	9,202
Sumflower	17,636	17,437	199	.....	18,009	19,003	19,003	.....	.....	19,674	22,557	22,557	.....	.....	23,203
Tallahatchie	24,510	22,096	2,414	.....	23,515	27,672	25,927	1,745	.....	27,465	27,115	24,597	2,518	.....	25,273
Tate	17,197	17,197	.....	.....	17,184	13,482	13,486	46	.....	13,295	14,150	13,470	680	.....	13,720
Tippah	7,434	7,383	51	.....	7,485	5,996	5,996	.....	.....	6,060	5,281	5,281	.....	.....	5,245
Tishomingo	3,720	3,720	.....	.....	3,744	3,537	3,537	.....	.....	3,555	4,565	4,565	.....	.....	4,616
Tunica	24,959	23,844	1,115	.....	24,716	23,436	22,079	1,357	.....	22,655	24,361	24,361	.....	.....	24,000
Union	10,099	8,209	1,890	.....	9,291	7,375	5,949	1,426	.....	6,649	8,212	7,005	1,207	.....	7,745
Warren	23,856	23,816	40	.....	23,201	20,417	20,417	.....	.....	20,416	29,386	29,386	.....	.....	29,081
Washington	64,551	64,507	44	.....	69,132	50,733	50,733	.....	.....	55,739	68,515	68,515	.....	.....	74,748
Wayne	4,819	4,819	.....	.....	4,913	4,155	4,155	.....	.....	4,254	5,252	5,252	.....	.....	5,191
Webster	9,515	9,515	.....	.....	8,966	5,705	5,705	.....	.....	5,621	6,488	6,488	.....	.....	6,393
Wilkinson	17,610	17,610	.....	.....	16,508	19,532	17,522	2,010	.....	18,323	28,386	25,586	2,800	.....	25,364
Whiston	10,749	10,749	.....	.....	10,782	8,102	8,102	.....	.....	8,124	12,666	12,666	.....	.....	12,731
Yalobusha	17,886	11,126	6,760	.....	14,888	15,606	8,592	7,014	.....	12,190	19,563	11,523	8,035	.....	15,590
Yazoo	49,379	49,379	.....	.....	47,884	35,692	35,692	.....	.....	35,458	51,549	51,549	.....	.....	51,108

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901, BY STATES AND COUNTIES—
Continued.

MISSOURI.

COUNTIES.	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				Equiva- lent 500- pound bales.	Commercial bales.				Equiva- lent 500- pound bales.	Commercial bales.				Equiva- lent 500- pound bales.
	Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.	
The State.....	19,377	19,377	.....	.....	20,275	27,980	25,712	2,268	.....	27,871	30,837	28,445	2,392	.....	30,890
Butler.....	136	136	.....	.....	136	230	230	.....	.....	241	.....	.....	.....	.....	.....
Dunklin.....	12,985	12,985	.....	.....	13,660	19,256	16,988	2,268	.....	18,568	19,700	17,368	2,392	.....	19,320
Howell.....	192	192	.....	.....	197	220	220	.....	.....	226	234	234	.....	.....	242
Mississippi.....	12	12	.....	.....	12	13	13	.....	.....	13	.....	.....	.....	.....	.....
New Madrid.....	1,690	1,690	.....	.....	1,831	2,645	2,645	.....	.....	2,790	3,577	3,577	.....	.....	3,862
Oregon.....	75	75	.....	.....	78	137	137	.....	.....	137	165	165	.....	.....	170
Ozark.....	610	610	.....	.....	610	879	879	.....	.....	910	599	599	.....	.....	614
Pemiscot.....	1,494	1,394	.....	.....	1,442	1,805	1,805	.....	.....	1,942	3,265	3,265	.....	.....	3,376
Ripley.....	353	353	.....	.....	353	180	180	.....	.....	192	145	145	.....	.....	147
Stoddard.....	1,387	1,387	.....	.....	1,393	1,813	1,813	.....	.....	2,014	2,640	2,640	.....	.....	2,701
Taney.....	543	543	.....	.....	553	802	802	.....	.....	843	462	462	.....	.....	458

NORTH CAROLINA.

The State.....	473,155	472,385	770	.....	440,400	509,341	507,263	2,078	.....	477,269	451,441	448,814	2,627	.....	415,808
Alamance.....	736	736	.....	.....	590	1,156	1,156	.....	.....	970	1,031	1,031	.....	.....	869
Alexander.....	612	880	82	.....	755	798	798	.....	.....	700	2,031	531	1,500	.....	1,208
Anson.....	19,139	19,139	.....	.....	18,666	16,141	16,141	.....	.....	15,741	12,354	12,354	.....	.....	11,645
Beaufort.....	3,623	3,623	.....	.....	3,485	6,486	6,486	.....	.....	6,260	5,757	5,757	.....	.....	5,695
Bertie.....	6,563	6,563	.....	.....	6,506	9,227	9,227	.....	.....	9,488	10,477	10,477	.....	.....	10,411
Bladen.....	3,055	3,055	.....	.....	2,999	3,222	3,222	.....	.....	3,142	3,685	3,685	.....	.....	3,660
Brunswick.....	253	253	.....	.....	253	412	412	.....	.....	412	1,005	1,005	.....	.....	1,001
Burke.....	224	224	.....	.....	202	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cabarrus.....	8,197	8,197	.....	.....	7,569	7,257	7,257	.....	.....	6,855	7,443	7,443	.....	.....	6,860
Caldwell.....	8	8	.....	.....	6	8	8	.....	.....	6	.....	.....	.....	.....	110
Camden.....	1,001	1,001	.....	.....	1,011	1,815	1,815	.....	.....	1,903	1,852	1,852	.....	.....	2,002
Carteret.....	600	600	.....	.....	595	902	902	.....	.....	872	753	753	.....	.....	745
Catawba.....	4,536	4,536	.....	.....	4,018	4,657	4,657	.....	.....	4,214	5,129	5,129	.....	.....	4,493
Chatham.....	6,734	6,734	.....	.....	6,724	7,205	7,205	.....	.....	7,873	6,381	6,381	.....	.....	5,648
Chowan.....	2,064	2,064	.....	.....	2,065	3,351	3,351	.....	.....	3,817	3,467	3,467	.....	.....	3,420
Cleveland.....	12,350	12,350	.....	.....	11,309	14,766	14,766	.....	.....	13,738	12,603	12,603	.....	.....	11,505
Columbus.....	2,483	2,483	.....	.....	2,505	2,969	2,969	.....	.....	2,976	2,086	2,086	.....	.....	2,045
Craven.....	4,244	4,244	.....	.....	4,076	5,312	5,312	.....	.....	5,175	4,991	4,991	.....	.....	4,843
Cumberland.....	8,601	8,601	.....	.....	7,970	8,080	8,080	.....	.....	7,525	6,888	6,888	.....	.....	6,208
Currituck.....	678	578	.....	.....	593	1,387	1,387	.....	.....	1,362	1,185	1,185	.....	.....	1,209
Davidson.....	1,366	1,366	.....	.....	1,295	1,489	1,489	.....	.....	1,415	1,486	1,486	.....	.....	1,328
Davie.....	840	840	.....	.....	758	1,192	1,192	.....	.....	1,053	712	712	.....	.....	617
Duplin.....	5,100	5,100	.....	.....	4,845	7,778	7,778	.....	.....	7,881	3,219	3,219	.....	.....	3,083
Durham.....	1,820	1,820	.....	.....	1,145	1,459	1,459	.....	.....	1,291	1,573	1,573	.....	.....	1,331
Edgecombe.....	15,626	15,626	.....	.....	13,699	19,078	19,078	.....	.....	17,145	23,125	23,125	.....	.....	20,686
Forsyth.....	11	11	.....	.....	9	60	60	.....	.....	50	.....	.....	.....	.....	.....
Franklin.....	10,865	10,865	.....	.....	9,831	13,951	13,951	.....	.....	12,464	12,627	12,627	.....	.....	10,979
Gaston.....	7,477	7,477	.....	.....	6,577	7,948	7,948	.....	.....	7,194	9,447	9,447	.....	.....	8,531
Graves.....	1,481	1,481	.....	.....	1,470	2,106	2,106	.....	.....	2,077	2,581	2,581	.....	.....	2,575
Granville.....	1,523	1,523	.....	.....	1,333	1,994	1,994	.....	.....	1,752	2,349	2,349	.....	.....	2,099
Greene.....	7,500	7,500	.....	.....	7,288	8,077	8,077	.....	.....	7,959	6,871	6,871	.....	.....	6,622
Guilford.....	549	549	.....	.....	276	408	408	.....	.....	387	1,171	1,171	.....	.....	1,110
Halifax.....	15,838	15,460	428	.....	14,587	16,414	15,646	768	.....	14,587	16,889	16,330	559	.....	15,290
Harnett.....	6,265	6,265	.....	.....	5,614	6,249	6,249	.....	.....	5,520	5,506	5,506	.....	.....	4,727
Hertford.....	3,993	3,983	10	.....	3,973	4,789	4,789	.....	.....	4,819	5,097	5,097	.....	.....	4,569
Hyde.....	139	139	.....	.....	135	397	397	.....	.....	398	189	189	.....	.....	200
Iredell.....	11,180	11,180	.....	.....	10,127	8,941	8,941	.....	.....	8,080	9,506	9,506	.....	.....	8,536
Johnston.....	19,834	19,834	.....	.....	17,835	25,335	24,025	1,310	.....	21,670	17,531	16,963	568	.....	14,942
Jones.....	3,680	3,680	.....	.....	3,543	4,201	4,201	.....	.....	4,030	2,956	2,956	.....	.....	2,841
Lenoir.....	7,153	7,153	.....	.....	7,155	9,126	9,126	.....	.....	9,053	7,947	7,947	.....	.....	7,786
Lincoln.....	5,796	5,796	.....	.....	5,107	5,801	5,801	.....	.....	5,210	5,607	5,607	.....	.....	4,893
Martin.....	3,642	3,642	.....	.....	3,603	3,529	3,529	.....	.....	3,514	4,001	4,001	.....	.....	3,812
Mecklenburg.....	22,805	22,805	.....	.....	21,799	26,038	26,038	.....	.....	25,222	22,384	22,384	.....	.....	20,921
Montgomery.....	5,503	5,503	.....	.....	5,044	3,295	3,295	.....	.....	2,993	3,144	3,144	.....	.....	2,835
Moore.....	5,050	5,050	.....	.....	4,484	4,885	4,885	.....	.....	4,253	4,107	4,107	.....	.....	3,586
Nash.....	10,174	10,174	.....	.....	8,795	10,056	10,056	.....	.....	8,732	12,012	12,012	.....	.....	10,525
Northampton.....	11,570	11,570	.....	.....	11,350	9,649	9,649	.....	.....	9,442	11,326	11,326	.....	.....	11,135
Onslow.....	2,333	2,333	.....	.....	2,298	2,827	2,827	.....	.....	2,668	2,076	2,076	.....	.....	1,993
Orange.....	1,929	1,929	.....	.....	1,636	2,424	2,424	.....	.....	2,196	2,026	2,026	.....	.....	1,715
Pamlico.....	1,274	1,274	.....	.....	1,267	2,171	2,171	.....	.....	2,174	1,329	1,329	.....	.....	1,287
Pasquotank.....	1,088	1,088	.....	.....	1,094	1,620	1,620	.....	.....	1,720	2,503	2,503	.....	.....	2,651
Pender.....	827	827	.....	.....	776	967	967	.....	.....	924	636	636	.....	.....	602
Perquimans.....	3,223	3,223	.....	.....	3,251	5,084	5,084	.....	.....	5,160	3,718	3,718	.....	.....	3,788
Pitt.....	14,474	14,474	.....	.....	13,948	15,902	15,902	.....	.....	15,179	16,531	16,531	.....	.....	15,583
Folk.....	1,000	1,000	.....	.....	896	825	825	.....	.....	743	813	813	.....	.....	717
Randolph.....	560	560	.....	.....	448	762	762	.....	.....	662	785	785	.....	.....	675
Richmond.....	23,931	23,931	.....	.....	23,609	7,854	7,854	.....	.....	7,468	4,888	4,888	.....	.....	4,393
Robeson.....	28,847	28,847	.....	.....	28,269	27,349	27,349	.....	.....	26,606	19,201	19,201	.....	.....	17,935
Rowan.....	9,453	9,453	.....	.....	8,791	8,661	8,661	.....	.....	8,052	7,446	7,446	.....	.....	7,569
Rutherford.....	5,271	5,271	.....	.....	4,698	5,825	5,825	.....	.....	5,509	5,078	5,078	.....	.....	4,449

1 Includes 5,000 pounds in Caldwell county not baled.

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901, BY STATES AND COUNTIES—Continued.

NORTH CAROLINA—Continued.

COUNTIES.	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				Equiva- lent 500- pound bales.	Commercial bales.				Equiva- lent 500- pound bales.	Commercial bales.				Equiva- lent 500- pound bales.
	Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.	
Sampson	9,521	9,521			8,881	10,639	10,639			9,798	7,519	7,519			6,622
Scotland						11,889	11,889			11,769	10,285	10,285			10,024
Stanly	6,105	5,805	300		5,368	4,280	4,280			3,928	4,319	4,319			3,929
Tyrrell	720	720			707	711	711			710	779	779			769
Union	25,316	25,316			22,950	22,263	22,263			21,117	17,388	17,388			15,682
Vance	2,542	2,542			2,325	4,387	4,387			4,036	3,969	3,969			3,494
Wake	22,616	22,616			19,581	25,534	25,534			22,145	18,106	18,106			16,007
Warren	6,653	6,653			6,058	9,150	9,150			8,523	9,163	9,163			8,170
Washington	1,861	1,861			1,837	3,025	3,025			3,043	2,473	2,473			2,465
Wayne	19,695	19,695			18,571	23,359	23,359			21,666	16,660	16,660			15,449
Wilson	11,660	11,660			10,606	12,451	12,451			11,227	11,230	11,230			10,275
Yadkin	20	20			16	36	36			18	30	30			18

OKLAHOMA.

The Territory.	84,035	53,077	30,958		71,983	116,875	89,782	27,093		106,707	149,064	109,770	39,288		131,413
Blaine	1,118		1,118		559	1,180		1,180		585	876	772	704		494
Cleveland	8,958	6,462	2,496		7,826	15,003	11,085	3,918		13,207	11,317	10,537	780		10,943
Custer	1,898	765	1,133		1,377	2,744	500	2,244		1,712	3,150	550	2,600		1,980
Devey	200	200			200	210	210			210	275	275			275
Greer	4,239	4,239			4,231	17,966	17,966			18,767	21,153	21,153			21,190
Kay											425	425			425
Kingfisher	1,368	1,368			1,359	2,132	2,132			2,102	2,510	2,510			2,406
Lincoln	16,688	10,028	5,660		13,326	22,763	16,787	5,976		20,433	25,879	17,772	11,107		23,726
Logan	6,132	4,192	1,940		5,286	6,025	3,381	2,644		4,846	11,743	4,569	7,174		8,307
Noble	1,000	1,000			1,000	840				840					
Oklahoma	4,166	4,166			4,213	7,112	7,112			7,447	6,549	5,739	810		6,233
Pawnee	1,971	1,971			2,181	1,734	1,734			1,830	4,277	4,277			4,473
Payne	5,855	3,555	2,300		4,810	9,923	3,474	6,449		6,016	14,452	6,915	7,537		10,865
Pottawatomie	28,662	12,351	16,311		22,839	20,515	15,833	4,682		18,711	28,055	19,479	8,576		24,199
Washita	2,698	2,698			2,722	8,728	8,728			9,101	16,101	15,101			15,506
Woods	82	82			104						302	302			302

SOUTH CAROLINA.

The State.	876,545	864,714	3,602	8,229	837,105	780,782	770,767	1,860	8,149	748,726	732,719	722,736	2,316	7,617	692,261
Abbeville	28,047	28,047			26,490	21,176	21,176			20,325	26,938	26,938			25,908
Aiken	26,889	26,889			25,044	25,597	25,597			24,547	25,273	25,273			23,950
Anderson	39,615	39,615			38,456	35,566	35,566			34,839	40,633	40,633			38,523
Barnwell	17,704	17,614	90		17,817	14,171	14,171			14,267	12,500	12,500			12,594
Barnwell	88,100	36,962	1,138		38,048	32,427	32,427			33,869	26,414	26,414			26,643
Beaufort	3,903	2,260		1,643	3,304	3,422	1,955		1,467	2,871	4,315	2,761		1,554	3,721
Berkeley	13,188	11,991		1,197	11,888	10,647	10,636		11	9,952	10,556	10,546		10	9,453
Charleston	5,389			5,389	3,707	6,671			6,671	4,703	6,013			6,013	4,229
Cherokee	10,369	10,369			9,700	7,642	7,642			7,120	8,217	8,217			7,483
Chester	21,045	20,331	714		19,133	21,207	20,317	890		19,448	16,291	16,291	200		15,274
Chesterfield	14,193	14,193			13,919	11,790	11,790			11,417	8,827	8,827			8,238
Clarendon	21,865	21,865			22,512	21,003	21,003			20,991	20,009	20,009			20,236
Colleton	8,043	8,043			8,099	8,604	8,604			8,417	9,276	9,280		40	8,721
Darlington	29,552	29,552			29,462	27,615	27,615			27,669	26,772	26,772			25,540
Dorchester	6,569	6,569			6,234	6,377	6,377			5,997	6,018	6,018			5,726
Edgefield	20,125	20,125			19,304	19,513	19,513			18,815	20,870	20,870			19,977
Fairfield	22,212	22,212			21,613	22,274	22,274			21,491	16,918	16,918			17,785
Florence	19,137	19,137			18,991	16,742	16,742			16,052	14,568	14,568			14,224
Georgetown	1,305	1,305			1,296	1,323	1,323			1,303	1,212	1,212			1,156
Greenville	26,809	26,809			24,645	23,888	23,888			21,911	25,701	25,701			22,705
Greenwood	28,834	28,820	14		26,987	22,880	22,880			21,282	27,623	27,623			26,651
Hampton	14,755	14,750	5		15,028	12,159	12,159			12,083	11,638	11,638			11,336
Horry	5,231	5,231			5,194	5,647	5,647			5,530	6,145	6,145			6,007
Kershaw	17,727	17,727			17,458	17,253	17,253			16,949	14,463	14,463			13,842
Lancaster	20,499	20,499			18,576	18,880	18,880			17,713	14,410	14,410			12,923
Laurens	39,993	38,780	1,213		35,888	30,991	30,991			29,231	34,879	34,879			32,457
Lexington	14,352	14,352			13,024	13,994	13,994			12,781	12,314	12,314			11,557
Marion	28,939	28,939			27,685	30,720	30,720			29,051	21,559	21,559			20,319
Marlboro	39,194	39,194			38,467	36,089	36,089			35,168	23,900	23,900			23,114
Newberry	26,245	26,845	400		24,240	20,936	20,936		976	19,040	26,587	24,471	2,116		22,474
Oconee	10,695	10,695			9,972	10,254	10,254			9,585	11,149	11,149			10,181
Orangeburg	65,149	65,134	15		62,071	52,203	52,203			49,738	53,980	53,980			50,596
Pickens	11,323	11,323			10,320	9,199	9,199			8,433	8,982	8,982			7,938
Richland	12,678	12,673			12,665	11,554	11,554			11,563	9,838	9,838			9,551
Saluda	14,643	14,643			13,497	12,492	12,492			11,490	14,463	14,463			13,469
Spartanburg	36,739	36,739			33,747	31,322	31,322			29,077	29,302	29,302			26,298
Sumter	50,670	50,670			51,404	45,523	45,523			45,809	34,093	34,093			33,926
Union	18,258	18,258			17,052	15,003	15,003			13,985	12,273	12,273			11,517
Williamsburg	20,630	20,630			20,318	19,804	19,804			18,647	13,904	13,904			13,498
York	26,037	26,024	13		23,910	27,134	27,134			25,489	22,156	22,156			22,521

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901, BY STATES AND COUNTIES—
Continued.

TENNESSEE.

COUNTIES.	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				Equiv- alent 500- pound bales.	Commercial bales.				Equiv- alent 500- pound bales.	Commercial bales.				Equiv- alent 500- pound bales.
	Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.	
The State.....	215,175	199,926	15,249	.....	211,641	227,601	203,149	24,452	.....	221,619	204,538	185,167	19,881	.....	197,133
Bedford.....	49	49	.....	.....	46	74	74	.....	.....	71	139	139	.....	.....	135
Benton.....	333	333	.....	.....	336	378	378	.....	.....	394	412	412	.....	.....	425
Bledsoe.....	8	.....	8	.....	4	3	3	.....	.....	3	.....	.....	.....	.....	23
Bradley.....	284	284	.....	.....	251	378	378	.....	.....	343	320	320	.....	.....	307
Cannon.....	24	24	.....	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Carroll.....	6,881	5,231	1,650	.....	6,215	10,845	5,421	5,424	.....	8,394	7,609	4,092	3,517	.....	5,952
Chester.....	3,774	3,774	.....	.....	3,771	3,351	3,351	.....	.....	3,394	3,619	3,619	.....	.....	3,683
Crockett.....	5,770	5,770	.....	.....	5,949	5,861	5,861	.....	.....	6,189	6,311	6,311	.....	.....	6,534
Decatur.....	1,208	1,208	.....	.....	1,176	1,197	1,197	.....	.....	1,188	1,460	1,460	.....	.....	1,461
Dekalb.....	4	4	.....	.....	4	2	2	.....	.....	2	.....	.....	.....	.....	.....
Dickson.....	6	6	.....	.....	6	6	6	.....	.....	6	.....	.....	.....	.....	25
Dyer.....	11,055	5,639	5,516	.....	8,639	14,625	8,361	6,264	.....	12,058	10,399	7,415	2,984	.....	9,160
Fayette.....	21,602	21,602	.....	.....	21,864	18,611	17,596	1,020	.....	18,533	13,357	13,357	.....	.....	13,105
Gibson.....	7,252	7,252	.....	.....	7,546	7,970	7,970	.....	.....	8,468	7,089	7,089	.....	.....	7,445
Glies.....	5,779	5,779	.....	.....	5,785	8,839	8,839	.....	.....	9,081	11,761	11,761	.....	.....	11,627
Hamilton.....	17	17	.....	.....	17	22	22	.....	.....	24	67	67	.....	.....	62
Hardenman.....	10,795	10,595	200	.....	10,700	10,881	10,881	.....	.....	10,982	8,739	8,739	.....	.....	8,598
Hardin.....	4,780	4,889	341	.....	4,648	5,885	3,786	2,099	.....	4,946	6,110	3,904	2,206	.....	5,038
Haywood.....	18,844	18,844	3,500	.....	17,098	15,400	14,948	512	.....	15,298	11,101	11,027	74	.....	11,017
Henderson.....	4,706	4,706	.....	.....	4,723	4,525	4,525	.....	.....	4,066	4,370	4,370	.....	.....	4,424
Henry.....	658	658	.....	.....	668	1,040	1,040	.....	.....	1,105	603	603	.....	.....	646
Hickman.....	86	36	.....	.....	36	28	28	.....	.....	31	64	64	.....	.....	64
Jackson.....	5	5	.....	.....	5	4	4	.....	.....	4	.....	.....	.....	.....	.....
James.....	13,530	13,530	.....	.....	14,657	18,909	18,909	.....	.....	15,075	17,210	14,310	2,900	.....	16,501
Lauderdale.....	13,079	10,786	2,293	.....	12,004	17,038	12,274	4,764	.....	15,088	12,881	12,078	803	.....	12,559
Lawrence.....	371	371	.....	.....	371	350	350	.....	.....	350	400	400	.....	.....	400
Lincoln.....	2,196	2,196	.....	.....	2,199	4,017	4,017	.....	.....	4,091	5,730	5,730	.....	.....	5,887
London.....	.....	.....	.....	.....	.....	3	3	.....	.....	3	745	745	.....	.....	710
McMinn.....	433	433	.....	.....	425	819	819	.....	.....	754	745	745	.....	.....	710
McNairy.....	6,997	6,997	.....	.....	7,125	6,161	6,161	.....	.....	6,298	6,203	6,203	.....	.....	6,348
Madison.....	12,095	12,095	.....	.....	12,480	12,824	12,824	.....	.....	13,044	9,237	9,237	.....	.....	9,366
Marshall.....	295	295	.....	.....	295	213	213	.....	.....	213	271	271	.....	.....	279
Mauzy.....	233	233	.....	.....	233	363	363	.....	.....	300	557	557	.....	.....	546
Meigs.....	3	3	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Monroe.....	3	3	.....	.....	3	14	14	.....	.....	14	.....	.....	.....	.....	22
Obion.....	867	867	.....	.....	867	2,415	2,415	.....	.....	2,428	3,000	807	2,193	.....	1,917
Overton.....	2	2	.....	.....	2	10	10	.....	.....	10	1	1	.....	.....	1
Perry.....	215	215	.....	.....	198	996	996	.....	.....	893	705	705	.....	.....	692
Polk.....	778	778	.....	.....	710	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rutherford.....	3,158	3,158	.....	.....	3,193	4,364	4,364	.....	.....	4,426	3,958	3,958	.....	.....	3,884
Sevier.....	6	6	.....	.....	6	2	2	.....	.....	2	.....	.....	.....	.....	2
Shelby.....	34,693	34,693	.....	.....	35,454	28,198	27,806	392	.....	28,537	28,111	27,437	674	.....	27,889
Tipton.....	20,327	18,586	1,741	.....	19,762	24,248	20,271	3,977	.....	23,075	19,405	15,435	4,030	.....	17,768
Warren.....	100	100	.....	.....	100	.....	.....	.....	.....	100	.....	.....	.....	.....	.....
Wayne.....	350	350	.....	.....	350	215	215	.....	.....	217	492	492	.....	.....	506
Weakley.....	1,573	1,573	.....	.....	1,648	1,322	1,322	.....	.....	1,458	1,963	1,963	.....	.....	2,171
White.....	8	8	.....	.....	8	.....	.....	.....	.....	120	4	4	.....	.....	215
Williamson.....	32	32	.....	.....	35	30	30	.....	.....	33	78	78	.....	.....	69

TEXAS.

The State.....	2,658,555	2,392,094	266,461	.....	2,609,018	3,536,506	3,121,525	414,981	.....	3,438,386	2,594,442	2,301,226	293,216	.....	2,502,166
Anderson.....	16,370	16,370	.....	.....	16,826	19,553	19,553	.....	.....	19,784	16,065	16,065	.....	.....	16,165
Angelina.....	3,967	3,967	.....	.....	3,838	4,482	4,482	.....	.....	4,519	4,598	4,598	.....	.....	4,600
Aransas.....	.....	.....	.....	.....	.....	1,996	.....	1,996	.....	1,078	.....	.....	.....	.....	.....
Archer.....	135	135	.....	.....	141	95	95	.....	.....	160	21	21	.....	.....	22
Atascosa.....	3,875	3,875	.....	.....	3,999	8,837	8,837	.....	.....	9,251	4,569	4,569	.....	.....	4,744
Austin.....	29,932	28,547	1,385	.....	31,744	9,805	9,024	781	.....	10,078	18,358	15,225	3,133	.....	18,046
Bandera.....	1,168	1,168	.....	.....	1,206	3,343	3,343	.....	.....	3,462	2,453	2,453	.....	.....	2,542
Bastrop.....	41,048	35,409	5,639	.....	40,261	37,226	25,960	11,266	.....	35,054	24,970	18,614	6,356	.....	22,671
Baylor.....	450	450	.....	.....	466	1,860	1,860	.....	.....	1,857	1,080	1,080	.....	.....	1,076
Bee.....	4,560	4,560	.....	.....	4,784	12,411	12,411	.....	.....	12,847	7,884	7,884	.....	.....	8,256
Bell.....	53,152	50,357	2,795	.....	55,754	66,086	56,053	10,033	.....	66,276	51,865	46,373	5,492	.....	51,842
Bexar.....	8,321	7,975	346	.....	8,886	28,813	28,869	4,944	.....	27,846	12,508	11,638	820	.....	12,578
Blanco.....	3,783	3,783	.....	.....	3,951	6,370	6,370	.....	.....	6,860	3,687	3,687	.....	.....	3,844
Bosque.....	11,566	11,566	.....	.....	11,736	23,220	23,220	.....	.....	23,992	15,518	14,005	1,513	.....	16,046
Bowie.....	16,665	16,665	.....	.....	16,826	20,557	20,557	.....	.....	21,347	16,240	16,240	.....	.....	16,766
Brazoria.....	6,720	6,720	.....	.....	6,888	1,264	1,264	.....	.....	1,314	1,493	1,493	.....	.....	1,635
Brazos.....	21,272	21,272	.....	.....	22,069	19,764	16,386	3,378	.....	18,473	21,349	17,954	3,395	.....	20,195
Brown.....	12,340	12,340	.....	.....	12,619	27,712	27,712	.....	.....	28,273	8,366	7,979	387	.....	8,255
Burleson.....	28,372	19,845	8,527	.....	25,194	18,341	13,818	4,523	.....	16,890	18,494	15,741	2,753	.....	17,684
Burnet.....	7,587	7,587	.....	.....	7,788	15,730	15,730	.....	.....	16,518	4,926	4,926	.....	.....	5,068

1 Includes 1,000 pounds in White county not baled.

2 Includes cotton not baled, as follows: Bledsoe county, 1,500 pounds; Dickson county, 2,500 pounds; Monroe county, 1,050 pounds; and White county, 6,000 pounds.

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901. BY STATES AND COUNTIES—

Continued.

TEXAS—Continued.

COUNTIES	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				Equiva- lent 500- pound bales.	Commercial bales.				Equiva- lent 500- pound bales.	Commercial bales.				Equiva- lent 500- pound bales.
	Total.	Square.	Round.	Sea Island.		Total.	Square.	Round.	Sea Island.		Total.	Square.	Round.	Sea Island.	
Caldwell	50,807	30,779	11,028		47,473	45,282	30,295	5,987		44,306	25,764	23,496	2,268		25,318
Callahan	1,402	1,402			1,477	469	469			468	1,305	1,305			1,401
Callahan	7,588	7,588			7,716	11,707	11,707			11,980	6,057	6,057			6,158
Camp	7,612	7,612			7,607	13,093	13,093			13,206	8,597	8,597			8,417
Cass	15,376	15,376			15,343	21,353	21,353			21,409	20,110	20,110			19,744
Cherokee	15,176	15,176			15,300	20,374	20,374			20,516	14,434	14,434			14,545
Childress	255	255			255	1,380	1,380			1,380	1,150	1,150			1,150
Clay	3,346	3,346			3,346	7,689	7,689			7,761	7,856	7,856			7,936
Coke	1,318	1,318			1,345	4,693	4,693			4,820	1,761	1,761			1,794
Coleman	7,773	7,773			8,089	18,224	18,224			19,371	7,616	7,374	242		7,684
Collin	53,330	42,971	10,359		49,077	82,934	54,179	28,755		70,963	68,549	49,078	19,471		60,049
Colorado	29,795	28,155	1,640		30,923	8,197	8,186	11		8,759	16,716	16,481	235		17,886
Comal	11,304	11,304			11,997	19,475	19,475			20,854	8,468	8,468			8,911
Comanche	23,196	23,196			23,797	46,366	46,366			47,777	23,409	23,409			23,907
Concho	40	40			42	166	166			173					
Cooke	11,815	11,515	300		11,905	18,249	18,249			18,751	20,346	17,910	2,436		19,561
Coryell	22,557	18,157	4,400		20,702	29,346	29,346			30,868	17,248	16,242	2,006		17,041
Cottle	165	165			173	710	710			710	738	738			812
Dallas	42,512	39,124	3,388		41,012	60,362	61,909	14,553		59,070	44,323	36,471	7,852		40,818
Delta	23,940	23,756	184		24,705	34,905	34,905	216		36,558	30,435	30,435			31,474
Denton	24,824	14,947	9,877		20,381	50,880	24,577	26,253		39,092	41,549	25,352	19,197		35,180
Dewitt	28,906	17,307	11,599		23,440	32,447	23,826	8,621		29,058	25,462	19,150	6,312		22,730
Duval	819	819			853	1,694	1,694			1,708	644	644			658
Eastland	16,340	14,600	1,740		15,611	39,704	35,955	3,749		38,164	25,996	23,983	2,016		25,453
Edwards	4	4			4	94	94			94	276	276			276
Ellis	93,685	71,774	21,911		86,639	138,104	104,645	33,459		126,134	82,437	71,520	10,917		79,434
El Paso	20,020	20,020			21,211	43,415	41,326	2,089		44,097	27,880	24,882	2,998		26,977
Evans	52,196	39,592	12,604		48,416	68,404	48,710	19,754		61,450	51,922	40,994	10,928		48,427
Fannin	61,063	51,190	6,873		59,802	102,019	92,248	9,776		101,027	82,889	78,367	4,522		83,429
Fayette	71,630	66,115	5,515		73,238	40,575	36,014	4,561		40,832	41,444	40,029	1,415		43,183
Fisher	745	745			745	3,359	3,359			3,364	1,036	1,036			1,062
Foard	400	400			400	1,510	1,510			1,542	721	721			750
Fort Bend	9,057	7,227	1,830		8,266	3,458	2,647	811		3,099	9,650	9,650			9,567
Franklin	8,527	8,527			8,659	10,533	10,533			10,820	7,003	7,003			7,052
Freestone	19,705	19,705			20,158	28,503	28,503			29,130	20,390	20,390			20,768
Frio	2,480	2,480			2,590	7,529	7,529			7,917	4,930	3,817	1,113		4,464
Galveston	794	794			761	356	356			356	965	965			930
Gillespie	6,076	6,076			6,383	12,360	12,360			12,956	7,835	7,835			8,216
Goliad	7,192	7,192			7,435	11,192	11,192			11,513	9,204	4,336	4,868		6,951
Gonzales	42,229	42,229			44,131	37,032	37,032			38,507	29,233	28,208	1,030		29,737
Grayson	45,281	35,911	9,370		40,871	70,074	54,501	15,573		63,480	79,611	56,512	23,099		67,650
Gregg	6,234	6,234			6,194	7,841	7,841			7,810	7,589	7,589			7,525
Grimes	25,695	25,695			26,541	11,832	11,481	351		11,981	16,037	15,499	538		16,141
Guadalupe	29,429	28,874	5,555		28,114	59,981	48,279	11,702		56,638	24,904	21,563	3,341		24,285
Hall	113	113			113	717	717			717	752	752			752
Hamilton	15,268	13,870	1,398		15,070	26,759	26,759			27,956	12,881	12,881			13,275
Harden	1,335	1,335			1,335	3,700	3,700			3,848	2,138	2,138			2,138
Hardin	89	89			83	151	151			149	101	101			101
Harris	5,532	5,532			5,859	2,047	2,047			2,118	5,055	2,846	2,209		4,063
Harrison	19,611	19,611			19,663	28,257	28,257			28,351	21,776	21,776			21,640
Haskell	830	830			830	2,510	2,510			2,510	1,870	1,870			1,956
Hays	24,161	20,974	3,187		23,737	34,299	26,191	8,108		31,652	19,186	13,954	5,232		17,197
Hemphill	40	40			40										
Henderson	15,894	15,894			16,093	21,821	21,821			22,131	12,568	12,568			12,665
Hidalgo					285	285	285			285					
Hill	62,493	49,753	12,740		59,070	97,209	67,854	29,355		85,660	55,751	47,887	7,864		53,798
Hood	8,352	7,496	856		7,941	18,584	15,464	3,120		17,244	10,593	8,523	2,070		9,589
Hopkins	24,567	24,567			24,710	49,011	49,011			49,268	30,653	30,653			30,698
Houston	25,625	25,625			26,154	26,671	26,671			27,254	25,384	25,384			25,965
Howard	5	5			5	300	300			300	450	450			450
Hunt	52,987	46,754	6,233		50,317	97,674	66,495	31,079		83,752	79,828	47,608	32,220		64,595
Jack	3,161	3,161			3,172	6,801	6,801			6,902	4,440	4,440			4,444
Jackson	3,195	3,195			3,325	1,197	1,197			1,267	3,465	3,465			3,537
Jasper	1,884	1,884			1,822	2,436	2,436			2,412	2,978	2,978			2,910
Johnson	26,844	25,068	1,776		26,384	45,307	37,717	7,590		42,790	32,673	27,946	4,727		28,623
Jones	4,401	4,401			4,401	7,345	7,345			7,495	10,120	10,120			10,411
Karnes	12,814	12,314			12,515	22,797	22,797			22,926	12,296	12,296			12,491
Kaufman	55,273	48,034	7,239		53,429	79,412	74,246	5,166		79,171	53,845	48,718	5,127		51,710
Kendall	1,856	1,856			1,878	3,912	3,912			3,994	3,062	3,062			3,198
Kent	189	189			189	104	104			105	198	198			203
Kerr	778	778			789	1,250	1,250			1,270	1,182	1,182			1,204
Kimble	634	634			634	1,062	1,062			1,067	834	834			834
Knox	941	941			941	2,578	2,578			2,601	2,041	2,041			2,114
Lamar	49,221	46,969	2,252		49,193	87,933	86,542	851		89,415	56,099	54,736	1,353		56,197
Lampasas	4,484	4,484			4,562	7,794	7,794			8,166	4,151	4,151			4,356
Lavaca	39,074	38,982	92		42,434	28,226	23,858	4,368		28,058	27,003	24,981	2,022		27,675
Lee	22,804	17,399	5,405		21,486	12,138	8,970	3,168		10,963	13,242	9,166	4,116		11,565
Leon	21,869	21,869			21,778	22,180	20,452	1,728		21,925	19,518	17,318	2,200		18,438
Liberty	3,475	3,475			3,376	2,222	2,222			2,179	2,218	2,218			2,125
Limestone	49,639	48,024	1,615		49,790	60,932	53,847	2,085		62,232	46,529	45,563	976		47,430

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901, BY STATES AND COUNTIES—
Continued.

TEXAS—Continued.

COUNTIES.	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				Equiv- alent 500- pound bales.	Commercial bales.				Equiv- alent 500- pound bales.	Commercial bales.				Equiv- alent 500- pound bales.
	Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.	
Live Oak	424	424			424	2,357	2,357			2,413	1,177	1,177			1,193
Llano	2,512	2,512			2,524	4,143	4,143			4,283	899	899			918
McCulloch	3,100	3,100			3,104	6,348	6,348			6,674	1,908	1,908			1,950
McLennan	70,536	58,824	16,712		65,961	93,460	70,246	23,214		88,447	65,954	51,199	14,755		61,225
Madison	11,636	11,636			11,896	8,247	8,247			8,418	7,937	7,937			8,207
Marion	3,891	3,891			3,880	6,122	6,122			6,043	4,848	4,848			4,779
Mason	4,164	4,164			4,257	6,893	6,893			7,143	3,163	3,163			3,218
Matagorda	4,289	4,289			4,375	540	540			537	1,326	1,326			1,331
Medina	4,058	4,058			4,195	12,344	12,344			12,959	7,789	7,789			8,097
Menard	660	660			689	1,859	1,859			1,934	1,500	1,500			1,600
Milam	68,927	59,567	9,360		67,753	54,109	52,046	2,063		55,869	43,680	43,680			45,856
Mills	4,706	4,706			4,879	8,412	8,412			8,819	5,093	4,977	116		5,207
Mitchell	906	906			916	2,658	2,658			2,710	984	984			1,002
Montague	16,767	13,384	3,383		15,061	36,798	32,609	4,189		34,488	28,247	28,247			28,454
Monterey	9,980	9,980			10,272	4,026	4,026			4,059	6,093	6,093			6,243
Morris	9,514	9,514			9,315	16,362	16,362			16,095	8,676	8,676			8,494
Nacogdoches	19,059	19,059			19,041	21,898	21,898			21,996	15,562	15,562			15,409
Navarro	66,460	62,192	4,268		65,478	91,518	78,889	12,629		88,013	51,155	46,773	4,382		49,937
Newton	1,387	1,387			1,319	1,584	1,584			1,503	1,243	1,243			1,203
Nolan	1,696	876	820		1,324	2,536	2,536	300		2,467	1,468	1,468			1,513
Nueces	489	489			503	1,941	1,941			1,952	595	595			601
Orange	33	33			36	13	13			9	15	15			11
Palo Pinto	5,239	4,682	657		4,928	12,019	11,119	900		12,514	6,447	6,447			6,317
Panola	13,927	13,927			13,927	17,840	17,829	11		17,823	13,395	13,395			13,472
Parker	17,382	17,382			17,433	36,222	36,222			36,672	19,624	19,624			19,551
Pecos	70	70			73	162	162			168	230	230			230
Polk	8,454	8,454			8,455	7,217	7,217			7,142	9,672	9,672			9,462
Rains	5,554	5,554			5,575	5,930	5,930			5,907	5,399	5,399			5,279
Red River	28,173	27,836	337		28,584	46,637	46,637			47,870	35,603	35,603			35,911
Reeves					8	8	8			8	75	75			75
Refugio	402	402			402	402	402			410	354	354			369
Robertson	34,436	29,132	5,304		32,394	32,776	27,140	5,636		30,849	33,549	31,351	2,198		33,289
Rockwall	11,848	11,848			12,053	24,302	19,582	4,720		22,202	13,319	12,769	550		13,351
Runnels	3,069	3,069			3,099	9,722	9,722			9,993	5,164	5,164			5,402
Rusk	21,236	21,236			21,291	24,997	24,997			25,088	19,022	19,022			18,671
Sabine	4,388	4,388			4,262	5,814	5,814			5,788	4,356	4,356			4,791
San Augustine	6,262	6,262			6,187	7,695	7,695			7,626	6,193	6,193			6,418
San Jacinto	8,844	8,844	300		8,826	6,618	6,618			6,749	5,528	5,528			5,376
San Patricio	830	830			835	2,547	2,547			2,619	1,317	1,317			1,366
San Saba	3,279	3,279			3,320	8,420	8,420			8,658	2,538	2,538			2,588
Seurry	900	900			936	4,610	4,610			4,934	2,888	2,888			2,970
Shackelford	807	807			807	1,763	1,763			1,788	434	434			442
Shelby	14,697	14,697			14,606	18,510	18,510			18,210	14,917	14,917			14,785
Smith	26,787	26,787			26,888	43,368	43,368			42,549	31,336	31,336			31,141
Somervell	1,375	1,375			1,411	4,687	4,687			4,776	2,799	2,799			2,833
Stephens	3,872	3,872			3,875	5,807	5,807			5,870	2,729	2,729			2,780
Stonewall	700	700			700	1,606	1,606			1,633	432	432			434
Tarrant	17,019	14,459	2,560		16,190	33,406	26,711	6,695		30,868	23,114	19,111	4,003		21,492
Taylor	6,462	6,462			6,520	10,403	10,253	150		10,363	5,215	4,227	988		4,894
Throckmorton	335	335			352	615	615			658	275	275			280
Titus	10,740	10,740			10,720	15,806	15,806			15,867	12,683	12,683			12,571
Tom Green	85	85			85	328	328			329	890	890			930
Travis	57,486	56,263	1,223		60,078	70,089	65,589	4,500		71,899	43,195	37,501	5,694		40,994
Trinity	6,776	6,776			6,812	7,904	7,904			8,092	7,266	7,266			7,389
Tyler	4,672	4,672			4,581	4,072	4,072			4,059	4,486	4,486			4,459
Upshur	13,512	13,512			13,431	21,343	21,343			21,306	17,479	17,479			17,315
Uvalde	515	515			528	1,847	1,847			1,860	1,353	1,353			1,380
Van Zandt	26,266	26,266			26,428	36,252	36,252			37,787	21,783	21,783			21,895
Victoria	11,451	11,451			11,956	7,809	2,647	5,162		5,547	18,000	4,220	8,780		9,060
Walker	9,277	9,277			9,714	6,478	6,478			6,823	7,547	7,547			7,810
Waller	8,845	8,845			9,191	2,265	2,265			2,306	7,372	7,372			7,483
Ward	921	924			928	2,759	2,759			2,718	3,055	3,055			2,907
Washington	47,324	46,452	872		48,791	23,096	22,020	1,076		23,405	30,354	29,244	1,110		30,380
Wharton	41,036	12,479	28,557		27,383	4,570	2,209	2,361		3,568	18,701	12,044	6,657		16,090
Wichita	313	313			313	2,000	2,000			1,956	1,457	1,457			1,625
Wilbarger	1,450	1,450			1,475	108,137	91,704	16,433		104,761	78,345	53,520	19,825		66,855
Williamson	88,537	77,752	10,785		89,237	28,361	22,228	6,133		26,554	18,485	15,096	3,389		17,291
Wilson	8,155	8,155			8,522	37,541	37,541			38,315	30,222	30,222			30,763
Wise	18,119	16,654	1,465		17,556	25,247	25,247			25,367	14,967	14,967			14,732
Wood	15,888	15,888			15,992	7,053	7,053			7,140	3,915	3,915			3,953
Young	2,984	2,984			3,031										

UTAH.

The State ¹											31				
Washington											31				

¹ No report of cotton ginned in 1899, 15,560 pounds ginned in 1900 but not baled, and no cotton ginned in 1901.

TABLE 8.—QUANTITY OF COTTON GINNED FROM CROPS GROWN IN 1899, 1900, AND 1901, BY STATES AND COUNTIES—
Continued.

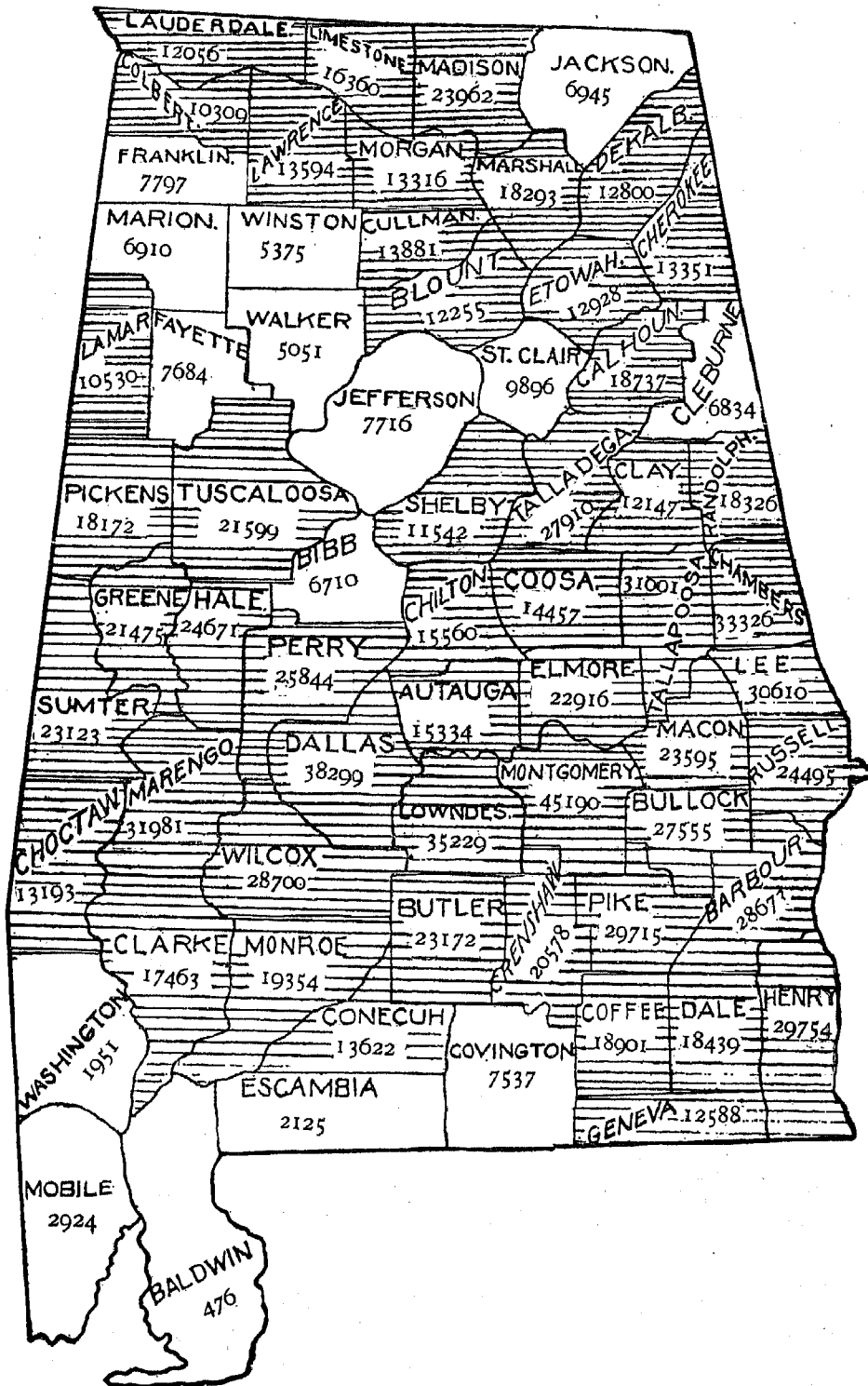
VIRGINIA.

COUNTIES.	CROP OF 1899.					CROP OF 1900.					CROP OF 1901.				
	Commercial bales.				EQUIVA- LENT 500- POUND BALES.	Commercial bales.				EQUIVA- LENT 500- POUND BALES.	Commercial bales.				EQUIVA- LENT 500- POUND BALES.
	Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.		Total.	Square.	Round.	Sea island.	
The State.....	9,239	9,239	.....	.....	8,622	11,883	11,833	.....	.....	11,022	14,009	14,009	.....	.....	112,916
Brunswick.....	3,190	3,190	.....	.....	2,951	3,602	3,602	.....	.....	3,323	3,170	3,170	.....	.....	2,692
Greensville.....	1,902	1,902	.....	.....	1,831	2,771	2,771	.....	.....	2,663	2,360	2,360	.....	.....	2,179
Mecklenburg.....	250	250	.....	.....	230	995	995	.....	.....	912	1,145	1,145	.....	.....	1,067
Nansemond.....	230	230	.....	.....	220	197	197	.....	.....	185	333	333	.....	.....	310
Norfolk.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,294	1,294	.....	.....	1,277
Pittsylvania.....	.....	.....	.....	.....	.....	2	2	.....	.....	2	.....	.....	.....	.....	110
Prince George.....	78	78	.....	.....	67	60	60	.....	.....	54	71	71	.....	.....	60
Southampton.....	2,220	2,220	.....	.....	2,079	3,133	3,133	.....	.....	2,936	4,184	4,184	.....	.....	4,033
Sussex.....	1,369	1,369	.....	.....	1,244	1,073	1,073	.....	.....	947	1,452	1,452	.....	.....	1,288

¹ Includes 5,000 pounds not baled, in Pittsylvania county.

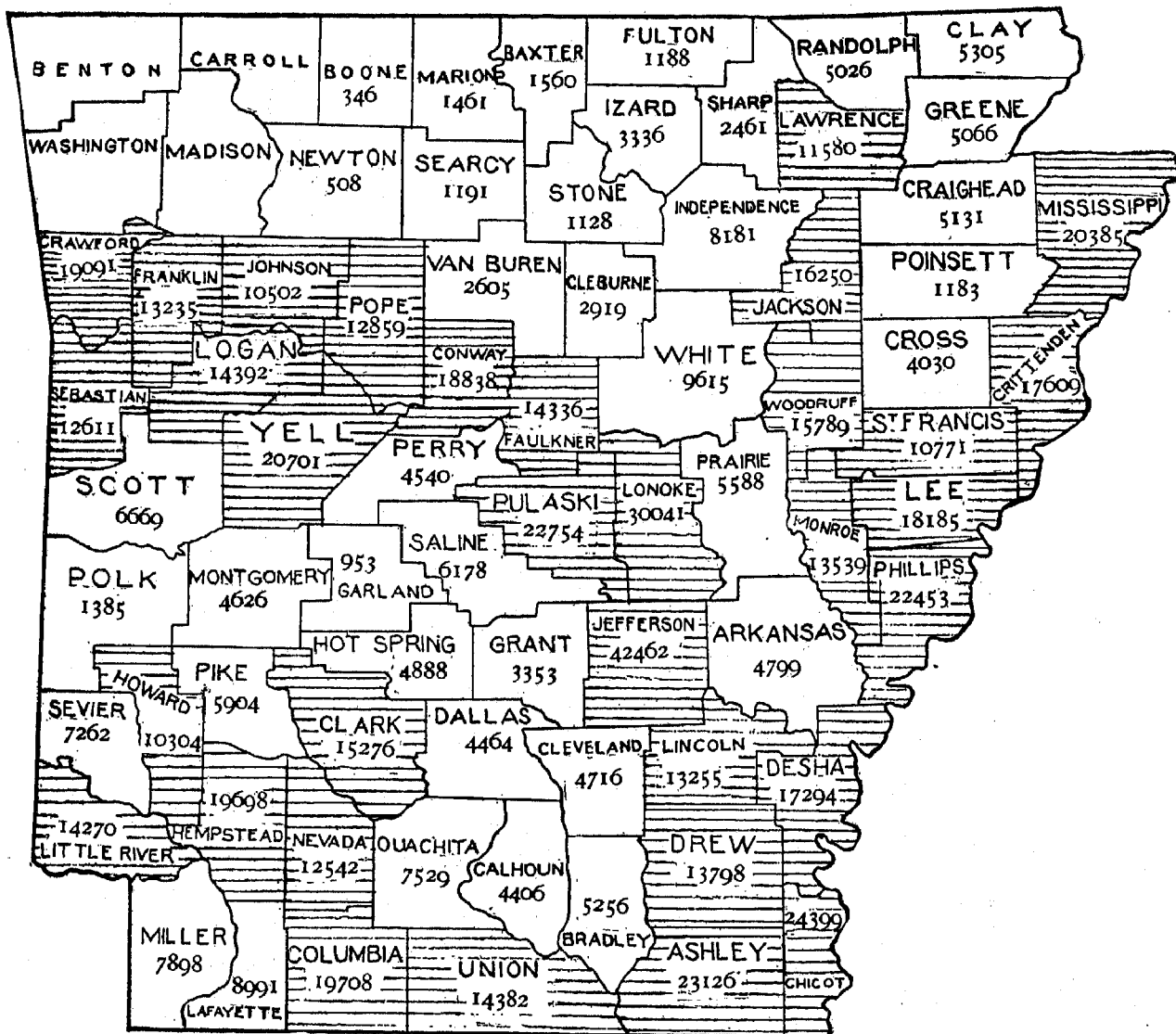
ALABAMA.

FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
COUNTIES SHADED, REPORTED 10,000 BALES OR OVER.



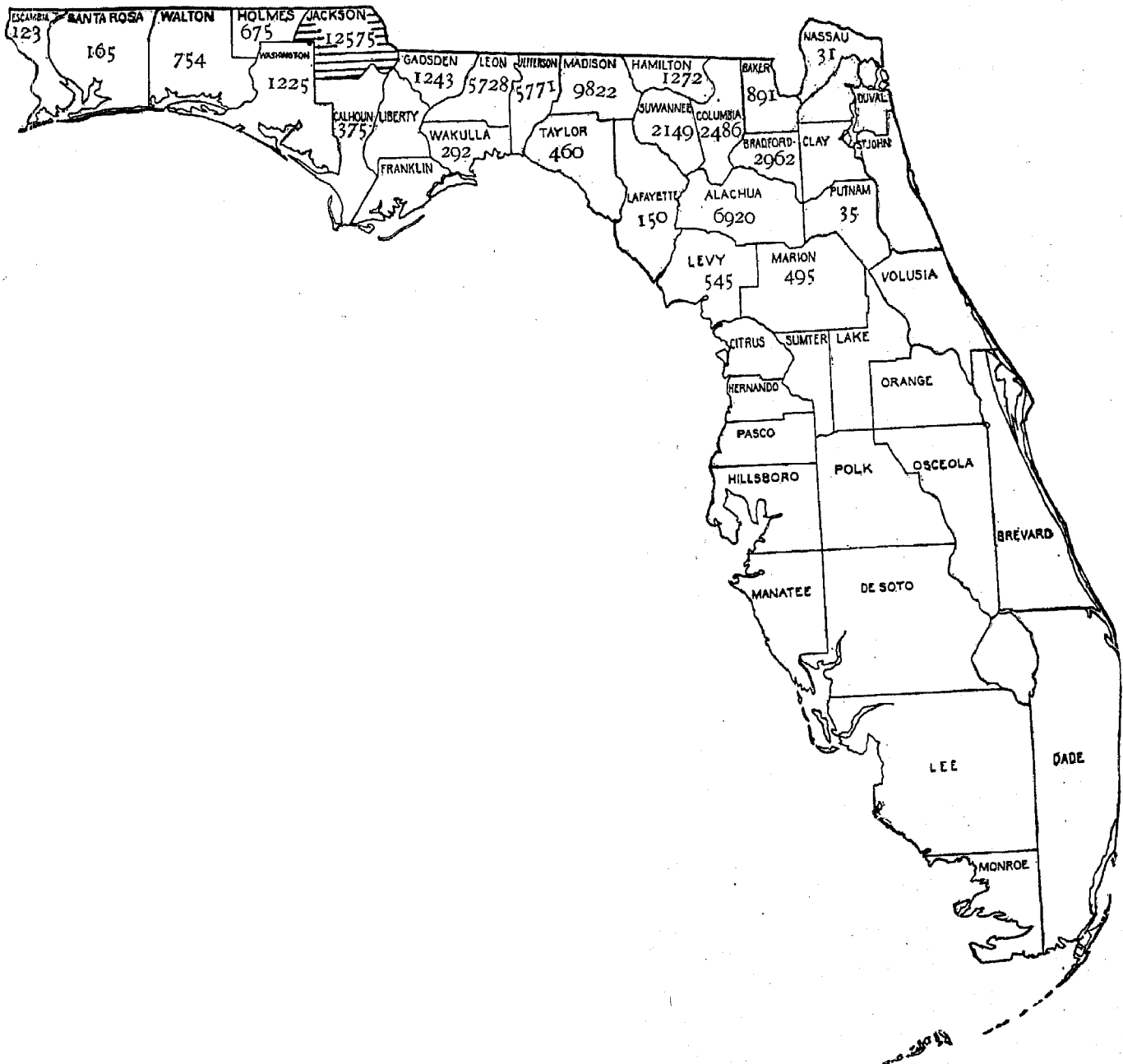
ARKANSAS.

FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
COUNTIES SHADED, REPORTED 10,000 BALES OR OVER.



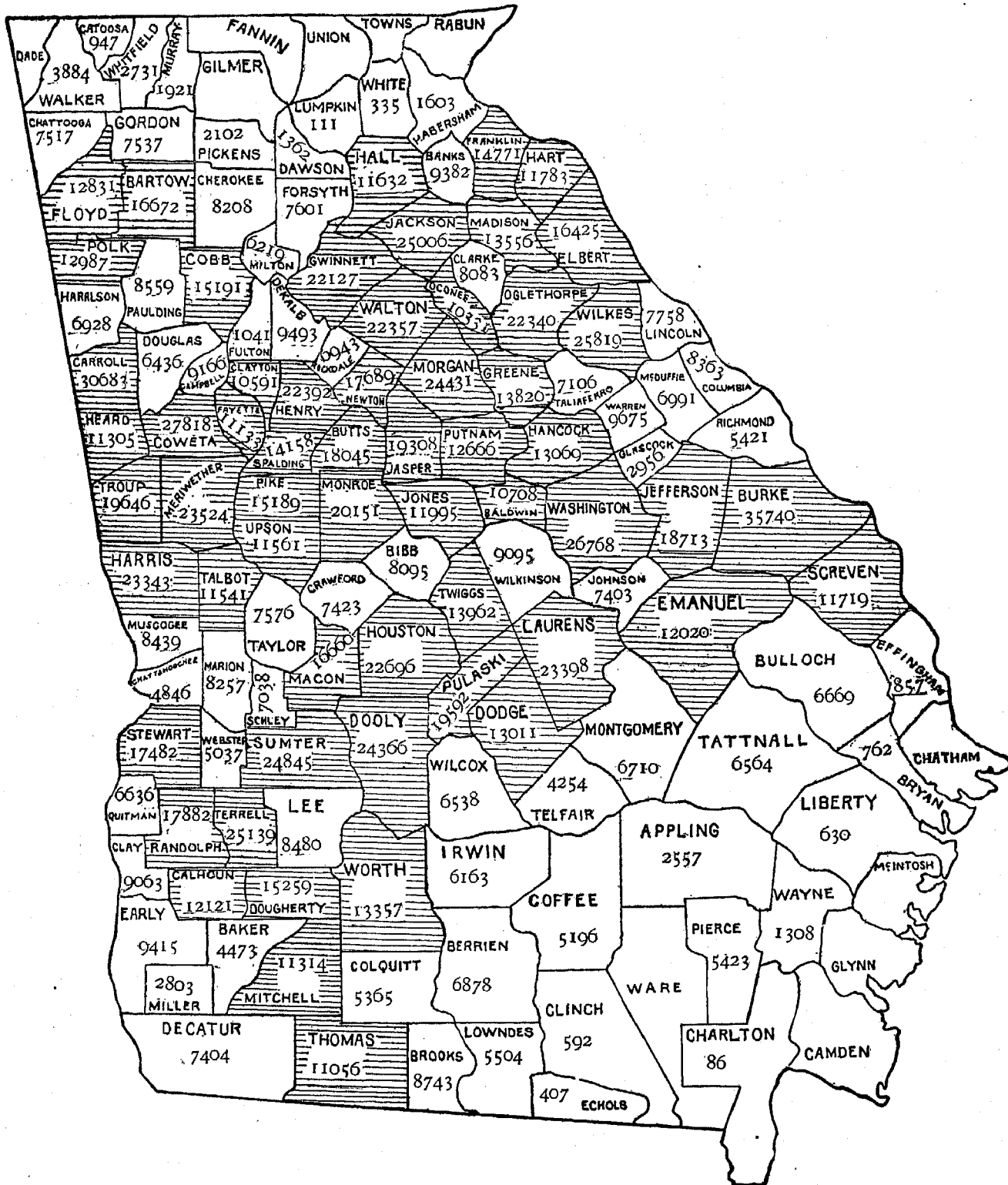
FLORIDA.

FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
COUNTIES SHADED, REPORTED 10,000 BALES OR OVER.



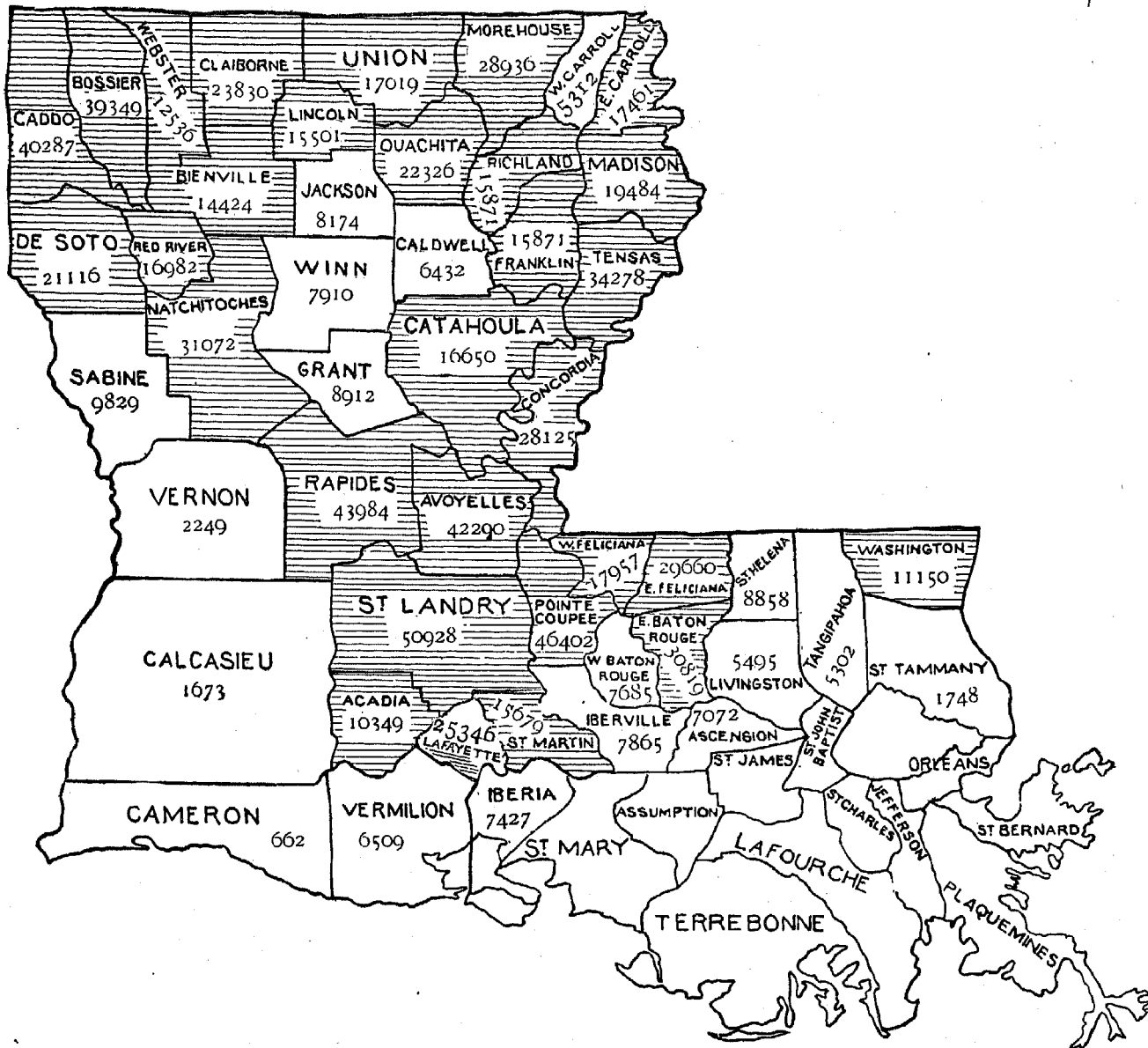
GEORGIA.

FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
COUNTIES SHADED, REPORTED 10,000 BALES OR OVER.



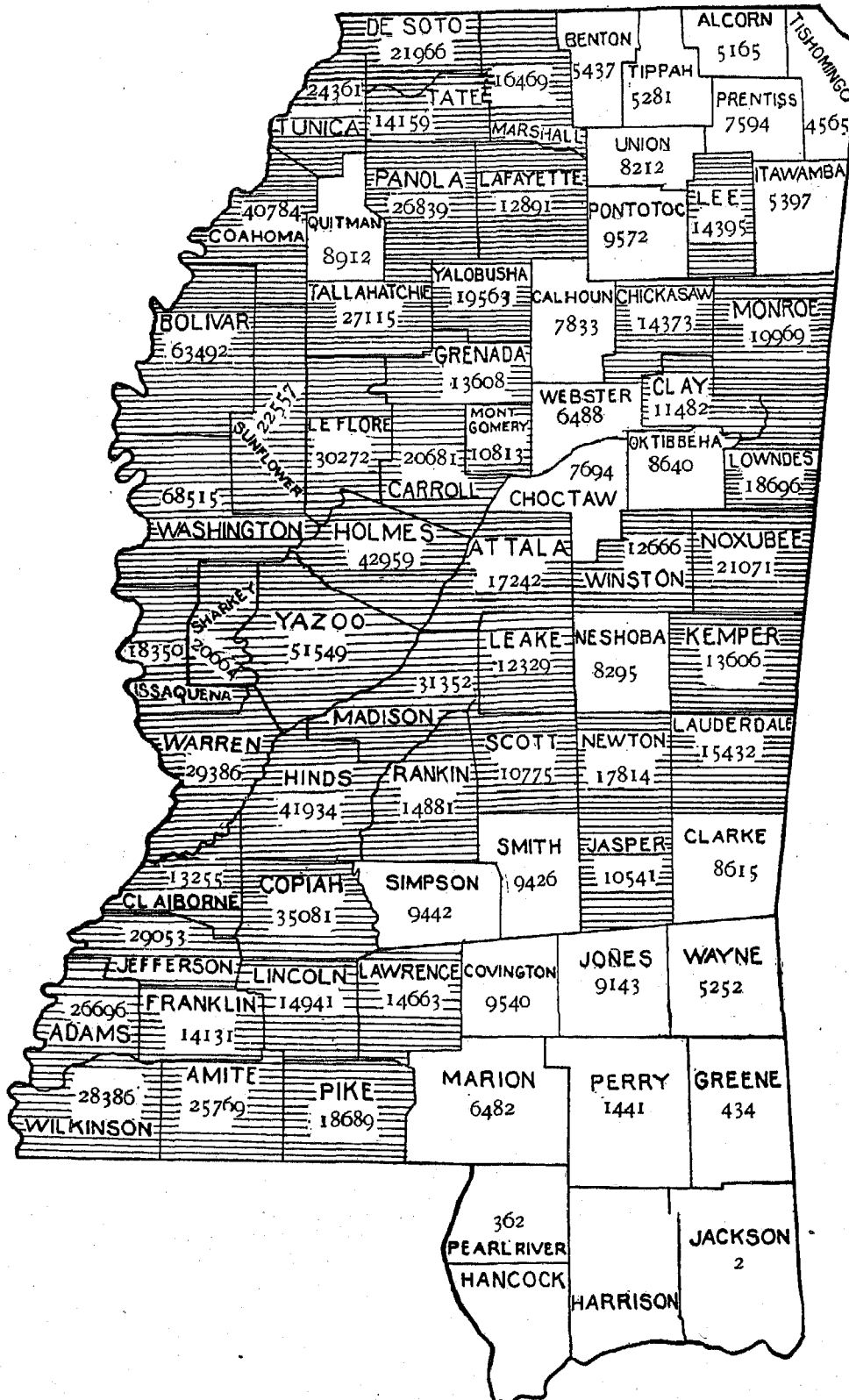
LOUISIANA,

FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
COUNTIES SHADED, REPORTED 10,000 BALES OR OVER.



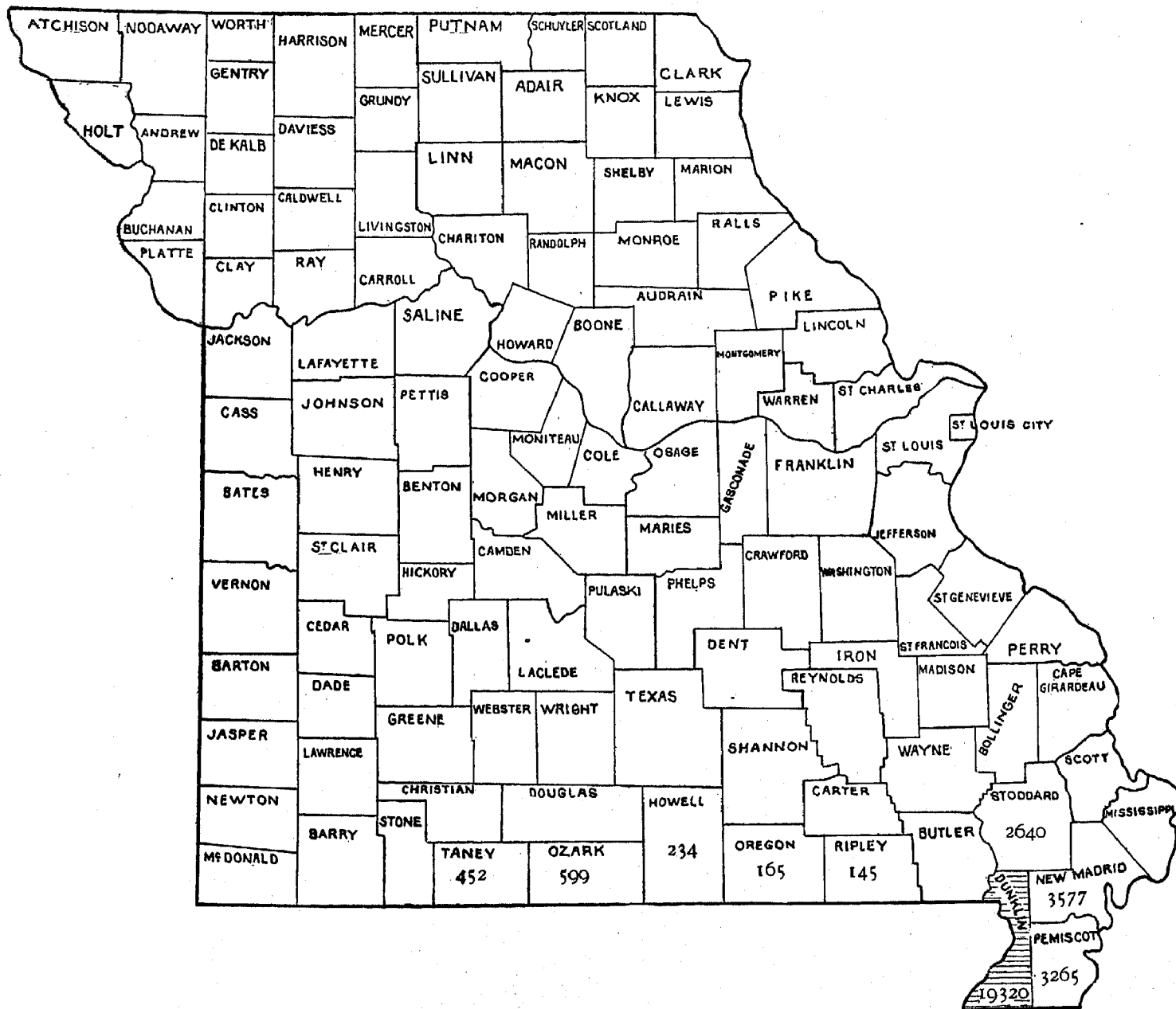
MISSISSIPPI.

FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
COUNTIES SHADED, REPORTED 10,000 BALES OR OVER.



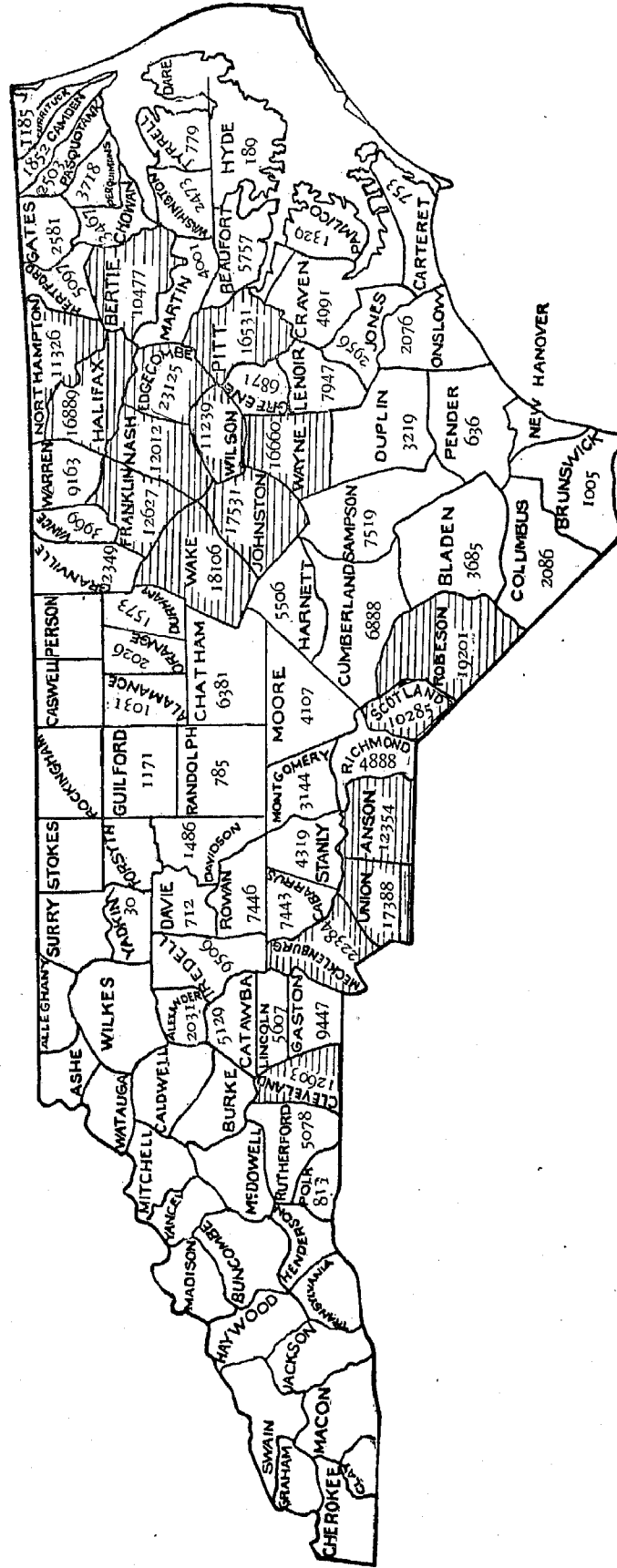
MISSOURI.

FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
COUNTIES SHADED, REPORTED 10,000 BALES OR OVER.

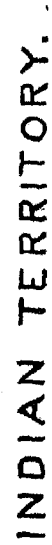


NORTH CAROLINA.

FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
COUNTIES SHADED, REPORTED 10,000 BALES OR OVER.



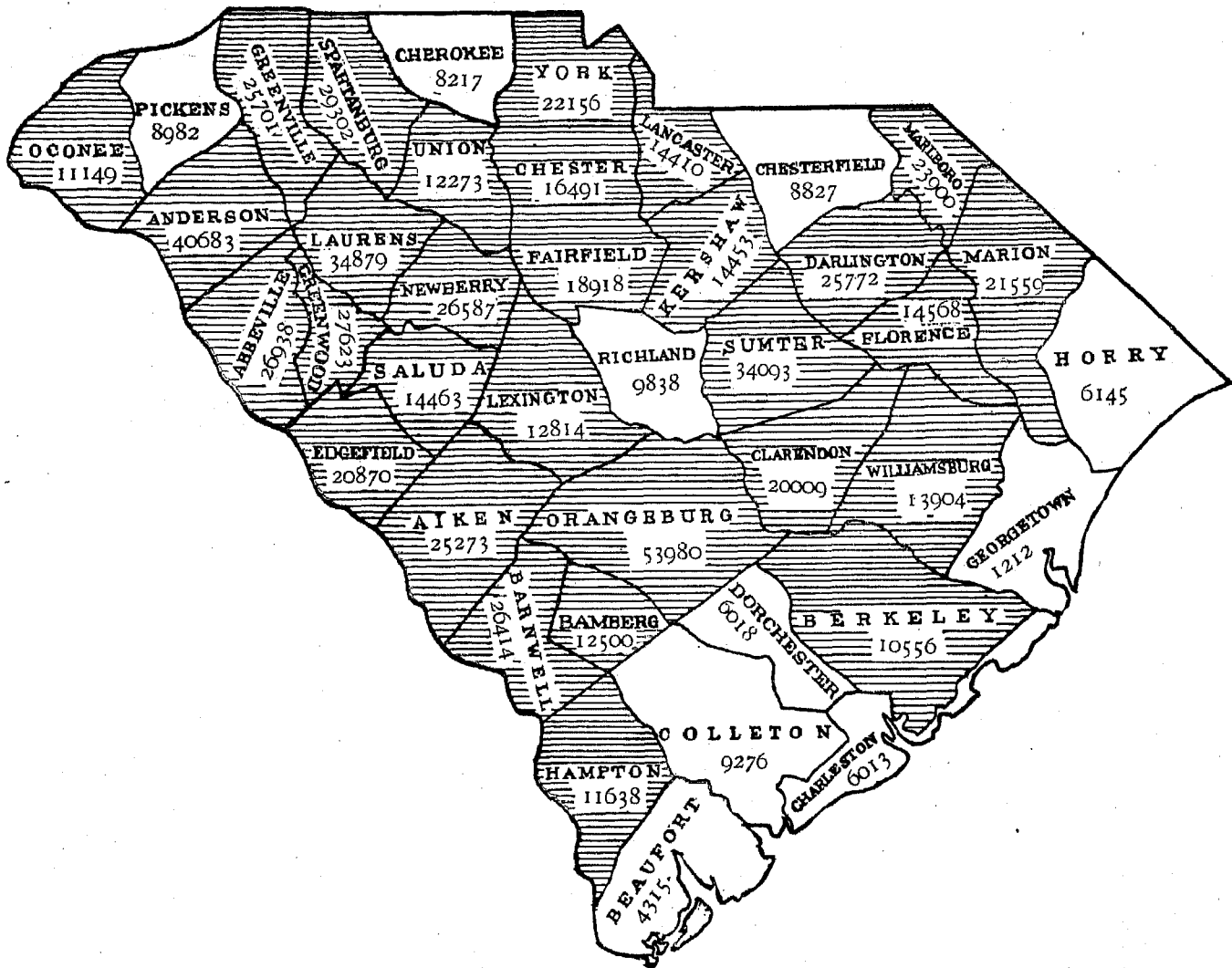
FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
COUNTIES SHADED, REPORTED 10,000 BALES OR OVER.



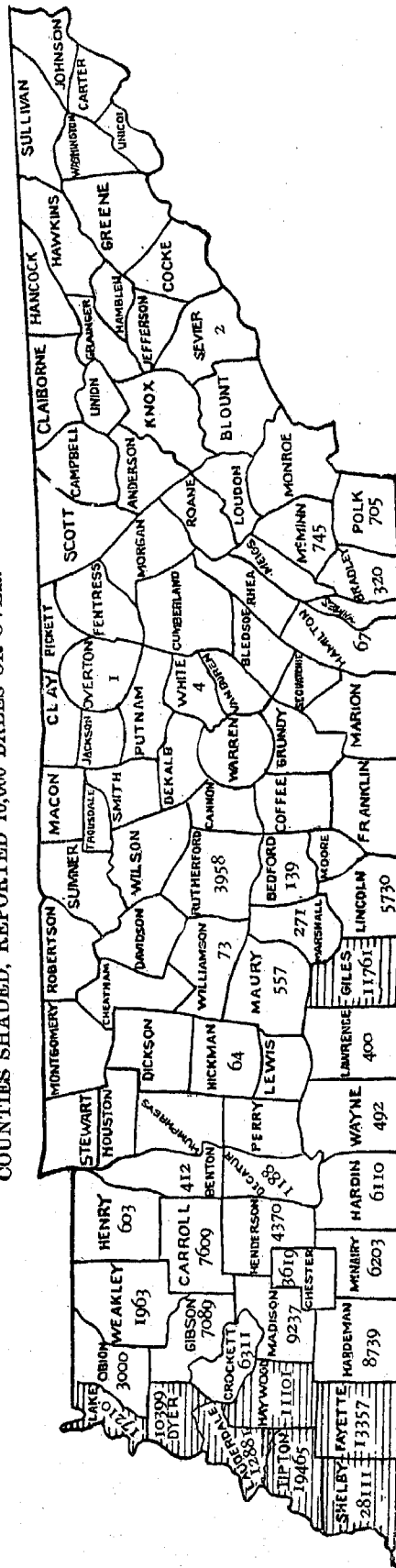
FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
COUNTRIES SHADED. REPORTED 10,000 BALES OR OVER.

SOUTH CAROLINA.

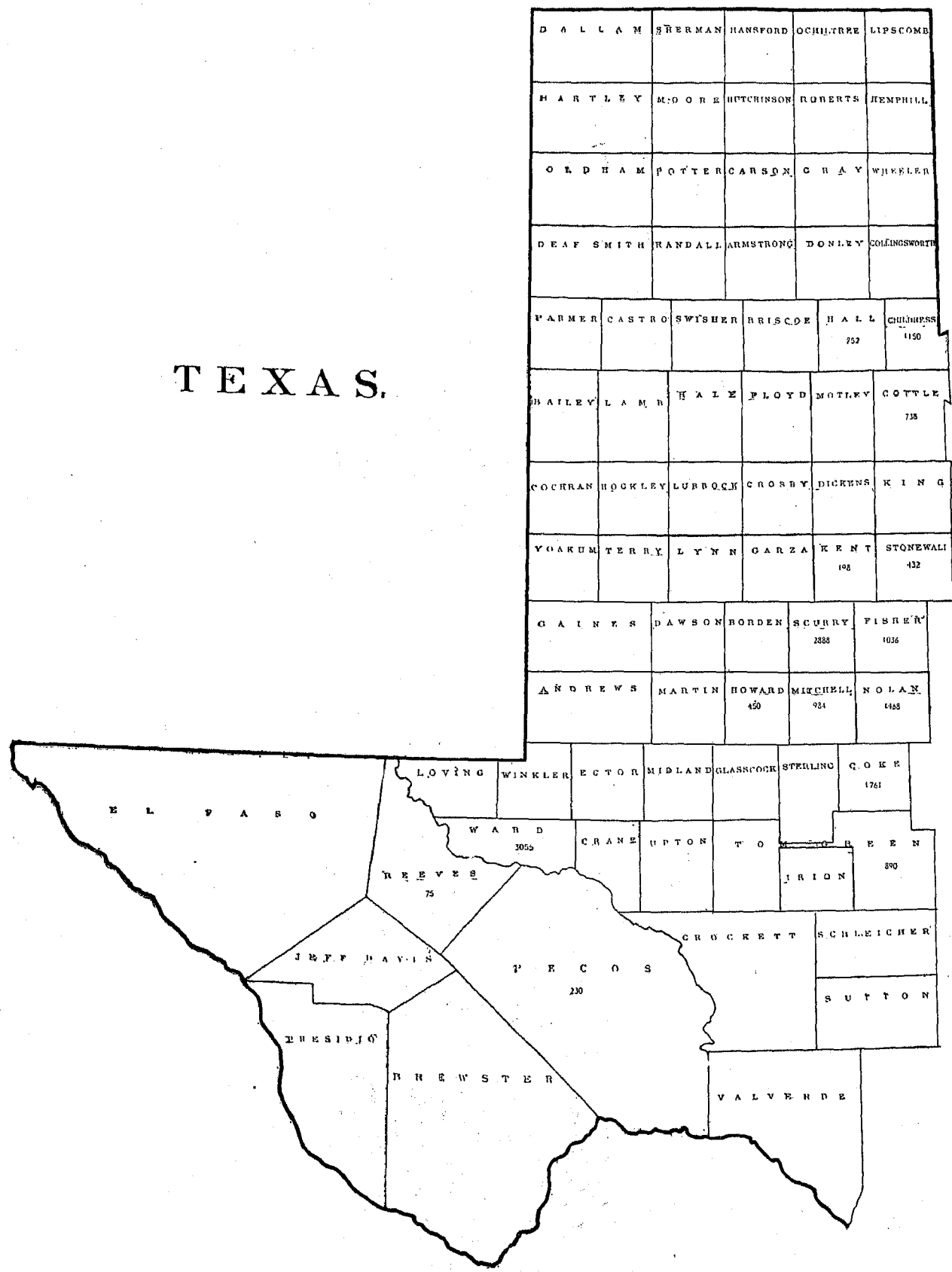
FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
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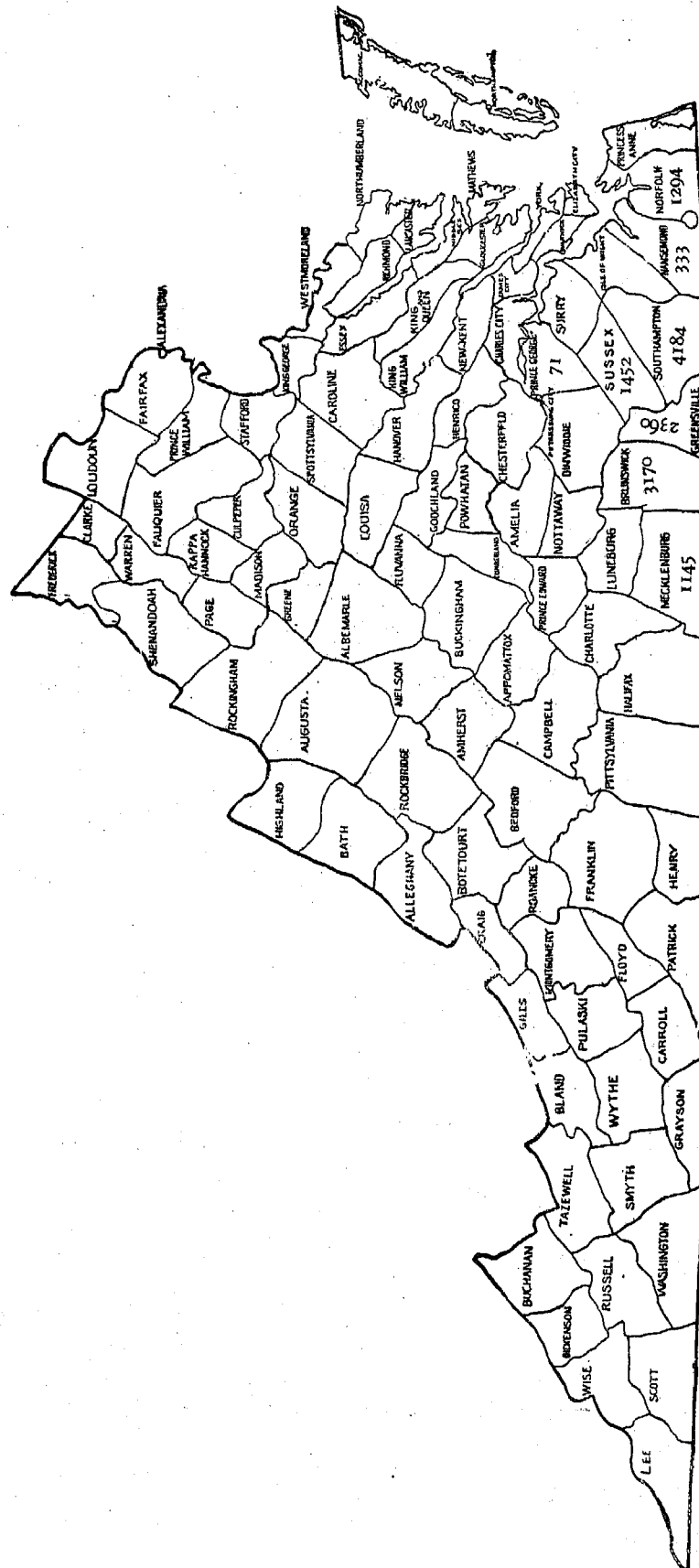
FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.
COUNTIES SHADED, REPORTED 10,000 BALES OR OVER.



TEXAS.



FIGURES SHOW NUMBER OF BALES GINNED FROM THE CROP OF 1901.



Twelfth Census of the United States.

CENSUS BULLETIN.

No. 207.

WASHINGTON, D. C.

June 24, 1902.

AGRICULTURE.

PENNSYLVANIA.

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 Pennsylvania, 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 Pennsylvania, June 1, 1900, numbered 224,248, and were valued at \$898,272,750. Of this amount \$322,879,810, or 35.9 per cent, represents the value of buildings, and \$575,392,940, or 64.1 per cent, the value of the land and improvements other than buildings. On the same date the value of farm implements and machinery was \$50,917,240, and that of live stock, \$102,439,183. These values, added to that of farms, give \$1,051,629,173, 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 \$207,895,600, of which amount \$80,901,459, or 38.9 per cent, represents the value of animal products, and \$126,994,141, 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 for 1889 by \$86,567,252, or 71.3 per cent, but a part of this gain is doubtless due to a more detailed enumeration in 1900 than in 1890.

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 \$57,043,770, leaving \$150,851,830 as the gross farm income for that year. The ratio which this amount bears to the "total value of farm property" is referred to in this bulletin as the "percentage of gross income upon investment." For Pennsylvania, in 1899, it was 14.3 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 report on agriculture in the United States. The present publication is designed to present a summarized advance statement for Pennsylvania.

Very respectfully,

L. G. Powers.
Chief Statistician for Agriculture.

AGRICULTURE IN PENNSYLVANIA.

GENERAL STATISTICS.

Pennsylvania has a total land area of 44,985 square miles, or 28,790,400 acres, of which 19,371,015 acres, or 67.3 per cent, are included in farms.

The surface of Pennsylvania is greatly varied, but is everywhere more or less hilly. The western part, occupying about one-fourth of the area of the state, is a broad plateau, whose rolling surface is broken by occasional ranges of hills, and deeply furrowed by water courses. The southeastern portion, extending from the Delaware River to the Blue Ridge, is for the most part undulating, and admirably adapted to the production of cereals.

Between these two sections, extending across the state from southwest to northeast, is a mountainous region, composed of the mountain chains which constitute the Appalachian system. The elevation of the greater part of these mountains is not more than 2,000 feet. They are intersected by numerous valleys, often of considerable length and breadth, but sometimes narrow and deep. The state is very well watered, and the soil, except in the mountains, is everywhere fertile, and even where least adapted to agriculture is suitable for grazing purposes.

NUMBER AND SIZE OF FARMS.

The following table 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	224,248	19,371,015	13,209,183	6,161,832	86.4	68.2
1890	211,557	18,364,370	13,210,597	5,153,773	86.8	71.9
1880	213,542	19,791,341	13,423,007	6,368,334	92.7	67.8
1870	174,041	17,994,200	11,515,965	6,478,235	103.4	64.0
1860	156,357	17,012,140	10,463,296	6,548,844	108.8	61.5
1850	127,577	14,923,847	8,628,619	6,295,228	117.0	57.8

The total number of farms reported for 1900 shows an increase of 75.8 per cent since 1850, and an increase of 6.0 per cent in the last decade. This increase was more rapid than the increase in total acreage, involving a gradual decrease in the average size of farms.

The total acreage has increased slowly, the gain being but 29.8 per cent since 1850, and 5.5 per cent since 1890. The area of improved farm land increased at a more rapid rate than the total acreage until 1890, but the use of a more strict construction of the term "improved land" by the Twelfth Census resulted in a slight decrease for the last decade in the per cent of farm land improved.

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.	Implementments and machinery.	Live stock.	Farm products. ¹
1900	\$1,051,629,173	\$898,272,750	\$50,917,240	\$102,439,138	\$207,895,600
1890	1,062,939,846	922,240,233	39,046,855	101,652,758	121,328,348
1880	1,095,405,324	975,689,410	35,473,037	84,242,877	129,760,476
1870 ²	1,194,786,853	1,043,481,582	35,658,196	115,647,075	183,946,027
1860	754,166,275	662,050,707	22,442,842	69,672,726	-----
1850	464,098,693	407,876,099	14,722,541	41,500,053	-----

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.

Though the total value of farm property was twice as great in 1900 as in 1850, a decrease of 1.1 per cent is shown for the last decade. This decrease is due to a loss of 2.6 per cent in the value of land, improvements, and buildings, as the value of implements and machinery increased 30.4 per cent, and that of live stock, 0.8 per cent. The value of farm products for 1899 exceeds that for 1889 by 71.3 per cent, but a part of this increase, and of that in the value of implements and machinery, is doubtless due to a more detailed enumeration in 1900 than heretofore.

COUNTY STATISTICS.

Table 3 gives a statement 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.				Gross income (products of 1899 not fed to live stock).	EXPENDITURES.	
	Total.	With build- ings.	Total.	Improved.	Land and improve- ments (ex- cept build- ings).	Buildings.	Imple- ments and machinery.	Live stock.		Labor.	Fertili- zers.
The State.....	224, 248	220, 869	19, 371, 015	13, 209, 183	\$575, 392, 940	\$322, 879, 810	\$50, 917, 240	\$102, 439, 183	\$150, 851, 830	\$10, 647, 730	\$4, 685, 920
Adams.....	3, 336	3, 319	281, 628	224, 680	6, 123, 830	4, 849, 080	753, 780	1, 489, 899	2, 288, 708	223, 990	117, 090
Allegheny.....	5, 565	5, 491	350, 596	282, 961	39, 076, 980	8, 293, 156	1, 882, 430	2, 297, 928	4, 870, 914	575, 450	116, 760
Armstrong.....	4, 202	4, 117	307, 807	277, 262	8, 541, 640	3, 970, 770	705, 630	1, 576, 189	1, 962, 072	116, 770	45, 570
Beaver.....	2, 602	2, 538	248, 973	185, 706	9, 104, 210	3, 811, 440	578, 930	1, 231, 239	1, 604, 652	137, 960	31, 180
Bedford.....	3, 615	3, 569	480, 241	208, 514	5, 960, 265	3, 167, 170	626, 160	1, 400, 765	1, 948, 438	121, 590	46, 380
Berks.....	7, 775	7, 299	461, 090	390, 703	15, 446, 830	13, 653, 240	1, 888, 850	3, 481, 690	5, 567, 282	739, 200	193, 150
Blair.....	1, 726	1, 689	204, 169	122, 276	4, 625, 200	2, 263, 240	373, 050	788, 435	1, 329, 590	143, 260	27, 480
Bradford.....	6, 679	6, 593	636, 284	447, 750	11, 586, 340	7, 887, 180	1, 464, 000	3, 078, 928	4, 103, 892	337, 620	45, 320
Bucks.....	6, 302	6, 229	358, 292	301, 693	11, 301, 080	14, 890, 970	2, 306, 580	3, 136, 516	5, 504, 257	923, 810	337, 180
Butler.....	5, 350	5, 222	444, 105	335, 689	11, 961, 090	5, 873, 130	1, 021, 240	2, 159, 876	2, 481, 827	180, 660	54, 960
Cambria.....	2, 566	2, 529	245, 525	140, 180	5, 723, 470	2, 716, 940	526, 510	944, 695	1, 472, 029	114, 310	39, 790
Cameron.....	387	386	40, 817	12, 671	398, 450	258, 580	49, 080	113, 552	164, 422	16, 020	2, 120
Carbon.....	1, 042	1, 030	116, 721	44, 238	1, 429, 620	1, 353, 520	223, 930	341, 354	571, 065	81, 050	32, 180
Center.....	2, 339	2, 306	237, 664	185, 504	6, 903, 200	3, 186, 220	675, 740	1, 258, 764	1, 664, 783	204, 180	26, 200
Chester.....	6, 202	6, 069	447, 309	371, 425	17, 181, 000	10, 684, 720	2, 178, 800	3, 988, 267	6, 365, 541	1, 141, 870	370, 880
Clarion.....	3, 192	3, 162	281, 546	195, 544	4, 719, 460	3, 682, 370	568, 100	1, 216, 762	1, 461, 446	95, 570	47, 480
Cleaveland.....	5, 452	5, 386	289, 300	167, 234	5, 372, 910	3, 024, 770	585, 710	1, 101, 460	1, 527, 856	107, 270	38, 770
Columbia.....	1, 362	1, 337	134, 873	72, 465	2, 663, 500	1, 541, 830	295, 500	514, 235	925, 872	90, 260	18, 390
Crawford.....	2, 760	2, 741	231, 181	165, 303	4, 182, 100	3, 049, 420	655, 990	984, 913	1, 682, 489	182, 350	94, 830
Cumberland.....	7, 894	7, 704	587, 527	368, 237	13, 219, 080	6, 811, 850	1, 380, 780	3, 563, 131	3, 768, 082	263, 660	62, 400
Dauphin.....	3, 066	3, 026	285, 256	231, 533	9, 024, 070	5, 810, 470	747, 980	1, 648, 229	2, 465, 993	255, 290	70, 310
Delaware.....	2, 844	2, 810	233, 545	178, 887	8, 553, 560	5, 081, 380	661, 405	1, 345, 186	2, 269, 018	259, 630	72, 145
Elk.....	1, 677	1, 663	92, 408	77, 005	13, 602, 370	6, 803, 270	596, 940	1, 254, 742	2, 101, 217	444, 000	85, 600
Erie.....	996	974	81, 084	35, 400	1, 499, 080	866, 960	168, 080	323, 532	414, 024	23, 320	11, 670
Fayette.....	5, 957	5, 818	459, 861	286, 480	14, 087, 150	6, 516, 850	1, 244, 910	2, 800, 885	3, 710, 336	427, 210	116, 840
Forest.....	3, 783	3, 722	402, 283	262, 720	15, 905, 400	5, 408, 220	709, 810	1, 710, 906	2, 441, 103	262, 450	54, 610
Franklin.....	587	576	58, 522	21, 439	660, 880	434, 210	77, 300	179, 035	202, 418	20, 270	8, 570
Fulton.....	3, 795	3, 761	397, 319	295, 426	11, 408, 030	6, 181, 530	943, 150	1, 987, 520	3, 021, 556	384, 870	94, 980
Greene.....	1, 451	1, 445	199, 068	105, 420	1, 386, 290	796, 610	193, 390	484, 767	656, 533	49, 590	31, 390
Huntingdon.....	3, 294	3, 239	354, 204	306, 334	13, 644, 580	3, 568, 650	512, 380	2, 257, 172	2, 120, 298	119, 540	13, 640
Indiana.....	2, 425	2, 396	363, 171	199, 020	3, 740, 380	2, 480, 550	452, 190	1, 090, 489	1, 488, 174	140, 410	29, 700
Jefferson.....	4, 475	4, 430	466, 065	337, 635	10, 302, 300	4, 816, 210	796, 900	1, 927, 685	2, 285, 746	115, 860	48, 850
Juniata.....	3, 042	2, 990	257, 441	164, 651	5, 517, 820	2, 886, 210	499, 550	1, 078, 546	1, 442, 837	78, 310	38, 450
Lackawanna.....	1, 556	1, 533	178, 186	103, 705	2, 757, 150	1, 617, 060	283, 040	586, 334	919, 172	80, 790	30, 940
Lancaster.....	1, 855	1, 827	150, 722	72, 347	4, 275, 500	2, 380, 850	405, 400	811, 978	1, 339, 978	176, 720	24, 400
Lawrence.....	9, 437	9, 348	552, 761	478, 325	30, 791, 780	23, 147, 820	2, 915, 770	5, 071, 838	9, 210, 815	1, 162, 610	266, 700
Lebanon.....	2, 639	2, 567	215, 969	160, 313	7, 147, 190	3, 482, 740	528, 680	1, 325, 019	1, 638, 371	114, 280	22, 560
Lehigh.....	2, 560	2, 516	169, 975	147, 368	7, 545, 180	4, 569, 050	535, 545	1, 260, 748	1, 800, 990	235, 500	69, 175
Luzerne.....	5, 299	5, 287	189, 897	166, 244	8, 270, 920	6, 242, 880	933, 500	1, 520, 301	2, 584, 281	293, 200	74, 960
Lycoming.....	3, 295	3, 231	256, 577	151, 654	7, 967, 740	3, 879, 710	708, 490	1, 128, 464	2, 082, 827	308, 750	79, 200
McKean.....	3, 782	3, 727	366, 829	214, 396	7, 763, 670	4, 490, 250	898, 700	1, 458, 388	3, 141, 770	215, 970	68, 690
Mercer.....	1, 877	1, 827	162, 897	72, 317	2, 645, 580	1, 590, 620	275, 060	763, 350	844, 385	98, 530	8, 840
Mifflin.....	4, 956	4, 905	397, 952	285, 812	10, 704, 830	5, 361, 450	937, 570	2, 474, 671	2, 737, 407	172, 930	42, 870
Monroe.....	1, 249	1, 232	157, 294	97, 588	3, 386, 120	1, 665, 920	298, 300	636, 347	964, 508	90, 750	15, 700
Montgomery.....	2, 057	2, 036	241, 020	106, 278	2, 085, 090	2, 085, 090	399, 940	620, 604	984, 392	89, 550	30, 730
Montour.....	5, 560	5, 740	270, 769	239, 764	25, 269, 160	19, 080, 400	2, 184, 410	2, 747, 132	5, 258, 974	1, 079, 490	172, 680
Northampton.....	812	837	75, 971	60, 648	2, 089, 360	1, 133, 750	246, 770	397, 463	664, 111	78, 300	34, 960
Northumberland.....	3, 638	3, 483	191, 378	166, 820	7, 006, 010	6, 389, 540	919, 310	1, 404, 632	2, 432, 743	273, 110	84, 540
Perry.....	2, 604	2, 660	214, 214	167, 428	5, 479, 105	3, 590, 670	616, 760	974, 766	1, 844, 439	192, 600	72, 790
Philadelphia.....	2, 286	2, 274	257, 732	151, 620	3, 567, 860	2, 239, 740	402, 230	840, 599	1, 258, 575	99, 310	44, 790
Pike.....	1, 072	1, 025	36, 002	31, 978	21, 418, 120	4, 008, 860	537, 550	480, 090	2, 152, 650	692, 010	135, 590
Potter.....	899	888	130, 821	30, 662	1, 311, 640	1, 081, 740	154, 230	274, 221	401, 641	42, 620	5, 890
Schuylkill.....	2, 484	2, 406	264, 723	124, 271	3, 596, 000	2, 029, 000	417, 770	1, 051, 785	1, 278, 549	108, 830	8, 610
Snyder.....	3, 011	2, 963	223, 484	141, 135	4, 923, 340	3, 691, 970	650, 060	1, 003, 656	2, 045, 561	240, 370	124, 740
Somerset.....	1, 854	1, 829	153, 985	111, 889	3, 303, 610	1, 778, 260	345, 680	625, 556	1, 001, 071	66, 390	35, 950
Sullivan.....	3, 782	3, 719	513, 895	279, 970	8, 732, 410	4, 181, 830	792, 930	1, 812, 969	2, 370, 114	193, 560	61, 880
Susquehanna.....	979	967	99, 935	52, 570	1, 224, 820	914, 090	176, 140	411, 651	436, 009	20, 000	8, 280
Tioga.....	4, 675	4, 611	490, 026	328, 076	6, 548, 760	5, 004, 350	873, 610	2, 415, 451	2, 775, 022	235, 150	26, 690
Union.....	4, 829	4, 782	460, 874	291, 953	8, 435, 250	4, 971, 960	1, 082, 800	2, 148, 006	2, 903, 814	231, 810	26, 990
Venango.....	1, 521	1, 518	113, 412	88, 177	3, 692, 870	2, 084, 310	360, 940	623, 244	967, 701	99, 460	21, 490
Warren.....	3, 273	3, 198	277, 378	166, 810	5, 283, 440	2, 860, 370	530, 100	1, 157, 803	1, 360, 591	123, 110	37, 770
Washington.....	3, 238	3, 163	276, 562	131, 645	3, 943, 340	2, 512, 160	475, 810	1, 304, 483	1, 864, 873	101, 190	17, 640
Wayne.....	4, 742	4, 637	526, 701	451, 705	25, 985, 300	8, 500, 770	1, 150, 120	3, 522, 645	3, 910, 480	300, 230	40, 840
Westmoreland.....	3, 663	3, 597	386, 536	145, 505	4, 991, 840	3, 602, 430	638, 690	1, 664, 623	1, 856, 425	153, 190	17, 980
Wyoming.....	5, 402	5, 342	515, 729	397, 385	20, 786, 820	8, 527, 570	1, 349, 530	2, 867, 619	3, 776, 966	302, 080	65, 000
York.....	1, 752	1, 720	188, 780	109, 484	3, 091, 300	1, 961, 850	328, 970	742, 879	1, 034, 746	98, 280	3, 380
York.....	8, 091	8, 024	519, 354	421, 897	14, 571, 770	11, 250, 050	1, 721, 660	3, 577, 586	5, 609, 691	541, 510	383, 300

In nearly all counties the number of farms increased in the last decade. Eleven counties report slight decreases. Except in 8 counties, situated mostly in the southern part of the state, the total farm acreage also shows a general increase since 1890. The decrease in improved acreage reported in a number of counties, is due to a more intensive cultivation of smaller areas, and to the use of a more

strict construction of the term "improved land" by the Twelfth than by any preceding census. The average size of farms for the state is 86.4 acres, and varies from 33.6 acres in Philadelphia county, to 149.8 acres in Huntingdon county. It is smallest in the extreme southeastern counties, which are devoted to dairying and truck farming, and contain a majority of the florists' establishments of the state.

For the state, the average value of farms is \$4,006. Less than half of the counties report increases in farm values since 1890, but an increase in the value of implements and machinery is reported in all counties. The value of live stock averages \$457 per farm, having increased since 1890 in more than half of the counties.

The average expenditure for labor in 1899 was \$74 per farm. It was greatest in the counties where floriculture, dairying, and market gardening prevailed. The average expenditure for fertilizers increased from \$16 per farm in 1889 to \$21 in 1899, the majority of the counties sharing in the increase.

FARM TENURE.

Table 4 gives a comparative statement 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 in 1900 is given by race of farmer, and "farms operated by owners" are subdivided into four groups, designated as "owners," "part owners," "owners and tenants," and "managers." These terms denote, 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.....	224,248	165,982	28,787	84,529	74.0	10.6	15.4
1890.....	211,557	162,219	18,040	31,298	76.7	8.5	14.8
1880.....	213,542	168,220	17,049	28,273	78.8	8.0	13.2

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.....	224,248	153,031	7,074	2,174	3,703	28,787	84,529
White.....	223,657	152,707	7,048	2,173	3,680	28,592	84,467
Colored ¹	591	324	26	1	23	145	72

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

The State.....	100.0	68.2	3.2	1.0	1.6	10.6	15.4
White.....	100.0	68.8	3.2	1.0	1.6	10.5	15.4
Colored ¹	100.0	54.8	4.4	0.2	3.9	24.5	12.2

¹ Comprising 6 Indians and 585 negroes.

The number of farms in Pennsylvania has increased 10,706, or 5.0 per cent, during the last two decades. During this period the farms operated by owners decreased 2,238, or 1.3 per cent, though the last decade shows an increase of 3,763, or 2.3 per cent; the number operated by cash tenants increased 6,688, or 39.2 per cent; and that by share tenants increased 6,256, or 22.1 per cent. The increases shown for the tenant classes have been continuous through both decades.

Of the farms of the state, 99.7 per cent are operated by white farmers, and only 0.3 per cent by colored farmers. Of the white farmers, 72.5 per cent own all or part of the farms they operate, and 27.5 per cent operate farms owned by others. For the colored farmers, the corresponding percentages are 59.4 and 40.6, respectively.

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.....	224,248	86.4	19,371,015	100.0	\$1,051,629,173	100.0
White farmers.....	223,657	86.5	19,345,274	99.9	1,049,589,533	99.8
Colored farmers ¹	591	43.6	25,741	0.1	2,039,640	0.2
Owners.....	153,031	78.2	11,972,638	61.8	607,750,011	57.8
Part owners.....	7,074	120.3	850,820	4.4	41,461,917	3.9
Owners and tenants.....	2,174	118.7	258,065	1.3	12,071,075	1.1
Managers.....	3,703	145.9	539,046	2.8	44,924,460	4.3
Cash tenants.....	28,787	76.7	1,819,478	9.4	141,888,955	13.5
Share tenants.....	84,529	113.8	3,980,768	20.3	203,532,755	19.4

¹ Comprising 6 Indians and 585 negroes.

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.	Implementations and machinery.	Live stock.		
The State.....	\$2,566	\$1,440	\$227	\$457	\$673	14.3
White farmers.....	2,567	1,441	228	457	673	14.4
Colored farmers ¹	2,150	910	112	279	360	10.4
Owners.....	2,027	1,317	211	416	605	15.2
Part owners.....	3,482	1,539	265	675	816	14.4
Owners and tenants.....	3,078	1,025	270	584	798	14.4
Managers.....	7,522	3,377	402	831	1,118	9.2
Cash tenants.....	3,848	1,450	212	438	704	11.8
Share tenants.....	3,322	1,715	280	578	860	14.6

¹ Comprising 6 Indians and 585 negroes.

Nearly 70 per cent of all farms in the state are operated by owners, who also control about 60 per cent of the acreage and values of farm property. Farms operated by managers, though comparatively few in number, are larger in area and have higher average values of all forms of farm property than any other class. Their gross income, however, is smaller than that of the other groups.

Colored farmers occupy an insignificant place in the agriculture of the state, controlling only 0.3 per cent of the farms, and 0.1 per cent and 0.2 per cent, respectively, of the total acreage and value.

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 ----	224,248	86.4	19,371,015	100.0	\$1,051,629,173	100.0
Under 3 acres ----	2,737	1.6	4,424	(1)	6,153,157	0.6
3 to 9 acres ----	14,419	0.0	85,982	0.4	30,078,199	2.9
10 to 19 acres ----	17,882	13.9	249,880	1.3	42,843,425	4.1
20 to 49 acres ----	41,575	38.5	1,392,167	7.2	122,268,356	11.6
50 to 99 acres ----	69,670	70.6	4,617,487	25.4	291,902,055	27.8
100 to 174 acres ----	57,800	126.4	7,308,029	37.7	359,518,853	34.2
175 to 259 acres ----	14,151	204.1	2,887,951	14.9	121,385,393	11.5
260 to 499 acres ----	5,088	322.3	1,640,093	8.5	56,938,894	5.4
500 to 999 acres ----	688	615.2	423,220	2.2	14,126,425	1.3
1,000 acres and over ----	238	1,940.2	461,773	2.4	6,403,816	0.6

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.	Implement and machinery.	Live stock.		
The State -----	\$2,566	\$1,440	\$227	\$457	\$678	14.3
Under 3 acres.....	855	1,233	78	87	518	23.1
3 to 9 acres.....	949	948	76	113	282	13.5
10 to 19 acres.....	1,180	968	94	154	303	12.6
20 to 49 acres.....	1,512	1,043	188	248	413	14.0
50 to 99 acres.....	2,190	1,845	226	423	632	15.1
100 to 174 acres.....	3,458	1,788	314	660	919	14.8
175 to 259 acres.....	5,137	2,185	386	870	1,178	13.7
260 to 499 acres.....	7,064	2,567	442	1,118	1,386	12.4
500 to 999 acres.....	14,043	4,371	584	1,549	1,940	9.4
1,000 acres and over.....	19,420	4,914	740	1,833	2,294	8.5

The group of farms containing from 50 to 99 acres each includes a larger number of farms than any other, but the

group containing from 100 to 174 acres comprises more than one-third of the total farm acreage, and the same proportion of the values of farm property of the state.

With few exceptions, the average values of all forms of farm property increase with the size of the farms. The farms containing less than three acres are an exception to this rule, in the value of buildings and in gross income, this class containing most of the florists' establishments of the state, and many city dairies and market gardens. The incomes from these industries depend less upon the acreage of owned or rented land used than upon the capital invested in buildings, implements, and live stock, and the expenditures for labor and fertilizers.

The average value per acre of the gross income for the various groups of farms classified by area is as follows: Farms under 3 acres, \$320.66; 3 to 9 acres, \$47.21; 10 to 19 acres, \$21.70; 20 to 49 acres, \$12.38; 50 to 99 acres, \$8.96; 100 to 174 acres, \$7.27; 175 to 259 acres, \$5.77; 260 to 499 acres, \$4.30; 500 to 999 acres, \$3.15; and 1,000 acres and over, \$1.18.

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. Similarly, 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 their principal 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 ----	224,248	86.4	19,371,015	100.0	\$1,051,629,173	100.0
Hay and grain ----	30,823	109.8	3,384,292	17.5	130,457,842	17.2
Vegetables ----	6,963	47.7	332,033	1.7	44,632,747	4.2
Fruits ----	8,577	49.1	175,800	0.9	15,505,046	1.5
Live stock ----	75,995	84.4	6,413,808	33.1	305,224,365	29.0
Dairy products ----	32,600	88.0	2,803,070	14.5	193,102,582	18.4
Tobacco ----	2,074	60.1	124,663	0.6	13,257,981	1.3
Sugar ----	24	537.8	12,907	0.1	301,149	(1)
Flowers and plants ----	734	6.5	4,745	(1)	6,894,985	0.6
Nursery products ----	95	61.1	5,801	(1)	990,169	0.1
Miscellaneous ----	71,363	85.7	6,113,296	31.6	291,262,377	27.7

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.	Implementments and machinery.	Live stock.		
The State -----	\$2,566	\$1,440	\$227	\$157	\$673	14.3
Hay and grain -----	3,497	1,668	246	444	730	12.5
Vegetables -----	4,433	1,487	226	264	762	11.9
Fruits -----	2,589	1,348	176	222	614	14.2
Live stock -----	2,060	1,264	207	476	580	14.4
Dairy produce -----	3,217	1,782	289	635	889	15.0
Tobacco -----	3,236	2,370	286	500	1,108	17.3
Sugar -----	10,431	1,281	280	556	782	6.2
Flowers and plants -----	5,049	4,023	244	78	3,017	32.1
Nursery products -----	7,243	2,703	229	248	5,301	50.9
Miscellaneous -----	2,158	1,317	212	394	599	14.7

For the several classes of farms, the average values per acre of products not fed to live stock are as follows: For farms whose operators derive their principal income from flowers and plants, \$466.69; nursery products, \$86.81; tobacco, \$18.48; vegetables, \$15.98; fruits, \$12.49; dairy produce, \$10.34; miscellaneous, \$7.00; live stock, \$6.87; hay and grain, \$6.65; and sugar, \$1.45. In computing these averages, the total area is used, and not merely the area devoted to the crop from which the principal income is derived.

The wide variations shown in the average gross income and in the percentage of gross income upon investment, are due largely to the fact that in computing gross incomes no deduction is made for expenditures. For florists' establishments, nurseries, and market gardens, the average expenditures for such items as labor and fertilizers represent 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 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 -----	224,248	86.4	19,371,015	100.0	\$1,051,629,173	100.0
\$0 -----	459	61.0	27,999	0.2	1,365,910	0.1
\$1 to \$19 -----	2,724	33.1	90,229	0.5	4,819,740	0.4
\$50 to \$99 -----	7,637	31.5	240,200	1.2	11,499,720	1.1
\$100 to \$249 -----	41,494	41.1	1,706,484	8.8	75,465,630	7.2
\$250 to \$499 -----	63,681	65.9	4,198,914	21.7	191,076,765	18.2
\$500 to \$999 -----	65,515	104.7	6,862,020	35.4	326,665,378	31.1
\$1,000 to \$2,499 -----	38,454	141.6	5,443,775	28.1	351,587,360	33.4
\$2,500 and over -----	4,284	187.1	\$01,394	4.1	89,148,780	8.5

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 invest- ment in farm property.
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	
	Land and im- prove- ments (except build- ings).	Build- ings.	Imple- ments and ma- chinery.	Live stock.		
The State -----	\$2,566	\$1,440	\$227	\$457	\$673	14.3
\$0 -----	2,028	747	39	162	-----	-----
\$1 to \$19 -----	1,185	478	34	72	37	2.1
\$50 to \$99 -----	812	566	42	86	80	5.3
\$100 to \$249 -----	929	678	73	139	177	9.7
\$250 to \$499 -----	1,550	1,003	145	303	367	12.2
\$500 to \$999 -----	2,658	1,534	261	533	710	14.2
\$1,000 to \$2,499 -----	5,130	2,656	455	902	1,446	15.8
\$2,500 and over -----	13,162	5,215	841	1,592	4,035	19.4

Of the 459 farms reporting no income in 1899, some were summer homes and a few were abandoned farms. Some were farms which had changed owners or tenants shortly before the date of enumeration and for which the occupants, June 1, 1900, could furnish no definite information concerning the products of the previous 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 census of 1900. The age grouping for neat cattle is 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 the previous census reports.

Table 14 presents a summary of live-stock statistics.

TABLE 14.—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.....	421,323	\$3,082,067	\$7.20	9,351
Steers.....	1 and under 2.....	108,681	1,739,459	16.01	1,787
Steers.....	2 and under 3.....	64,252	1,808,405	29.82	1,432
Steers.....	3 and over.....	16,352	712,704	43.51	1,720
Bulls.....	1 and over.....	69,006	1,607,397	23.29	934
Heifers.....	1 and under 2.....	224,623	3,705,397	16.50	5,420
Cows kept for milk.....	2 and over.....	943,773	29,141,561	30.83	78,801
Cows and heifers not kept for milk.....	2 and over.....	48,807	1,221,261	25.02	1,400
Colts.....	Under 1.....	28,547	808,696	28.26	878
Horses.....	1 and under 2.....	36,584	1,916,501	52.39	1,371
Horses.....	2 and over.....	525,850	38,225,630	72.69	218,006
Mule colts.....	Under 1.....	1,144	45,876	40.10	50
Mules.....	1 and under 2.....	3,604	210,286	58.35	183
Mules.....	2 and over.....	33,311	2,651,523	79.60	21,977
Asses and burros.....	All ages.....	576	22,559	39.16	601
Lambs.....	Under 1.....	571,583	1,827,924	2.32	2,460
Sheep (ewes).....	1 and over.....	769,463	2,651,067	3.45	6,789
Sheep (rams and wethers).....	1 and over.....	190,020	663,615	3.49	818
Swine.....	All ages.....	1,107,981	5,830,295	5.26	157,346
Goats.....	All ages.....	2,197	8,951	4.07	6,548
Fowls: ¹					
Chickens ²		10,553,106	4,483,486		
Turkeys.....		259,824			
Geese.....		60,780			
Ducks.....		171,271			
Bees (swarms of).....		161,670	581,578	3.29	
Value of all live stock.....			102,439,183		

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 \$102,439,183, of which 40.0 per cent represents the value of horses; 28.4 per cent, that of dairy cows; 13.6 per cent, that of other neat cattle; 5.7 per cent, that of swine; 4.5 per cent, that of sheep; 4.4 per cent, that of poultry; and 3.4 per cent, that of all other live stock.

There were kept in towns and cities nearly one-twelfth as many dairy cows, nearly one-half as many horses two years old and over, almost two-thirds as many mules two years and over, and about one-seventh as many swine, as 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 all live stock not on farms would be \$21,392,693. Exclusive of poultry and bees not on farms, the total value of live stock in the state is, approximately, \$123,831,876.

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.....	943,773	953,074	590,981	38,635	959,483	1,107,981
1890.....	927,254	779,164	618,660	29,563	1,812,107	1,278,029
1880.....	854,156	876,081	533,587	22,914	1,776,598	1,187,968
1870.....	706,437	638,114	460,339	18,009	1,794,801	867,548
1860.....	673,547	745,946	437,654	8,832	1,631,540	1,031,266
1850.....	530,224	623,722	350,398	2,259	1,822,867	1,040,366

¹ Lambs not included.

Every decade since 1850 shows an increase in the number of dairy cows. The gain since 1850 is 78.0 per cent, and since 1890, 1.8 per cent. The number of other neat cattle has fluctuated from decade to decade, but shows an increase of 52.8 per cent since 1850, and 22.3 per cent since 1890. Except for a decrease in the last decade of 4.5 per cent, each decade since 1850 shows an increase in the number of horses reported. There were 17 times as many mules and asses reported in 1900 as in 1850, every decade showing an increase, that of the last being 30.7 per cent.

In the year 1850 more sheep were reported than at any later date. Every decade since 1870 records a decrease in numbers, that in the last being 40.5 per cent. Swine have fluctuated in number, the census of 1900 showing an increase of 6.5 per cent since 1850, but a decrease of 13.3 per cent since 1890.

The fact that in 1900 the enumerators were instructed to report no fowls under 3 months old, while in 1890 no such limitation was made, explains, to a great extent, the small increase in the number of chickens reported, and the decreases in the numbers of all other fowls. An increase in the number of eggs reported tends to confirm this statement. Compared with the figures for 1890, the present census shows an increase of 1.7 per cent in the number of chickens, and the following decreases in the numbers of other fowls: Ducks, 52.1 per cent; turkeys, 51.5 per cent; and geese, 42.9 per cent.

ANIMAL PRODUCTS.

Table 16 is a summarized statement of animal products on farms.

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.....	6,782,226	\$1,881,689
Mohair and goat hair.....	Pounds.....	720	242
Milk.....	Gallons.....	1,487,083,818	\$35,860,110
Butter.....	Pounds.....	74,221,085	
Cheese.....	Pounds.....	857,167	9,080,725
Eggs.....	Dozens.....	67,038,180	
Poultry.....			7,151,243
Honey.....	Pounds.....	2,526,202	805,292
Wax.....	Pounds.....	61,802	
Animals sold.....			15,494,178
Animals slaughtered.....			11,627,980
Total.....			80,901,459

¹ Includes all milk produced, whether sold, consumed, or made into butter or cheese.

² Includes the value of milk sold or consumed, and of butter and cheese made.

The value of all animal products of the state for 1899 was \$80,901,459, of which 44.3 per cent represents the value of dairy produce; 33.5 per cent, that of animals sold and animals slaughtered on farms; 20.1 per cent, that of poultry and eggs; 1.7 per cent, that of wool, mohair, and goat hair; and 0.4 per cent, that of honey and wax.

DAIRY PRODUCE.

In 1899 the proprietors of 32,600 farms, or 14.5 per cent of the farms of the state, derived their principal income from dairy produce. The production of milk in 1899 was 118,127,338 gallons greater than in 1889, a gain of 32.0 per cent. The amount of cheese made on farms increased 95.2 per cent in the last decade, while the amount of butter made on farms decreased 3.4 per cent in the same time, owing, largely, to the constantly increasing amount of milk and cream consumed in cities and to the transfer of butter making from the farm to the creamery.

Of the \$35,860,110 given in Table 16 as the value of dairy produce, 75.4 per cent, or \$27,053,424, represents the value of dairy products sold, and 24.6 per cent, or \$8,806,686, the value of such products consumed on farms. Of the former amount, \$17,274,430 was received from the sale of 171,045,659 gallons of milk; \$9,466,575, from 51,309,833 pounds of butter; \$249,779, from 537,445 gallons of cream; and \$62,640, from 812,528 pounds of cheese.

ANIMALS SOLD AND ANIMALS SLAUGHTERED.

The value of animals sold and animals slaughtered on farms is \$27,122,158, or 18.0 per cent of the gross farm income. Of all farmers reporting domestic animals, 180,508, or 83.9 per cent, reported animals slaughtered, the average value per farm being \$64.42. Of all reporting domestic animals, 141,450, or 65.7 per cent, reported sales of live animals, the average value per farm being \$109.54. In reporting the value of animals sold on farms the enumerators were instructed to secure from each operator a statement of the amount received from sales in 1899, less the amount paid for live stock in that year.

POULTRY, EGGS, WOOL, AND HONEY AND WAX.

Of the \$16,231,968, given as the value of poultry and eggs, 55.9 per cent represents the value of eggs produced, and 44.1 per cent, the value of poultry raised. In 1899, 16,988,265 dozen more eggs were produced than in 1889, a gain of 33.9 per cent.

The amount of wool reported in 1900 was 4.5 per cent greater than that reported in 1890. The average weight of fleeces increased from 5.3 pounds to 6.7 pounds, indicating an improvement in the grade of sheep kept.

Bradford county leads in the production of apianian products, reporting 218,590 pounds of honey for 1899. For the state, 2,526,202 pounds of honey and 61,302 pounds of wax were reported in 1900, a gain in the last decade of 3.0 per cent in honey, and 53.7 per cent in 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	195,983	500,981	3.0	200,036	943,773	4.7
White farmers.....	195,472	589,754	3.0	199,668	942,193	4.7
Colored farmers.....	511	1,227	2.4	868	1,580	4.3
Owners ¹	140,535	402,309	2.9	144,750	629,121	4.3
Managers.....	3,089	14,143	4.6	2,990	19,729	6.6
Cash tenants.....	20,021	57,150	2.9	19,722	104,632	5.3
Share tenants.....	32,338	117,379	3.6	32,574	190,291	5.8
Under 20 acres.....	22,814	82,603	1.4	23,904	43,232	1.8
20 to 99 acres.....	98,371	250,189	2.5	101,507	395,093	3.9
100 to 174 acres.....	55,338	210,336	3.8	56,131	356,027	6.3
175 to 259 acres.....	13,754	61,658	4.7	12,822	100,453	7.8
260 acres and over.....	5,706	33,195	5.8	5,672	48,968	8.6
Hay and grain.....	24,007	88,730	3.7	23,033	106,270	4.6
Vegetable.....	5,956	14,864	2.5	4,505	11,658	2.6
Fruit.....	2,821	6,137	2.2	2,258	5,301	2.3
Live stock.....	67,599	205,483	3.0	70,338	277,374	3.9
Dairy produce.....	31,125	96,609	3.1	32,600	284,921	8.7
Tobacco.....	1,878	4,980	2.7	1,765	7,451	4.2
Flower and plant.....	245	535	2.2	114	203	1.8
Miscellaneous ²	62,352	173,553	2.8	65,423	250,595	3.8

¹Including "part owners" and "owners and tenants."

²Including sugar farms and nurseries.

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.....	1,480,833	Bushels.....	51,869,780	\$21,896,795
Wheat.....	1,514,043	Bushels.....	20,632,680	13,712,976
Oats.....	1,173,847	Bushels.....	37,242,810	11,093,893
Barley.....	9,583	Bushels.....	197,178	89,163
Rye.....	810,048	Bushels.....	3,944,750	2,070,847
Buckwheat.....	249,840	Bushels.....	3,922,980	1,945,860
Broom corn.....	221	Pounds.....	114,610	6,817
Kafir corn.....	1	Bushels.....	14	7
Flaxseed.....	75	Bushels.....	684	741
Clover seed.....	.....	Bushels.....	37,276	163,522
Grass seed.....	.....	Bushels.....	12,846	18,978
Hay and forage.....	3,259,411	Tons.....	4,020,388	87,514,779
Tobacco.....	27,760	Pounds.....	41,502,620	2,959,304
Hemp.....	8	Pounds.....	3,850	228
Hops.....	13	Pounds.....	13,710	1,451
Peanuts.....	2	Bushels.....	77	99
Dry beans.....	2,182	Bushels.....	23,957	38,719
Dry peas.....	482	Bushels.....	6,363	7,618
Potatoes.....	227,867	Bushels.....	21,769,472	9,397,054
Sweet potatoes.....	3,443	Bushels.....	234,724	130,990
Onions.....	1,505	Bushels.....	347,806	216,646
Miscellaneous vegetables.....	77,621	.....	.....	6,088,214
Maple sugar.....	.....	Pounds.....	1,423,540	115,910
Maple sirup.....	.....	Gallons.....	160,297	123,868
Sorghum cane.....	105	Tons.....	121	71
Sorghum sirup.....	.....	Gallons.....	6,514	3,090
Small fruits.....	12,271	.....	.....	1,268,827
Grapes.....	27,852	Centals.....	471,254	3,639,518
Orchard fruits.....	2318,215	.....	.....	47,976,464
Nuts.....	.....	.....	.....	91,149
Forest products.....	.....	.....	.....	6,481,181
Flowers and plants.....	1,073	.....	.....	2,246,075
Seeds.....	866	.....	.....	104,229
Nursery products.....	3,201	.....	.....	541,032
Willows.....	5	.....	.....	715
Miscellaneous.....	10	.....	.....	47,316
Total.....	8,692,408	.....	.....	126,994,141

¹Sold as cane.

²Estimated from number of vines or trees.

³Including value of raisins, wine, etc.

⁴Including value of cider, vinegar, etc.

Of the total value of crops in 1899, cereals, including Kafir corn, contributed 40.0 per cent; hay and forage, 29.5 per cent; vegetables, including potatoes, sweet potatoes, and onions, 12.5 per cent; fruits and nuts, 7.9 per cent; forest products, 5.1 per cent; flowers and plants, 1.8 per cent; and all other products, 3.2 per cent.

The average values per acre of the several crops were as follows: Flowers and plants, \$2,093.27; nursery products, \$169.02; onions, \$143.95; tobacco, \$106.60; small fruits, \$103.40; miscellaneous vegetables, \$78.44; potatoes, \$41.24; orchard fruits, \$25.07; cereals, including Kafir corn, \$10.72; hay and forage, \$11.47. The crops yielding the greatest returns were grown upon the most highly cultivated land, and required relatively large expenditures for labor and fertilizers.

CEREALS.

Table 19 is a statement of the changes in cereal production since 1849.

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

PART 1.—ACREAGE.

YEAR. ¹	Barley.	Buck-wheat.	Corn.	Oats.	Rye.	Wheat.
1899	9,583	249,840	1,480,833	1,173,847	310,048	1,514,043
1889	20,950	210,488	1,252,398	1,310,197	339,041	1,318,472
1879	23,592	246,199	1,373,270	1,237,593	398,465	1,445,884

¹ No statistics of acreage were secured prior to 1879.

PART 2.—BUSHELS PRODUCED.

YEAR.	Barley.	Buck-wheat.	Corn.	Oats.	Rye.	Wheat.
1899	197,178	3,922,980	51,869,780	37,242,810	3,944,750	20,632,680
1889	493,863	3,069,717	42,318,279	36,197,409	3,742,164	21,595,499
1879	438,100	3,693,326	45,821,591	33,841,439	3,683,621	19,462,405
1869	529,562	2,582,173	34,702,093	36,478,685	3,577,641	19,672,967
1859	530,714	5,572,024	28,196,821	27,387,147	5,474,788	13,042,165
1849	165,584	2,193,692	19,835,214	21,538,156	4,805,160	15,367,691

The total area under cereals in 1879 was 4,724,503 acres; in 1889, 4,448,547 acres; and in 1899, 4,738,194 acres. Of the total area under cereals in 1899, 32.0 per cent was devoted to wheat; 31.2 per cent, to corn; 24.8 per cent, to oats; 6.5 per cent, to rye; 5.3 per cent, to buckwheat; and 0.2 per cent, to barley.

The area under wheat in 1899 was 14.8 per cent greater than ten years before; that under corn, 18.2 per cent; and that under buckwheat, 18.7 per cent. The area devoted to rye decreased 7.7 per cent in the decade 1889-1899; that under oats, 10.4 per cent; and that under barley, 54.3 per cent.

The total number of bushels produced in 1849 was 63,905,497, and in 1899, 117,810,178, a gain of 84.4 per cent in fifty years.

The largest area under wheat was in the southeastern part of the state, Lancaster, York, and Franklin counties each producing over 1,000,000 bushels in 1899. This section led also in the production of corn, Lancaster county reporting over 4,000,000 bushels, and York county, over 3,000,000 bushels. Oats were raised extensively in the eastern section, several counties showing yields of over 1,000,000 bushels each. Rye was also reported largely in the eastern part, while barley was more abundantly grown in the central portion of the state.

HAY AND FORAGE.

In 1900, 207,706 farmers, or 92.6 per cent of the total number, reported hay and forage crops, of which, exclusive of cornstalks and corn strippings, they obtained an average yield of 1.2 tons per acre. The acreage in hay and forage in 1899 was 1.6 per cent less than ten years before.

In 1899 the acreages and yields of the various kinds of hay and forage were as follows: Clover, 293,683 acres and 336,072 tons; other tame and cultivated grasses, 2,873,126 acres and 3,174,110 tons; grains cut green for hay, 44,729 acres and 57,821 tons; forage crops, 45,366 acres and 181,023 tons; and other kinds, 231,961 acres and 271,362 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 only 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	11,774,211	9,097,700	24,060,651	7,652,710
Apricots	10,044	5,913	1,634	169
Cherries	956,273	465,867	474,940	60,571
Peaches	3,521,930	1,146,842	143,464	117,151
Pears	815,349	325,062	434,177	141,534
Plums and prunes	707,512	152,533	100,210	7,899

The total number of fruit trees in 1890 was 11,193,417, while in 1900 there were 17,844,269—an increase of 6,650,852, or 59.4 per cent, in the decade. The number of plum and prune trees reported in 1900 was nearly five times as great as in 1890, and the numbers of peach, pear, and cherry trees were approximately three times as great. The number of apricot trees increased 69.9 per cent, and that of apple trees, 29.4 per cent. The increases were quite evenly distributed throughout the state.

Of the total number in 1900, 66.0 per cent were apple trees; 19.7 per cent, peach trees; 5.4 per cent, cherry trees; 4.6 per cent, pear trees; 4.3 per cent, apricot, plum, prune, and unclassified trees; the latter class, which is not included in the table, numbered 58,950 and yielded 21,778 bushels of fruit. The value of orchard products given in Table 18 includes the value of 504,472 barrels of cider, 110,324 barrels of vinegar, and 938,810 pounds of dried and evaporated fruits. Comparisons of fruit yields or values, when made by decades only, are of little value, as the yield of any given year depends upon the season.

SMALL FRUITS.

The total area used in the cultivation of small fruits in 1899 was 12,271 acres, distributed among 50,937 farms, an average of 0.24 acre per farm. Of the total area, 5,667 acres, yielding 10,179,430 quarts, were devoted to strawberries.

These berries were grown generally throughout the state, but the southeastern counties of York, Lancaster, Berks, and Chester, together with the western counties of Allegheny and Erie, report 38.0 per cent of the product and 36.4 per cent of the acreage. The acreages and productions of the other berries were as follows: Raspberries and Logan berries, 3,938 acres and 5,360,530 quarts; blackberries and dewberries, 1,383 acres and 1,995,070 quarts; currants, 716 acres and 1,031,870 quarts; gooseberries, 267 acres and 366,930 quarts; and other small fruits, 300 acres and 326,730 quarts.

VEGETABLES.

The total area used in the cultivation of vegetables, including potatoes, sweet potatoes, and onions, in 1899 was 310,436 acres. Of this area 73.4 per cent was devoted to potatoes, 25.0 per cent to miscellaneous vegetables, 1.1 per cent to sweet potatoes, and 0.5 per cent to onions. Potatoes were extensively raised throughout the state, 227,867 acres being devoted to them, and yielding 21,769,472 bushels, an average of 95.5 bushels per acre.

The total area used in the cultivation of miscellaneous vegetables was 77,621 acres, of which the products of 42,041 acres were not reported in detail. Of the remaining 35,580 acres, 12,879 were devoted to sweet corn; 10,851, to cabbages; 6,089, to tomatoes; 785, to turnips; 754, to muskmelons; 749, to cucumbers; 618, to watermelons; 596, to asparagus; 561, to celery; and 1,698, to other vegetables.

TOBACCO.

Though tobacco was cultivated in Pennsylvania as early as 1689, its production was not reported with any degree of care until 1840. In that year the total production was 325,018 pounds, and with the exception of a decrease in the decade from 1880 to 1890 the production has steadily and rapidly increased. The increase in production for the last decade was 43.3 per cent, and that in acreage, 3.0 per cent.

The present census shows that tobacco was grown in 1899 by 9,621 farmers, who obtained from 27,760 acres a yield of 41,502,620 pounds, or an average of 1,495 pounds per acre.

The most important tobacco region in the state is the southeastern part, where Lancaster and York counties reported a total of 34,413,650 pounds. In Lancaster county, which was the leading tobacco county of the country in 1889, there were 5,809 farmers, June 1, 1900, who reported a total of 18,025 acres, upon which they raised 28,246,160 pounds, or 68.1 per cent of the state total. The value of the product in this county was \$1,991,446. In the northern part of the state, Tioga county reported 2,812,330 pounds; Bradford county, 1,693,820 pounds; and Clinton county, 1,221,730 pounds. Other counties producing over 200,000 pounds, are Chester, Lebanon, and Lycoming.

SORGHUM CANE.

The present census shows that in 1899, 233 farmers raised 105 acres of sorghum cane, from which they sold

21 tons of cane for \$71, and from the remaining product manufactured 6,514 gallons of sirup, valued at \$3,090. This was a decrease in acreage since 1889 of 78.5 per cent. The sorghum crop reached its highest point in 1869, with a production of 213,373 gallons of sirup.

FLORICULTURE.

The area devoted to the cultivation of flowers and ornamental plants in 1899 was 1,073 acres, and the value of the products sold therefrom was \$2,246,075. These flowers and plants were grown by 1,093 farmers and florists, of whom 734 made commercial floriculture their principal business. These 734 proprietors reported a glass surface of 8,811,711 square feet. They had invested in the aggregate \$6,894,985, of which \$3,705,528 represents the value of land, and of improvements other than buildings; \$2,952,280, the value of buildings; \$179,445, that of implements; and \$57,732, that of live stock. Their sales of flowers and plants amounted to \$2,043,124, and of other products, to \$171,319. They expended for labor \$513,677, and for fertilizers, \$41,537. Including the value of products fed to live stock, the average gross income per farm reporting was \$3,036.

In addition to the 734 principal florists' establishments, 2,969 farms and market gardens made use of glass in the propagation of flowers, plants, or vegetables. They had an area under glass of 5,210,827 square feet, making, with the 6,608,783 square feet belonging to the florists' establishments, a total of 11,819,610 square feet of land under glass.

NURSERY PRODUCTS.

The total value of nursery stock sold in 1899 was \$541,032, reported by the operators of 280 farms and nurseries. Of this number, 95 derived their principal income from the nursery business. They had 5,801 acres of land, valued at \$688,035; buildings worth \$256,755; implements and machinery worth \$21,775; and live stock worth \$23,604. Their sales of nursery products amounted to \$457,820, and sales of other products to \$45,765. They expended for labor \$150,365, and for fertilizers, \$9,050. Including value of products fed to live stock, the average gross income per farm reporting was \$5,421.

LABOR AND FERTILIZERS.

The total expenditure for labor on farms in 1899, including the value of board furnished, was \$16,647,730, an average of \$74 per farm. The average was highest on the most intensively cultivated farms, being \$1,583 for nurseries, \$700 for florists' establishments, \$141 for vegetable farms, \$126 for tobacco farms, \$113 for dairy farms, \$89 for hay and grain farms, \$88 for fruit farms, \$70 for sugar farms, and \$50 for live-stock farms. "Managers" expended an average per farm of \$334; "cash tenants," \$90; "share tenants," \$87; and "owners," \$62. White farmers expended \$74 per farm and colored farmers, \$45.

Fertilizers purchased in 1899 cost \$4,685,920, an average of \$21 per farm, and an increase since 1890 of 38.5

per cent. The average was \$95 for nurseries, \$57 for florists' establishments, \$46 for vegetable farms, \$33 for tobacco farms, \$25 for hay and grain farms, \$22 for dairy

farms, \$18 for fruit farms, \$16 for live-stock farms, and \$12 for sugar farms.

IRRIGATION STATISTICS.

Irrigation began more than one hundred years ago in Berks county, where small areas of bottom lands were artificially flooded as early as 1800. Until recent years the practice of irrigation was confined to narrow and comparatively level strips of land edging the streams upon which water could be diverted easily and at slight expense. The hilly nature of the country in which irrigation was first introduced precluded the possibility of any considerable extension of irrigated areas.

The acreage artificially watered in 1899 was devoted principally to hay, more than 93 per cent of the total area irrigated being under this crop. A large part of this acreage was reported from Monroe, Northampton, Lehigh, Bucks, Berks, and Lancaster counties in the southeastern part of the state. In 1899 the acreage of hay irrigated was 758, and the value of the crop was \$17,920, or \$23.64 per acre.

The value of irrigation in truck farming as an assurance against loss by drouth has been demonstrated in several counties of the state, and the reports from irrigated farms show a very large income per acre. The methods of irrigation on these farms vary greatly, and the cost is much higher than on farms where hay is the only crop irrigated.

The water is generally pumped from driven wells by steam power or windmills. In the vicinity of large cities

the farmers occasionally use city water. Notwithstanding the heavy original cost of engines, pumps, pipes, etc., in nearly every instance the value of the irrigated crop reported was equal to or exceeded the first cost. In 1899 the average value per acre of the products derived from irrigated land devoted to truck farming, was \$330.43.

The following table shows the number of irrigators, and acreage irrigated, with cost of construction of irrigation systems, and value of irrigated products in 1899.

TABLE A.—NUMBER OF IRRIGATORS, ACREAGE IRRIGATED, AND COST OF CONSTRUCTION OF IRRIGATION SYSTEMS, WITH ACREAGE AND VALUE OF IRRIGATED CROPS.

COUNTIES.	Number of irrigators.	Acreage irrigated.	Cost of construction of irrigation systems.	IRRIGATED CROPS.		
				Acreage.	Value.	
					Total.	Average per acre.
The State	134	814	\$15,627	804	\$33,220	\$41.32
Berks	37	214	470	204	4,369	21.42
Lancaster	20	189	1,707	189	5,884	31.13
Monroe	8	73	7,020	73	7,600	104.11
Northampton	41	214	2,015	214	7,665	35.82
Other counties	28	124	4,415	124	7,702	62.11

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MANUFACTURES.

TIN AND TERNE PLATE.

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

SIR: I transmit herewith, for publication in bulletin form, a report on the manufacture of tin and terne plate, prepared under my direction by Mr. William G. Gray, of Philadelphia, expert special agent for iron and steel.

Statistics for this industry were not separately collected in 1890, the production being very small in that year. During the following decade, however, the development was remarkable, and in 1900 the United States had assumed a leading position in the production of tin and terne plate, consuming over three-eighths of the world's estimated production of pig tin in 1900. In order to give a complete statement of the industry, the statistics of the manufacture of black plates for tinning and terne plating have been included in this report.

The statistics are presented in 22 tables. Tables 1 to 6 relate to the combined tin and terne dipping and black plate industries, as follows: Table 1, a summary of the two industries; Table 2, capital invested in active, idle, and building establishments, by industries; Table 3, capital invested in the combined industries by classes of establishments, active, idle, and building; Table 4, capital, salaried officials, clerks, etc., and wage-earners engaged in active establishments, by states; Table 5, quantity and cost of materials used; and Table 6, approximate value of products. Tables 7 to 14 relate to the tin and terne dipping industry, as follows: Table 7, a general summary; Table 8, capital invested in active, idle, and building establishments; Table 9, a summary of the active establishments, by states; Table 10, quantity and cost of materials used; Table 11, quantity and value of products, by states; Table 12, daily capacity of active and idle establishments, by states; Table 13, number of completed and building tinning sets, by states; and Table 14, months in operation, by states. Tables 15 to 20 relate to the black plate industry, as follows: Table 15, a general summary; Table 16, capital

invested in active and building establishments; Table 17, a summary by states; Table 18, quantity and cost of materials used; Table 19, quantity and value of products, by states; and Table 20, black-plate mills, active and building, by states. Detailed statistics for the tin and terne dipping industry are presented in the last two tables—Table 21, the statistics of active establishments, and Table 22, the statistics of idle and building establishments.

The reports show a capital of \$6,790,047 invested in the tin and terne dipping industry by the 57 active establishments reported 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 manufacturing corporations engaged in this industry. The value of the products is returned at \$31,892,011, to produce which involved an outlay of \$291,323 for salaries of officials, clerks, etc.; \$1,889,917 for wages; \$236,456 for miscellaneous expenses, including rent, taxes, etc.; and \$26,728,150 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 tin and terne dipping industry 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.

Very respectfully,



Chief Statistician for Manufactures.

THE MANUFACTURE OF TIN AND TERNE PLATE.

By WILLIAM G. GRAY, *Expert Special Agent.*

Tin plates, or, rather, tinned plates, are thin sheets or plates of iron or steel which have been coated by being dipped in a bath of molten tin. They are largely used in the manufacture of household utensils and cans for preserving vegetables, fruit, meat, fish, etc. Iron or steel composes usually from 94 to 98 per cent of the weight of an ordinary box of tin plates. A 100-pound box of best charcoal finished tin plates contains about 6 pounds of coating, while the coating on a 100-pound box of finished coke plates may not weigh over 2½ pounds. The plates are usually packed in wooden boxes.

Terne plates are also thin sheets of iron or steel, but, instead of being dipped in a molten bath of tin alone, a bath containing an alloy of tin and lead is used, the proportion of tin varying from 10 to 33 per cent. A 120-pound box of best grade terne plates contains about 20 pounds of coating, while a box of ordinary grade frequently contains as low as 3 pounds. Terne plates are used wholly for roofing purposes, and are therefore called also roofing plates. On account of the lead used in the bath they are much duller in appearance than tin plates.

There is considerable diversity of opinion as to the exact meaning of the word "terne." Some authorities claim that it means "consisting of three," namely, iron, tin, and lead. The word is derived from the French, however, and means dull or tarnished. The expression "terne plate" was doubtless adopted to distinguish dull plates coated with a mixture of lead and tin from bright plates coated with pure tin. The latter are sometimes called "bright" plates, or, in French, "blanc" plates. In Germany tin plate is known as "weissblech" and terne plate as "mattblech." The word "matt," also means dull.

The base weight of a box of standard tin or terne plates in the United States is 100 pounds; in Great Britain it is 108 pounds.

Black plates are the thin iron or steel sheets from which tin and terne plates are made. They are generally made from Bessemer and open-hearth steel, but a few establishments in the United States sometimes roll iron sheets, to be used almost entirely for fine grades of roofing plates. The quantity made, however, is not

very large. The machines and pots used for tinning or coating black plates are called tinning sets.

A majority of the establishments which manufactured tin or terne plates, or both, during the census year, also operated rolling mills, these mills being equipped for the production of the black plates which were coated with tin or with tin and lead in the tin-dipping departments. At some plants, however, tinning pots had not been installed, and black plates or sheets were chiefly produced. Practically all the black plates made by establishments of the latter character were consumed by the tin dipping or stamping works of the country. In any statement, therefore, purporting to give the capital invested, persons employed, wages paid, etc., in the manufacture of tin and terne plates, it would be a manifest error to omit similar data for all establishments engaged in the manufacture of black plates, even though in some instances these plates were not coated with tin or lead by the plants producing them, but were sold to establishments equipped with tinning pots. If such data were omitted from the report on the manufacture of tin and terne plates, a true idea of the magnitude and importance of the industry would not be given.

For these reasons the statistics of the manufacture of tin and terne plates are presented in this report under two heads, the tin and terne dipping industry and the black plate industry. In order to secure a separate statement for each of these industries it has been necessary to divide the reports of all establishments which manufacture the black plates used in their dipping departments.

The statistics given in this report for the tin and terne dipping industry are identical in their totals with the statistics of the tin and terne plate industry, as given in Parts I and II of the Statistics of Manufactures. The statistics of the black plate industry are included, under the general head of iron and steel, in Parts I and II of the Statistics of Manufactures. These statistics are also included in Part III of the Statistics of Manufactures, in the special report on Iron and Steel, where the black plates produced appear among the products of "rolling mills and steel works."

Statistics of the tin and terne dipping and black

plate industries were not separately collected at the census of 1890. It is, therefore, impossible to present comparative figures in any of the statements. The production in 1890 was, however, very small.

The period covered by this report is the census year beginning June 1, 1899, and ending May 31, 1900, or the business year of the establishments reporting which most nearly conforms to this year.

COMBINED TIN AND TERNE DIPPING AND BLACK PLATE INDUSTRIES.

Table 1 is a summary of the statistics of the tin and terne dipping and black-plate industries.

TABLE 1.—THE TIN AND TERNE DIPPING AND BLACK PLATE INDUSTRIES: SUMMARY, 1900.

	Total.	Tin and terne dipping industry.	Black-plate industry.
Number of establishments	166	57	44
Capital	\$27,488,302	\$6,790,047	\$20,698,255
Salaries, clerks, etc., number	726	333	393
Salaries	\$818,015	\$291,323	\$526,692
Wage-earners, average number	14,826	3,671	11,155
Total wages	\$10,288,061	\$1,889,917	\$8,398,144
Men, 16 years and over	13,798	3,014	10,784
Wages	\$9,996,889	\$1,711,475	\$8,285,414
Women, 16 years and over	688	625	63
Wages	\$193,884	\$172,568	\$21,266
Children, under 16 years	340	32	308
Wages	\$97,388	\$5,874	\$91,514
Miscellaneous expenses	\$505,128	\$236,456	\$268,672
Cost of materials, including mill supplies, freight, etc.	\$345,004,716	\$26,728,150	\$18,276,566
Value of products, including custom work and repairing	\$51,912,619	\$31,892,011	\$30,020,608

¹ Includes 35 plants which manufactured black plates as well as tin and terne plates, 22 plants which manufactured tin and terne plates only, and 9 plants which manufactured black plates only.

² Includes rented property valued at \$165,000.

³ Includes a duplication of \$20,590,566, the value of black plates reported among the products of the black-plate industry and used as material in the tin and terne dipping industry.

While it might appear from Table 1 that 101 establishments were engaged during the census year in the combined industries, this was not the case, since establishments which performed both operations, namely, the manufacture of black plates and the dipping of these plates, would thus be counted twice. This will be plain from the following diagram:

9 black plate establishments	} The black plate industry (44 establishments).
35 black plate and dipping establishments	
22 dipping establishments	
	} The tin and terne dipping industry (57 establishments).

It thus appears that 35 active dipping establishments, or a majority of the whole number, were equipped also for the manufacture of black plates. In addition, there were 22 active plants equipped for tin and terne dipping only, and 9 active plants equipped for the manufacture of black plates only, or a total of 66 active plants.

The capital invested in the black plate industry was \$20,698,255, or 75.3 per cent of the total for the combined industries, and the capital invested in the tin and terne dipping industry was \$6,790,047, or 24.7 per cent of the total.

The cost of materials shown for the combined industries includes a duplication of \$20,590,566, the value of the black plates produced by black plate establishments and used as material in the tin and terne dipping establishments. It is necessary, therefore, to deduct this sum from the cost of materials shown for the combined

industries. In this manner it is found that the approximate cost of all materials consumed in the combined industries during the census year was \$24,414,150.

Similarly, in order to obtain a true total value of products, it is necessary to deduct from the total value of products shown for the combined industries the value of the black plates produced by the black plate establishments and used as material in the tin and terne dipping establishments. In this manner it is found that the total value of the products of the combined industries was approximately \$41,322,053. In this total, however, there are included products other than black plates or tin and terne plates, valued at \$9,660,669.

In these calculations it is assumed that the domestic black plates consumed by the tin and terne plate plants were all produced during the census year. Of course this is not the fact, as a considerable part of the black plates consumed by tin and terne plate plants in the early part of the census year was drawn from stock made in the previous year, while a large part of the black plates produced by domestic mills toward the close of the census year was still in stock, not having been forwarded to the tin and terne plate plants. The figures for cost of materials and value of products for the combined industries are not, therefore, altogether exact. They are, however, approximately correct, and give a fair idea of the importance of the combined industries during the census year.

The average cost per pound of the domestic black plate consumed by tin and terne plate plants in 1900 was 2.49 cents, while the average value of the black plates made by domestic mills during the same year was 2.37 cents, a difference of .12 cents per pound.

Table 2 shows the capital invested in active, idle, and building tin and terne dipping establishments and black-plate establishments during the census year.

TABLE 2.—THE TIN AND TERNE DIPPING AND BLACK PLATE INDUSTRIES: CAPITAL INVESTED IN ACTIVE, IDLE, AND BUILDING ESTABLISHMENTS, 1900.

INDUSTRY.	Number of establishments.	CAPITAL.			
		Total.	Land.	Buildings, machinery, tools, and implements.	Cash and sundries.
Total	171	\$28,291,888	\$1,949,125	\$15,588,610	\$10,759,148
Tin and terne	61	7,397,531	569,125	3,012,790	3,815,616
Black plate	47	20,894,357	1,380,000	12,575,820	6,943,532

¹ Includes 37 plants which were equipped, or were being equipped, for the manufacture of black plates and tin and terne plates; 24 plants which were equipped for the manufacture of tin and terne plates only, and 10 plants which were equipped, or were being equipped, for the manufacture of black plates only.

² Includes rented property valued at \$165,000.

Table 2 indicates that the most important item of capital was that invested in buildings, machinery, tools, and implements. For the combined industries this amounted to \$15,583,610, or 55.1 per cent of the total capital.

In Table 3 the capital invested in active tin and terne dipping and black-plate establishments is given separately from the capital invested in idle and building establishments.

TABLE 3.—THE TIN AND TERNE DIPPING AND BLACK PLATE INDUSTRIES: CAPITAL INVESTED IN ACTIVE, IDLE, AND BUILDING ESTABLISHMENTS, 1900.

CLASSES.	Number of establishments.	CAPITAL.			
		Total.	Land.	Buildings, machinery, tools, and implements.	Cash and sundries.
Total.....	71	\$28,291,883	\$1,949,125	\$15,583,610	\$10,759,148
Active.....	66	27,488,802	1,895,400	15,080,765	10,512,137
Idle and building..	5	803,081	53,725	502,845	247,011

¹ Includes rented property valued at \$165,000.

Table 4 shows by states the capital invested in active tin and terne dipping and black-plate establishments, together with the number and salaries of the salaried officials, clerks, etc., and the average number and total wages of the wage-earners employed.

TABLE 4.—THE TIN AND TERNE DIPPING AND BLACK PLATE INDUSTRIES: ESTABLISHMENTS, CAPITAL, SALARIED OFFICIALS, CLERKS, ETC., AND WAGE-EARNERS, BY STATES, 1900.

STATES.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		WAGE-EARNERS.	
			Number.	Salaries.	Average number.	Total wages.
United States.....	66	\$27,488,802	726	\$818,015	14,826	\$10,288,061
Illinois.....	5	1,762,162	30	49,884	615	459,974
Pennsylvania.....	30	12,517,557	842	358,566	6,017	4,349,327
All other states ² ..	31	13,208,583	354	410,065	8,194	5,478,760

¹ Includes rented property valued at \$165,000.

² Includes states grouped in order that the operations of individual establishments may not be disclosed, as follows: New York, 4; Maryland, 3; Virginia, 1; West Virginia, 3; Kentucky, 1; Ohio, 12; Indiana, 5; Michigan, 1; Missouri, 1.

During the census year a considerable part of the total production of black plates was consumed by tin dipping plants located in states other than those in which the black plates were produced, and in some instances, establishments manufacturing black plates, as well as tin and terne plates did not produce enough of the former to supply their own tinning plants, and consequently made purchases from mills located in other states. It has been found impracticable, therefore, to give the value of the black plates and tin and terne plates pro-

duced during the census year, by states, without more or less duplication. In Pennsylvania, for instance, although black plates amounting in value to \$9,423,900 were produced, the domestic black plates consumed by the tin and terne plate plants located in the state amounted in value to only \$7,810,211. In Illinois, on the other hand, where black plates valued at only \$905,992 were produced, the quantity consumed by the tin and terne dipping plants was valued at \$1,367,602. An accurate showing of the Pennsylvania black plate industry requires the crediting to this state of the value of the black plates produced there and sold to tin and terne plate establishments located in other states, even though the value of these black plates reappears in the value of products reported by the establishments, outside of Pennsylvania, which manufactured them into tin or terne plates. For these reasons the cost of materials and the approximate value of products by states have been omitted from Table 4.

Table 5 shows the quantity and cost of the materials used during the census year by the 66 active tin and terne dipping and black-plate establishments.

TABLE 5.—THE TIN AND TERNE DIPPING AND BLACK PLATE INDUSTRIES: QUANTITY AND COST OF MATERIALS USED, 1900.

MATERIALS.	Unit of measure.	Quantity.	Cost.
Total.....			\$45,004,716
Iron ore.....	Tons ²	1,035	6,916
Spiegeleisen, ferromanganese, and all other pig iron.....	Tons ²	16,514	253,920
Old iron or steel rails, and other scrap iron or steel.....	Tons ²	84,422	592,222
Iron or steel ingots, blooms, tin-plate bars, sheet bars, or slabs.....	Tons ²	648,807	13,911,080
Domestic black plates or sheets for tinning.....	Pounds.....	325,556,992	20,590,566
Foreign black plates or sheets for tinning.....	Pounds.....	2,358,607	78,282
Pig tin.....	Pounds.....	20,282,778	4,528,473
Pig lead.....	Pounds.....	6,871,480	398,617
Palm oil.....	Pounds.....	5,511,645	282,227
Sulphuric acid, tinning flux, bran, and pink meal.....			187,318
Boxes and nails.....			303,816
Fuel:			
Anthracite coal and culm.....	Tons ¹	4,456	6,465
Bituminous coal and slack.....	Tons ¹	598,113	619,245
Coke.....	Tons ¹	2,645	4,628
Charcoal.....	Bushels.....	12,926	739
Natural gas.....			328,388
Oil.....	Barrels.....	50	1,061
All other materials, including mill supplies, freight, etc.....			2,911,253

¹ Includes a duplication equal to the cost of the domestic black plates consumed. (See Table 1, note 3.)

² Tons of 2,240 pounds.

Table 6 shows the approximate value of the products of the tin and terne dipping and black plate establishments. The value of domestic black plates consumed by tin and terne dipping plants has been omitted from the statement, since this item is included in the figures given for finished tin and terne plates. The value of black plates produced by domestic mills, but not consumed by the tin and terne dipping plants during the census year is, however, included in the table.

TABLE 6.—THE TIN AND TERNE DIPPING AND BLACK PLATE INDUSTRIES: APPROXIMATE VALUE OF PRODUCTS, 1900.

PRODUCTS.	Value.
Total.....	\$41,322,053
Products of tin and terne dipping establishments, including tin plates, terne plates, other sheet iron and sheet steel, tinned or terne plated, all other products, and amount received for custom work and repairing.....	31,892,011
Products of black-plate establishments, omitting the value of black plates consumed by tin and terne dipping plants.....	9,430,042

In compiling Table 6, it was found impossible to give the exact value of all finished products manufactured by tin and terne plate and black plate establishments during the census year, since duplications of a minor character were more or less unavoidable. The value given for all products is, however, approximately correct. The importance of the two industries, whose growth has been practically confined to a single decade, and which to-day collectively form one of the most vigorous

and progressive branches of the iron and steel industry, is strikingly shown in the figures presented. It may be added that since the close of the census year a number of new black plate and tin dipping plants have been built in several states, some of which are now in operation; others are rapidly approaching completion. The outlook for the future growth of the industry is exceptionally bright, as the demand for tin and terne plates will undoubtedly increase year by year as new uses for both products are discovered and developed. It is possible, too, that, as the productive capacity of the domestic tin dipping plants increases, both tin plates and terne plates may form important features of our expanding export trade. A start in this direction has already been made, as shown by the figures of the Treasury Department for the fiscal year ending with June 30, 1901, when 1,367,405 pounds of domestic tin plates, terne plates, and taggers tin were exported, valued at \$66,550. Of this total 6,300 pounds, valued at \$401, were sent to the United Kingdom.

THE TIN AND TERNE DIPPING INDUSTRY.

The statistics given in this part of the report relate to the tin and terne dipping industry alone. They do not include data for the rolling-mill departments of plants which manufacture black plates as well as tin and terne plates, or data for establishments which manufacture black plates only. A series of tables giving full and complete details for the black plate industry will be found on pages 11 to 13 of this report.

Table 7 is a summary of the leading statistics of the tin and terne dipping industry for the census year.

TABLE 7.—THE TIN AND TERNE DIPPING INDUSTRY: SUMMARY, 1900.

Number of establishments.....	57
Capital.....	\$6,790,047
Salaries of officials, clerks, etc., number.....	333
Salaries.....	\$291,323
Wage-earners, average number.....	3,671
Total wages.....	\$1,889,917
Men, 16 years and over.....	3,014
Wages.....	\$1,711,475
Women, 16 years and over.....	625
Wages.....	\$172,568
Children, under 16 years.....	32
Wages.....	\$5,874
Miscellaneous expenses.....	\$236,466
Cost of materials used, including mill supplies, freight, etc.....	\$26,723,150
Value of products, including custom work and repairing.....	\$31,892,011

¹ Includes rented property valued at \$140,000.

Table 8 gives statistics of the capital invested during and at the close of the census year in active and idle tin and terne dipping establishments, and plants under construction.

TABLE 8.—THE TIN AND TERNE DIPPING INDUSTRY: CAPITAL INVESTED IN ACTIVE, IDLE, AND BUILDING ESTABLISHMENTS, 1900.

CLASSES.	Number of establishments.	CAPITAL.			
		Total.	Land.	Buildings, machinery, tools, and implements.	Cash and sundries.
Total.....	61	\$7,397,531	\$569,125	\$3,012,790	\$3,815,616
Active.....	57	6,790,047	528,400	2,634,040	3,627,607
Idle and building.....	4	607,484	40,725	378,750	188,009

¹ Includes rented property valued at \$140,000.

It appears from Table 8 that a comparatively small amount of the total capital was invested in land, the large items being "buildings, machinery, tools, and implements" and "cash and sundries." Of the 61 establishments enumerated, 45 commenced business between 1890 and 1900 and 2 during the census year. From the remaining 14 no report of the date of commencing business was received. At the close of the census year, only 2 new tin and terne dipping plants were being erected, 1 in Pennsylvania and 1 in Michigan. Of the 2 idle establishments, 1 was located in Pennsylvania and 1 in Ohio.

Table 9 is a summary of the statistics of the 57 active tin and terne dipping establishments for 1900, by states.

TABLE 9.—THE TIN AND TERNE DIPPING INDUSTRY: SUMMARY BY STATES, 1900.

STATES.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products, including custom work and repairing.
			Number.	Salaries.	Average number.	Total wages.			
United States	57	\$6,790,047	338	\$291,823	3,671	\$1,889,917	\$236,456	\$26,728,150	\$31,892,011
Illinois.....	3	413,055	10	19,323	166	88,061	29,993	1,778,048	2,081,887
New York.....	4	245,679	23	23,430	55	25,399	14,068	366,409	463,199
Ohio.....	12	1,203,265	38	33,301	697	394,676	38,963	5,012,175	6,028,314
Pennsylvania.....	25	3,042,029	189	147,202	1,678	813,092	82,169	10,354,084	12,530,981
All other states ²	13	1,886,119	67	68,007	1,175	568,089	71,273	9,207,484	10,792,670

¹ Includes rented property valued at \$140,000.² Includes establishments distributed as follows: Indiana, 5, all controlled by one company; Kentucky, 1; Maryland, 2; Michigan, 1; Missouri, 1; Virginia, 1; West Virginia, 2.

Of the 57 establishments shown in Table 9, 50 were operated by incorporated companies, 5 by firms and limited partnerships, and 2 by individuals. Pennsylvania led in the number of establishments, Ohio, Indiana, New York, and Illinois following in the order named. In the number of wage-earners employed, which is a more accurate measure of the importance of the industry, these states stand in the same order except that the relative positions of New York and Illinois are reversed, the former ranking fifth and the latter fourth. It should be noted, however, that the production was large in some of the states included under the head of "all other states." The order given above is, therefore, not strictly a measure of the importance of the industry in the several states. A more satisfactory measure is found in Table 12, page 8, where the capacity of the tin and terne dipping establishments is given separately for each state where such establishments existed at the close of the census year. Table 12, however, includes both active and idle establishments. From Table 9 it appears that Pennsylvania and Ohio together reported more than one-half of the total value of products.

Table 10 shows the quantity and cost of materials used during the census year in the 57 active tin and terne dipping establishments.

TABLE 10.—THE TIN AND TERNE DIPPING INDUSTRY: QUANTITY AND COST OF MATERIALS USED, 1900.

MATERIALS.	Unit of measure.	Quantity.	Cost.
Total.....			\$26,728,150
Domestic black plates or sheets for tinning.....	Pounds...	825,556,992	20,590,566
Foreign black plates or sheets for tinning.....	Pounds...	2,358,607	78,282
Pig tin.....	Pounds...	20,282,778	4,528,473
Pig lead.....	Pounds...	6,871,480	898,617
Palm oil.....	Pounds...	5,511,645	282,227
Sulphuric acid, tinning flux, bran, and pink meal.....			187,318
Boxes and nails.....			303,316
Fuel:			
Anthracite coal and culm.....	Tons ¹	4,456	6,465
Bituminous coal and slack.....	Tons ¹	35,048	48,059
Coke.....	Tons ¹	975	2,000
Charcoal.....	Bushels.....	556	122
Natural gas.....			34,110
Oil.....			700
All other materials, including mill supplies, freight, etc.....			² 267,895

¹ Tons of 2,240 pounds.² In some cases the cost of freight is included in the cost of materials, it not being practicable to secure the cost of freight separately.

It appears from Table 10 that, aside from the cost reported for black plates, which amounted to 77.3 per cent of the total cost of the materials used, pig tin and pig lead were the most important items. Table 10 indicates, also, that the use of foreign black plates or sheets, which was confined to the states of Pennsylvania and Virginia, was very small compared with the use of domestic black plates and sheets. Bituminous coal and slack, and natural gas were the most important fuels used, in the order named. There were 19 establishments which used natural gas for fuel in whole or in part, located as follows: Pennsylvania, 9; West Virginia, 2; Ohio, 3; and Indiana, 5.

The amount of freight paid on materials consumed was separately reported by a number of establishments, but some of the plants could not give complete reports under this head, since the freight charges were frequently paid by the shippers.

As nearly as can be ascertained, the loss in manufacture of black plates into finished tin or terne plates amounted during the census year to about 10,577,000 pounds, or about 1.2 per cent. In explanation of this loss it might be well to state that at the tin dipping works the finished black plates, before receiving their coating of tin or tin and lead, are white pickled in order that the blue oxide surface may be removed, in which process they lose in weight from one-half to three-quarters of 1 per cent. As a rule, terne plates are resheared or resquared after they are finished, the loss resulting therefrom being about 1.5 per cent.

Of the pig tin and pig lead consumed, about 7 per cent was lost in the process of manufacture. A part of this loss was, however, subsequently recovered from the dross, but at least 2 per cent was totally lost. The palm oil used was almost entirely lost. So, too, were the zinc and muriatic acid from which the chloride of zinc, known as "flux," is made.

In connection with the loss in manufacture above referred to, it may be mentioned that the total loss by the various pickling processes through which the black plates pass from the time they leave the hot rolls until they reach the tinning pots will approximate 4 per cent, over 3 per cent of which is caused by black pickling—that is, the first pickling process after the plates are hot rolled and before they are annealed or cold rolled—

and from one-half to three-quarters of 1 per cent by white pickling. In manufacturing common or light coated plates it is usually assumed by tin plate manufacturers that the loss in weight by the two pickling processes about equals the gain in weight by coating. This is not altogether correct, however, as in the case of heavy coated plates the gain in weight through coating greatly exceeds the loss in weight by pickling.

If to the total cost of materials given in Table 10, \$26,728,150, there is added the \$291,323 paid to salaried employees, the \$1,889,917 paid to wage-earners, and the \$236,456 paid for miscellaneous expenses, a total of \$29,145,846 is obtained for materials, salaries, wages, and miscellaneous expenses.

Table 11 shows the quantity and value of the tin and terne plates and other products of the 57 active tin and terne dipping establishments, by states, for 1900.

TABLE 11.—THE TIN AND TERNE DIPPING INDUSTRY: QUANTITY AND VALUE OF PRODUCTS, BY STATES, 1900.

STATES.	Total value.	TIN PLATES.		TERNE PLATES.		OTHER SHEET IRON AND SHEET STEEL, TINNED OR TERNE PLATED. ¹		Value of all other products, including custom work and repairing.
		Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
United States	\$31,892,011	707,718,239	\$25,558,021	141,285,783	\$5,731,124	1,000,473	\$86,492	\$521,374
Illinois.....	2,081,837	47,296,727	1,999,489	8,900,000	205,000	800,000	80,000	2,848
New York.....	463,199	5,591,050	258,199	30,146,921	1,176,778	200,473	8,492	222,611
Ohio.....	6,023,314	132,168,383	4,623,930	77,129,648	3,263,769			123,247
Pennsylvania.....	12,530,991	256,879,332	9,137,483	30,109,214	1,085,582			173,168
All other states ²	10,792,670	265,787,747	9,533,920					

¹Includes the products of establishments which operate stamping works as well as tin and terne dipping plants. Most of these products are stamped into shape from black plates and then tinned.

²Includes establishments distributed as follows: Indiana, 5, all controlled by one company; Kentucky, 1; Maryland, 2; Michigan, 1; Missouri, 1; Virginia, 1; West Virginia, 2.

Table 11 indicates that the production of tin plates was more than four times as great as the production of terne plates. Illinois produced tin plates only, while New York, Ohio, and Pennsylvania produced both tin and terne plates. Tin scrap, tin dross, spelter, etc., are included under the heading of "all other products."

The average value of the tin plates produced was over 3.6 cents per pound; of the terne plates, over 4 cents per pound; and of other sheet iron or sheet steel tinned or terne plated, over 8.6 cents per pound.

Almost all the tin and terne plates made in the United States during the census year were consumed in the home market. The total exports by the manufacturers amounted to only 17,939 pounds, valued at \$897, reported entirely by the state of Pennsylvania.

Table 12 gives the daily capacity, on single turn, of the 59 completed active and idle tin and terne dipping plants which were in existence during the census year. A majority of these plants were equipped for the manufacture of both tin and terne plates. Others, however, produced terne plates only, and still others, tin plates only. The capacities of the 2 plants in course of construction are not included.

The rank of the 11 states, shown in Table 12, measured by the total capacity of their active and idle establishments, is as follows:

Pennsylvania, Ohio, Indiana, West Virginia, Illinois, Maryland, Missouri, New York, Kentucky, Virginia, and Michigan. The three states of Pennsylvania, Ohio, and Indiana had almost four-fifths of the total capacity shown, no other state having a capacity of over 155,000 pounds per day.

TABLE 12.—THE TIN AND TERNE DIPPING INDUSTRY: DAILY CAPACITY OF ACTIVE AND IDLE ESTABLISHMENTS, 1900.

STATES.	Number of establishments.	DAILY CAPACITY (IN POUNDS) SINGLE TURN.		
		Total.	Tin plates.	Terne plates.
United States	59	2,759,901	2,018,538	741,363
Illinois.....	3	142,000	142,000	.....
Indiana.....	5	452,000	330,050	71,950
Kentucky.....	1	10,600	5,300	5,300
Maryland.....	2	120,000	120,000	.....
Michigan.....	1	8,000	8,000	.....
Missouri.....	1	100,000	100,000	.....
New York.....	4	47,800	27,800	20,000
Ohio.....	13	500,500	358,500	142,000
Pennsylvania.....	26	1,220,001	806,888	413,113
Virginia.....	1	10,000	.....	10,000
West Virginia.....	2	154,000	75,000	79,000

A number of the tin dipping plants run on single turn only, each turn being, on an average, ten hours. At other plants, however, especially those which produce their own black plates, double and triple turn is the practice, two and three sets of skilled workmen being employed. Based upon double turn, the capacity of the completed works for tin plates alone, including the two idle plants, was 4,037,076 pounds daily, or, allowing 300 working days for each year, 1,211,122,800 pounds annually, and for terne plates, 1,482,726 pounds daily, or 444,817,800 pounds annually. The total yearly capacity for the two products on double turn is thus found to be 1,655,940,600 pounds. These capacities are, of course, largely theoretical, as it would be almost a physical impossibility to operate all the tinning sets in the country at the same time and on double turn. The

figures serve, however, to show the total quantity of tin and terne plates that could be turned out in the United States in a single year if the operation of all the plants on double turn for all the working days in the year were practicable.

Of the 59 active and idle completed tin and terne plate plants enumerated above, 15 plants were equipped for the manufacture of tin plates only, 9 plants for the manufacture of terne plates only, and 35 plants for the manufacture of both tin and terne plates. The 15 plants equipped for the manufacture of bright plates only were distributed as follows: Illinois, 3; Maryland, 2; Michigan, 1; Missouri, 1; New York, 3; Ohio, 1; and Pennsylvania, 4. The 9 plants equipped for the manufacture of terne plates only were located as follows: New York, 1; Ohio, 3; Pennsylvania, 4; and Virginia, 1. The 35 plants equipped for the manufacture of both tin and terne plates were distributed as follows: Indiana, 5; Kentucky, 1; Ohio, 9; Pennsylvania, 18; and West Virginia, 2.

Table 13 shows the number of establishments and the number of completed and building sets for tin and terne dipping in each state at the close of the census year.

TABLE 13.—THE TIN AND TERNE DIPPING INDUSTRY: TINNING SETS, COMPLETED AND BUILDING, BY STATES, 1900.

STATES.	Number of establishments.	NUMBER OF SETS.		
		Total.	Completed.	Building.
United States.....	59	638	585	53
Illinois.....	3	30	30	.....
Indiana.....	5	92	84	8
Kentucky.....	1	4	4	.....
Maryland.....	2	21	21	.....
Michigan.....	2	12	4	9
Missouri.....	1	17	15	2
New York.....	4	13	13	.....
Ohio.....	18	119	103	16
Pennsylvania.....	26	303	285	18
Virginia.....	1	3	3	.....
West Virginia.....	2	23	23	.....

¹ Does not include 2 establishments—1 in Indiana and 1 in Pennsylvania—which were active during the census year, but from which the tinning pots were removed before the close of the year.

If the 2 plants in process of erection are deducted from the total given in Table 13, it will be found that at the close of the census year there were only 57 completed plants in the United States which were equipped for the manufacture of tin plates or terne plates, or both. The tinning pots in the 2 plants in course of construction are, of course, included in Table 13.

Table 13 indicates that there were 303 completed and building tinning sets (285 completed and 18 building) located in Pennsylvania at the close of the census year—almost one-half of the total number for the United States; that there were 119 sets in Ohio (103 completed and 16 building); and 92 sets in Indiana (84 completed and 8 building). Almost five-sixths of the total number of tinning sets in the United States were located in

these three states. In point of equipment Illinois ranked fourth, with 30 sets; West Virginia fifth, with 23 sets; Maryland sixth, with 21 sets; and Missouri seventh, with 17 sets (15 completed and 2 building). There were 13 sets in New York, all completed; 13 sets in Michigan, only 4 of which were completed; 4 completed sets in Kentucky; and 3 completed sets in Virginia.

Table 14 shows, by states, the number of months the tin and terne dipping establishments were in operation during the census year.

TABLE 14.—THE TIN AND TERNE DIPPING INDUSTRY: NUMBER OF ESTABLISHMENTS AND MONTHS IN OPERATION, BY STATES, 1900.

STATES.	Number of establishments.	Months on full time.	Months on three-fourths time.	Months on half time.	Months on one-fourth time.	Months idle.
United States.....	57	489	39	29	5	122
Illinois.....	3	33	.....	.....	.....	3
Indiana.....	5	43	.....	.....	.....	17
Kentucky.....	1	.....	12	.....	.....	.....
Maryland.....	2	24	.....	.....	.....	.....
Michigan.....	1	.....	12	.....	.....	.....
Missouri.....	1	12	.....	.....	.....	.....
New York.....	4	31	5	5	.....	7
Ohio.....	12	102	2	9	1	30
Pennsylvania.....	26	214	5	14	2	65
Virginia.....	1	7	2	1	2	.....
West Virginia.....	2	23	1	.....	.....	.....

If each of the 57 tin and terne dipping plants which were active during the census year had run for 12 consecutive months on full time the total number of months of operation would have been 684. As a matter of fact, however, although several of the establishments ran on full time for 12 months, some ran for several months on three-fourths, one-half, and one-fourth time, and others were idle for one, two, three, or more months. If the 57 establishments are considered as one plant and their working period as 684 months, it appears from Table 14 that they were operated on full time 489 months; on three-fourths time 39 months; on one-half time 29 months; on one-fourth time 5 months; and were idle 122 months.

Applying the same rule to the various states, it appears that out of a possible 36 months of running time, the 3 plants in Illinois were operated 33 months on full time and were idle 3 months. Out of 60 months of running time, the 5 Indiana plants were operated on full time 43 months and were idle 17 months. The single plant in Kentucky ran 12 months on three-fourths time. The 2 plants in Maryland were operated 12 months each on full time. The single plant in Michigan ran 12 months on three-fourths time and the single plant in Missouri 12 months on full time. The 4 plants in New York, out of a possible 48 months, ran on full time 31 months, on three-fourths time 5 months, on half time 5 months, and were idle 7 months. The 12 plants in Ohio, out of a possible 144 months, ran 102 months on full time, 2 months on three-fourths time, 9 months on

half time, 1 month on one-fourth time, and were idle 30 months. If the 25 plants in Pennsylvania had run for 12 months each they would have been in operation 300 months. It appears from the returns, however, that they were idle 65 months, and in operation on full time 214 months, on three-fourths time 5 months, on half time 14 months, and on one-fourth time 2 months. The single plant in Virginia ran on full time 7 months, on three-fourths time 2 months, on half time 1 month, and on one-fourth time 2 months. The 2 plants in West Virginia ran 23 months on full time out of a possible 24 months, and 1 month on three-fourths time.

The production of tin and terne plates from July 1, 1891, to December 31, 1901, was as follows:

	Pounds.
1891 (last six months)	2, 236, 743
1892.....	42, 119, 192
1893.....	123, 606, 707
1894.....	166, 343, 409
1895.....	254, 611, 395
1896.....	359, 209, 798
1897.....	574, 779, 000
1898.....	732, 289, 000
1899.....	808, 360, 000
1900.....	677, 969, 000
1901.....	894, 411, 000

From July 1, 1891, to June 30, 1897, these statistics were collected by Col. Ira Ayer, special agent of the Treasury Department. For the last six months of 1897 and for the whole of 1898 they were collected by the editor of the "Metal Worker," of New York City, and from 1899 to 1901, inclusive, they were collected by the American Iron and Steel Association, of Philadelphia.

In the above statement no account has been taken of overtime. A number of plants in several states ran both night and day for various periods during the census year, the number of extra hours reported for "overtime" amounting to 8,457.

Detailed statistics of the tin and terne dipping industry are presented in Tables 21 and 22, which appear at the end of this report. The statistics for each state are summarized in the following paragraphs. In cases where less than three tin or terne plate plants were located within a state, or where all the plants in a state were operated by a single company, it has been necessary, in order that the operations of individual establishments may not be disclosed, to include the statistics with those for another state.

There were 25 establishments in Pennsylvania engaged in the tin and terne dipping industry, with an aggregate capital of \$3,042,029. The average number of wage-earners employed was 1,578, and the value of products, \$12,530,991. These products included 256,879,332 pounds of tin plates valued at \$9,137,483, 77,129,648 pounds of terne plates valued at \$3,263,769, 200,473 pounds of other sheet iron or sheet steel, tinned or terne plated, valued at \$6,492, and miscellaneous products valued at \$123,247. Pennsylvania apparently

enjoys the distinction of being the only state from which tin and terne plates were exported by the manufacturers during the census year. The quantity reported was 17,939 pounds, valued at \$897. The kinds and cost of fuel used were as follows: Anthracite coal and culm, \$5,585; bituminous coal and slack, \$16,038; coke, \$100; and natural gas, \$18,778.

Since the 5 establishments in operation in Indiana were all under the management of a single company, the statistics of capital invested, the cost of materials used, and the value of products have been included with similar data for the state of Illinois. All the 5 Indiana establishments produced both tin and terne plates. In reaching a total for the establishments in the state, each of the 5 plants operated by the single company above referred to has been counted as one establishment. The average number of wage-earners employed during the year was 572, and the daily capacity on single turn of the 5 establishments was 380,050 pounds of tin plates and 71,950 pounds of terne plates. Indiana was the only state which used natural gas exclusively for fuel in the manufacture of tin and terne plates during the census year, not one of the 5 establishments reporting the consumption of a single ton of coal.

During the census year there were 3 establishments in Illinois engaged in the tin dipping industry. Terne plates were not made. The average number of wage-earners employed during the year was 166, and the daily capacity of the 3 establishments was 142,000 pounds of tin plates. The capital invested in the 8 tin and terne plate plants in Indiana and Illinois was \$1,117,184, and the value of products, \$8,347,155. These products included 231,992,162 pounds of tin and terne plates, valued at \$8,248,445; 800,000 pounds of other sheet iron or sheet steel, tinned or terne plated, valued at \$80,000; and tin and terne dross, scruff, etc., valued at \$18,710. For fuel, bituminous coal and slack, oil, and natural gas were used. The oil and the bituminous coal and slack were reported entirely by Illinois, and the natural gas by Indiana.

There were 12 completed tin and terne dipping establishments in Ohio at the close of the census year, with a total capital of \$1,203,265. The average number of wage-earners employed during the year was 697, and the value of products, \$6,023,314. These products included 132,163,383 pounds of tin plates valued at \$4,623,930, 30,146,921 pounds of terne plates valued at \$1,176,773, and miscellaneous products, including custom work and repairing, valued at \$222,611. The kinds and cost of fuel used were as follows: Bituminous coal and slack, \$7,352, and natural gas, \$7,037.

As Maryland and West Virginia had each only 2 tin and terne dipping establishments in operation during the census year, it is necessary to combine the data for the two states to avoid disclosing the operations of individual establishments. The 4 establishments located in these two states reported a total capital of \$586,182.

The average number of wage-earners employed was 274, and the value of products, \$2,650,708. These products included 67,721,725 pounds of tin and terne plates valued at \$2,632,992. In addition, miscellaneous products to the value of \$16,816 were reported and custom work and repairing to the value of \$900. The establishments in Maryland made tin plates only.

During the census year there were 4 tin and terne dipping establishments in operation in the state of New York, with an aggregate capital of \$245,579. The average number of wage-earners employed during the year was 55, and the value of products, \$463,199. These products included 5,591,050 pounds of tin plates valued at \$258,199, and 3,900,000 pounds of terne plates valued at \$205,000. So far as could be learned, none of the tin or terne plates made in the state of New York during the census year were exported by the manufacturers. The kinds and cost of fuel used were as follows: Anthracite coal and culm, \$880; bituminous coal and slack, \$1,525; and charcoal, \$70.

In each of the states of Virginia, Kentucky, Michi-

gan, and Missouri only 1 tin or terne plate plant was in operation during the census year. In addition, 1 plant for the manufacture of both tin and terne plates was being erected in Michigan on May 31, 1900. These 5 establishments reported a total capital of \$1,050,067. The average number of wage-earners employed during the year was 329, and the value of products, \$1,876,644. These products included 43,479,801 pounds of tin and terne plates—mostly tin plates—valued at \$1,737,554; miscellaneous products valued at \$118,290; and custom work and repairing amounting to \$20,800. Of the 4 establishments in operation, 2 made terne plates and 2 made tin plates. The Michigan establishment consumed its entire product in its own works in the manufacture of various specialties. The 3 remaining establishments sold their output in whole or in part in the general market. Virginia and Kentucky made terne plates only, and Michigan and Missouri made tin plates only. The kinds and cost of fuel used were as follows: Bituminous coal and slack, \$10,628; coke, \$1,900; and charcoal, \$2.

THE BLACK PLATE INDUSTRY.

The statistics given in this part of the report relate, as a rule, to those establishments which make a specialty of the manufacture of black plates for tinning. In some cases, however, where the total output includes products other than black plates, it has been found impracticable to separate the capital invested, wages paid, persons employed, etc., in the production of these miscellaneous products, from the corresponding items for the production of black plates alone. The former data are therefore included with the latter in all the statistics which follow. It will be noticed, however, that the value given for "other products" is not large compared with the value of the black plates reported. It may be added that plates and sheets other than black plates for tinning formed about one-half of the value reported for "other products."

Table 15 is a summary of the statistics for the 44 establishments which were engaged in whole or in part in the black-plate industry during the census year.

TABLE 15.—THE BLACK PLATE INDUSTRY: SUMMARY, 1900.

Number of establishments	44
Capital	\$20,698,255
Salaried officials, clerks, etc., number	398
Salaries	\$526,692
Wage-earners, average number	11,155
Total wages	\$8,898,144
Men, 16 years and over	10,784
Wages	\$8,286,364
Women, 16 years and over	68
Wages	\$21,266
Children, under 16 years	308
Wages	\$91,514
Miscellaneous expenses	\$268,672
Cost of materials used	\$18,276,566
Value of products	\$30,020,608

¹ Includes rented property valued at \$25,000.

In addition to the 44 completed black plate establishments in operation during the census year, 3 establishments were in course of construction on May 31, 1900. The capital invested at the close of the census year in both active and building establishments is given in detail in Table 16.

TABLE 16.—THE BLACK PLATE INDUSTRY: CAPITAL INVESTED IN ACTIVE AND BUILDING ESTABLISHMENTS, 1900.

CLASSES	Number of establishments.	CAPITAL.			
		Total.	Land.	Buildings, machinery, tools, and implements.	Cash and sundries.
Total	47	¹ \$20,894,352	\$1,380,000	\$12,570,820	\$6,943,532
Active	44	20,698,255	1,367,000	12,446,725	6,884,530
Building	3	196,097	13,000	124,095	59,002

¹ Includes rented property valued at \$25,000.

Table 16 indicates that the most important item of capital reported for this industry is that invested in buildings, machinery, tools, and implements.

Table 17 presents the statistics of the industry for 1900, by states.

The 44 establishments included in Table 17 were located in 8 states, as follows: Pennsylvania, 22; Ohio, 9; Indiana, 5; Illinois, 3; West Virginia, 2; and Maryland, Kentucky, and Missouri, 1 each. Thus, one-half of the total number of black-plate plants in operation during the census year was located in Pennsylvania, and more than three-sevenths of the total capital reported was invested in the plants located in that state.

TABLE 17.—THE BLACK PLATE INDUSTRY: SUMMARY, BY STATES, 1900.

STATES.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products.
			Number.	Salaries.	Average number.	Total wages.			
United States.....	44	\$20,698,255	393	\$526,692	11,155	\$8,398,144	\$268,672	\$18,276,566	\$30,020,608
Illinois.....	3	1,349,107	14	30,061	449	371,913	26,621	933,624	1,537,125
Pennsylvania.....	22	9,475,628	153	211,364	4,439	3,535,635	66,948	6,708,650	11,147,659
All other states ¹	19	9,873,620	226	285,267	6,267	4,490,596	175,103	10,634,292	17,335,824

¹ Includes establishments distributed as follows: Indiana, 5, all controlled by one company; Kentucky, 1; Maryland, 1; Missouri, 1; Ohio, 9, 8 of which are controlled by one company; West Virginia, 2.

TABLE 18.—THE BLACK PLATE INDUSTRY: QUANTITY AND COST OF MATERIALS USED, 1900.

MATERIALS.	Unit of measure.	Quantity.	Cost.
Total.....			\$18,276,566
Iron ore.....	Tons ¹	1,035	6,916
Pig iron, spiegeleisen, and ferromanganese.	Tons ¹	16,514	253,920
Old iron or steel rails and other scrap iron or steel.	Tons ¹	34,422	592,222
Iron or steel ingots, blooms, billets, tin-plate bars, sheet bars, and slabs.	Tons ¹	648,807	13,911,080
Fuel:			
Bituminous coal and slack.....	Tons ¹	563,085	571,186
Coke.....	Tons ¹	1,670	2,628
Charcoal.....	Bushels.	12,370	617
Natural gas.....			294,278
Oil.....	Barrels	50	361
All other materials, including mill supplies, freight, etc.			2,643,353

¹ Tons of 2,240 pounds.

Table 18 indicates that the cost of iron or steel ingots, blooms, billets, tin plate bars, sheet bars, or slabs amounted to \$13,911,080, out of a total cost of

\$18,276,566 for all materials. The most important fuels used were "bituminous coal and slack," costing \$571,186, or a little over \$1 a ton, and natural gas, costing \$294,278. During the census year 15 establishments used natural gas for fuel, in whole or in part, located as follows: Indiana, 5; Ohio, 2; Pennsylvania, 6; and West Virginia, 2.

The iron ore, pig iron, spiegeleisen, and ferromanganese reported in Table 18 were consumed by establishments which produced steel ingots and muck bars as well as black plates for tinning. The charcoal reported was consumed by 1 establishment in Pennsylvania which operated a bloomery for the production of charcoal blooms, all of which were subsequently manufactured into finished products in its rolling mill.

Table 19 shows, by states, the quantity and value of the products turned out by the 44 active black plate establishments during the census year.

TABLE 19.—THE BLACK PLATE INDUSTRY: QUANTITY AND VALUE OF PRODUCTS, BY STATES, 1900.

STATES.	Total value.	BLACK PLATES.						ALL OTHER PLATES AND SHEETS.		Value of all other products.
		Total.		Bessemer steel.		Open-hearth steel.		Tons.	Value.	
		Tons.	Value.	Tons.	Value.	Tons.	Value.			
United States.....	\$30,020,608	394,014	\$20,967,805	355,077	\$18,673,311	38,937	\$2,294,494	79,096	\$4,517,644	\$4,535,159
Illinois	1,537,125	14,491	905,992	6,906	396,280	7,585	509,712	.....	.....	631,133
Pennsylvania	11,147,659	178,574	9,423,900	169,464	9,012,437	9,110	411,463	23,547	1,296,279	427,480
All other states ¹	17,335,824	200,949	10,637,913	178,707	9,264,594	22,242	1,373,319	55,549	3,221,365	3,476,546

¹ Includes establishments distributed as follows: Indiana, 5, all controlled by one company; Kentucky, 1; Maryland, 1; Missouri, 1; Ohio, 9, 8 of which are controlled by one company; West Virginia, 2.

Table 19 indicates that more than nine-tenths of the black plates manufactured were made from Bessemer steel, and less than one-tenth from open-hearth steel. No iron black plates were reported by any of the 44 active establishments. The average value of all kinds of black plates for tinning was \$53.21 per ton. The Bessemer black plates averaged \$52.59 per ton and the open-hearth black plates \$58.93 per ton. The value of all billets and sheet and tin plate bars produced for sale by black plate establishments, which amounted approximately to \$1,894,000, is included in the "value of all other products."

Changing gross tons to pounds, it is found that the

total production of Bessemer and open-hearth steel black plates in 1900 was 882,591,360 pounds, of which 795,372,480 pounds were Bessemer steel and 87,218,880 pounds were open-hearth steel. These figures do not include the 79,096 tons of plates and sheets other than black plates produced by black-plate mills during the census year.

Pennsylvania ranked first in the production of Bessemer steel black plates during the census year, producing almost one-half of the total quantity. Indiana was second, Ohio third, and West Virginia fourth. These four states made over 96 per cent of the total production of Bessemer steel black plates. Pennsylvania, Ohio,

and West Virginia also produced almost all of the 79,096 tons of other plates and sheets reported above, Ohio ranking first, Pennsylvania second, and West Virginia third. In the production of open-hearth steel black plates, Missouri ranked first, Pennsylvania second, Illinois third, and Ohio fourth. These four states produced over 96 per cent of the total production of open-hearth plates.

Table 20 shows the number of hot and cold mills, completed and building, in the 47 establishments, completed and building, during the census year. This table also shows the annual capacity of the hot mills in finished black plates. As a rule the capacities are reported on triple turn.

TABLE 20.—THE BLACK PLATE INDUSTRY: ACTIVE AND BUILDING MILLS, 1900.

STATES.	Number of establishments.	Number of hot mills.	Number of cold mills.	Annual capacity of hot mills in gross tons. ¹
United States	47	355	308	692,725
Illinois	3	28	12	50,700
Indiana	5	58	38	102,025
Kentucky	1	3	2	5,000
Maryland	1	5	3	9,825
Michigan	1	4	4	7,700
Missouri	1	10	10	18,000
Ohio	9	68	63	131,850
Pennsylvania	24	170	162	340,575
West Virginia	2	14	14	27,250

¹ Tons of 2,240 pounds.

Table 20 indicates that there were 355 completed and building hot black plate mills located in the 44 active and 3 building establishments. Of these mills, 332 were completed and 23 were building. The total annual capacity of all the hot mills, both completed and building, was 692,725 gross tons of finished black plates. The completed mills had a capacity of 641,450 tons and the building mills a capacity of 51,275 tons. The number of cold mills was 308, of which 294 were completed and 14 were building. The hot and cold mills in course of construction were located in Pennsylvania, Ohio, and Michigan.

In point of equipment and capacity, Pennsylvania was first, with 170 hot mills (160 completed and 10 building) and 162 cold mills (157 completed and 5 building). The hot mills had an annual capacity of 340,575 gross tons of finished black plates (completed mills, 314,325 tons, and building mills, 26,250 tons). Ohio was second, with 68 hot mills (59 completed and 9 building), having an annual capacity of 131,850 tons of black plates (completed mills, 114,525 tons, and building mills, 17,325 tons) and 63 cold mills (58 completed and 5 building). Indiana was third, with 53 completed hot mills, having an annual capacity of 102,025 tons, and 38 cold mills. Illinois was fourth, with 28 completed hot mills, with an annual capacity of 50,700 tons of black plates, and 12 cold mills. None of the other states named in the table had more than 14 hot mills or an annual capacity exceeding 28,000 tons of finished black plates.

HISTORY OF THE MANUFACTURE OF TIN AND TERNE PLATES.

FOREIGN COUNTRIES.

Flower, in his "History of the Trade in Tin," states that brass, which is an alloy of tin and copper, was used by the ancients, in the proportion of one part of tin to nine of copper. He is in doubt as to the source from which the ancients obtained their supply of tin, but inclines strongly to the belief that it came from Cornwall, in England, although he concedes that it may have been brought to Tyre and other cities in Phœnicia from China, whose civilization dates back to at least 2500 B. C. He also states that tin was employed at a very early period for coating iron and copper vessels, but gives no account of the process employed. He quotes Pliny (A. D. 23) as an authority, and is inclined to the opinion that the vessels were dipped in a bath of molten tin as at the present day.

Modern writers practically agree that the art of coating iron sheets or plates with tin was first practiced commercially by the people of Bohemia, tin ore having been discovered in the mountains of that country about the year 1240 A. D. Flower states specifically that the manufacture of tin plates was begun in Bohemia between

the years 1240 and 1600, but adds that the town or village where it originated and the year when the first tin plates were made are unknown. But that the coating of iron sheets with tin was carried on exclusively in Bohemia for many years prior to 1620, and that the process of manufacture was strictly guarded by those engaged in it, are beyond doubt. Down to the year last named, not only England but the whole of Europe was dependent upon Bohemia for its supply of tin-coated sheets. In 1620, however, the reigning Duke of Saxony obtained the secret which the Bohemians had carefully guarded for so many years, and immediately erected works in his domain for the manufacture of tin plates. A flourishing industry was soon established and many thousand workmen were given employment. The plates were sent by land and river to Hamburg, whence they were forwarded by sea "as far as trade was known."

Although tin had been smelted for centuries in England from ore mined in Cornwall, and a large trade in pig tin had been established with other European countries for hundreds of years, it was not until about 1670 that tin plates were experimentally produced in Great

Britain. An English gentleman, Andrew Yarranton, had been sent to Saxony in 1665 by a company of English noblemen and gentlemen for the express purpose of acquiring the art of coating iron sheets with tin. After spending some time in Saxony, where he was treated with the utmost civility, and was allowed to study the process of manufacture and to examine carefully the different materials used in making tin plates, he returned to England and established a small plant at Pontypool, in Monmouthshire. The enterprise was not a commercial success, because a patent for the manufacture of tin plates was granted to a high court official, who, it is said, had no knowledge whatever of the process of manufacture. The works at Pontypool were soon abandoned, and for a half century longer Germany and Bohemia continued to enjoy the monopoly they had so long maintained. About 1720 Maj. John Hanbury, an ironmaster of Pontypool, took up the manufacture of tin plates where it had been dropped by Yarranton. His enterprise was successful from the start, and it is not too much to claim that to Major Hanbury belongs the honor of establishing on British soil the first permanent plant for the production of tin plates.

Until 1728 all iron plates had been produced under the hammer, and, as a result, the thickness of the sheets was far from uniform. But in that year the art of producing sheets of uniform thickness by means of rolls was invented, the honor of the invention being claimed by both Major Hanbury and John Payne. By this process the cost of producing iron sheets for tinning was greatly reduced and a flourishing trade was soon established on English soil, the rolled British plates, because of their superior quality and finish, largely displacing in the home market the somewhat crude hammered product of the German manufacturers.

Soon after 1720 the manufacture of tin plates was begun at a number of points in Wales, especially at locations where good waterpower was available and where forges had already been established for the manufacture of charcoal iron. From 1720 to 1834 the growth of the tin plate industry in England and Wales was slow but steady. During the latter year the total production in the two countries was about 180,000 boxes of 108 pounds each, and the value of the exports about \$1,640,000. After 1834 the industry grew more rapidly. In 1848 the production was 420,000 boxes, and the value of the exports over \$2,442,000; and by 1860 the production had reached 1,700,000 boxes, and the exports were valued at \$7,547,000. The growth of the industry was confined almost entirely to the counties of Glamorgan and Carmarthen, in Wales. In 1870 the production advanced to 3,459,782 boxes, but in 1876 it fell to 2,815,393 boxes. Soon after 1876 it again revived, and advanced rapidly from that year to 1890, reaching a total of over 9,500,000 boxes in the latter year. The magnitude of the export trade of Great Britain in tin and terne plates a few years ago is indicated by the

imports into the United States, since, prior to 1892, this country obtained practically its entire supply from the United Kingdom. In 1889 the United States imported 742,136,000 pounds, valued at the port of shipment at \$21,726,707; and in 1891 about 734,455,000 pounds, valued at \$25,900,305. The total value of the tin and terne plates imported into the United States from 1871 to 1891, inclusive, was \$333,241,709, an average of \$15,868,652 annually. From 1892 to 1900, inclusive, the total value was \$78,372,484, an average of \$8,708,053 annually. In the year last named the total imports were only 135,264,881 pounds, valued at \$4,617,813.

About the time of the failure of Andrew Yarranton to establish the manufacture of tin plates in England, and perhaps prior thereto, several similar attempts were made in France, all of which failed. About 1714, however, a plant was erected at Mansvaux, in Alsace, for the manufacture of tin plates and was successfully operated. This was at least six years prior to the revival of the industry at Pontypool, in England. A plant was established at Bains, in Lorraine, in 1733; another at Imphy, near Nevers, in 1745; and still another at Morambeau, in Franche Comté, in 1751. France still manufactures tin plates, but the quantity produced is not large. Works are said to be in operation in Bohemia, also, the original home of the industry, and in Moravia and Styria. Considerable quantities are produced in Westphalia and in Rhenish Prussia, but until recent years, when the industry became firmly established in the United States, the chief source of the world's supply was England and Wales, about five-sixths of the total production of these two countries being exported.

Iron plates coated with an alloy of tin and lead were used early in the Nineteenth and probably also in the Eighteenth century in Germany and France in the manufacture of painted, decorated, and lacquered ware, such as salvers, tea trays, botanists' drums, sandwich boxes, pencil cases, bird cages, etc., the surface of which was covered with paint and pictures. For such uses the lead alloy was cheaper than tin and answered the purpose as well. It does not appear, however, that sheets coated with an alloy of tin and lead were used for roofing purposes by either of the countries named until long after the beginning of the Nineteenth century.

Prior to the manufacture of terne plates for roofing, tin plates 10 by 14 inches in size were frequently used for that purpose. As a rule, heavy plates were used, corresponding to what is commercially known as 2x, or about No. 27 gauge. One of the leading tin plate manufacturers of Pennsylvania states that many years ago a number of roofs in Philadelphia were covered with tin plates instead of terne plates, and that the plates on these roofs are to-day in almost as good condition as when first laid. The plates used, however, were very heavily coated with tin. In the United States, during the period following the Civil War, large quantities of

tin plates were sold for roofing purposes throughout the West, especially in the dry, mountainous districts. Some thirty or forty years ago tin plates were largely used for roofing purposes in Canada. These plates, which were unpainted and shone out brilliantly in the sun, cost in those days from \$10 to \$12 per box. Some of the tin plates placed on roofs in Quebec and other Canadian cities over three-quarters of a century ago are still in good condition. The roofs of Quebec are exceedingly steep, which may account in part for the great durability of the plates. At the present time the practice in the large Canadian cities is to use galvanized sheets for roofing purposes. It is claimed that sheets of this character last from twenty to thirty-five years without repairs. The gauges used are Nos. 26 and 28. About 20 per cent of the quantity annually consumed in Canada is imported from the United States. The remainder is obtained from Great Britain. Small quantities of imported English black plates are also used on very steep roofs. If painted every year, these sheets are said to last for about fifteen or twenty years. No. 28 gauge is the thickness generally used. Considerable quantities of terne plates are still used in the rural districts.

THE UNITED STATES, PRIOR TO 1890.

Diligent search has failed to bring to light any record of the production of terne plates for roofing purposes in any country prior to 1830. In that year small quantities of lead-coated sheets were made in an establishment located on Market street, Philadelphia, Pa., and used for covering roofs. It is, of course, possible that England, Wales, Germany, or France produced roofing plates coated with tin and lead much earlier than the year named. If such is the case, however, the date of their manufacture and the country in which they were made seems not to be known.

Flower, in his "History of the Trade in Tin," does not mention the year when terne plates were first produced nor the country in which they were manufactured, although he is strongly inclined to the opinion that they were made in France before they were made in England. As early as 1848 reference to the manufacture in Great Britain of plates of "dull appearance" was made by Mr. Thomas William Booker, high sheriff of Glamorganshire, in an address on the tin plate industry of Monmouthshire, Glamorganshire, and Carmarthenshire, delivered before the Royal British Association at its annual meeting at Swansea, in Wales, in the year named. He referred to the depression at that time existing in the tin plate trade, and in the course of his remarks said that the works located in the district mentioned could produce not less than 520,000 boxes of tin plates annually, and that "a small proportion of the plates manufactured are of dull appearance. These are for a special purpose, lead being used in the manufacture." As far as can be learned, he made no men-

tion of the word "terne." As three years later, however, in 1851, "tin and terne plates" appear in the list of exports from Great Britain, it is reasonable to assume that the "dull plates" mentioned by Mr. Booker were iron plates coated with a mixture of tin and lead, although they may have been coated with lead only. No mention of terne plates is apparently made in the iron and steel exports from Great Britain in 1848.

The plates made in the Philadelphia establishment were 10 by 14 inches, the standard commercial size in those days. Imported English tin plates were used instead of black plates. They were first put together and run through a bath of molten lead, the tin on the plates serving as a holder for the lead. The plates were sold for roofing purposes and were of excellent quality. The quantity produced, however, was not very large. Regarding the sale of these plates, the N. & G. Taylor Company, of Philadelphia, says: "News of the sale of so novel an article soon found its way across the water, and terne plates commenced to be made there." Very few terne plates are used for roofing purposes in Europe, zinc sheets being commonly used instead. The manufacture of terne plates did not become an important branch of the tin plate industry until America began to use this material for covering roofs.

The manufacture of household and culinary articles from sheet metal has been carried on in the United States for many years. Tin plates and iron black plates were chiefly used for this purpose, the articles being stamped from a single blank. At first only shallow articles were made, such as pie plates and pot covers, but about 1860 a machine was devised for the manufacture of deeper wares, such as milk pans, washbowls, cake pans, and, finally, dish pans. Tin plates were largely used in the production of all of the articles named. In the process of manufacture, however, they lost their luster, and had to be redipped in liquid tin. Frequently black plates were stamped into shape and then tinned. For some articles, such as ladles, skimmers, etc., black iron sheets were always used, being first stamped into shape and then put through the tinning process.

The firm of E. Ketcham & Co., of Brooklyn, N. Y., began the manufacture of shallow stamped ware in 1857, and in 1862 had 16 tinning pots in its works, and employed a large force of hands twelve months in the year. In addition to the redipping of tin plates which had become oxidized in transit or defaced in the course of manufacture, iron black plates in the form of sheets were also dipped. Occasionally these redipped tin plates or dipped black plates were sold as sheets, but sales of this character were not customary. Usually all tinned black sheets or retinned bright plates were used by the firm in its own works in the manufacture of stamped ware. In no instances were tin plates manufactured for sale on the general market. Black plates were also stamped into various shapes by this

firm, tinned, and then sold. Heavy imported tin plates were used as a rule by all stamping companies, but at times, on account of delay in the arrival of these tin plates, American and foreign black sheets were purchased and tinned.

In addition to the firm of E. Ketcham & Co., the following companies were early engaged in the manufacture of stamped ware, namely: James Aikman & Co., of New York; The Iron Clad Can Company, of New York; F. Haberman, of New York; Sidney Shepard & Co., of Buffalo; the Chicago Stamping Company, of Chicago; the Dover Stamping Company, of Boston; the St. Louis Stamping Company, of St. Louis; John Dunlap, of Pittsburg; and the firm of Lalance & Grosjean, of New York. All these establishments were equipped with tinning pots.

Prior to 1860 the firm of Lalance & Grosjean operated a large number of tinning pots, one of its principal products being tinned iron spoons. This firm also imported and retinned large quantities of French sheet-metal goods, that is, articles which were made from heavy sheet iron and always retinned. It began to manufacture articles of this character about 1862 at its works at Woodhaven, Long Island, N. Y., using a machine devised especially for the purpose. As sheet iron of the necessary strength and ductility could not be procured from the iron manufacturers of the United States, imported black plates were used. These sheets were stamped into the desired shapes, and were dipped in a bath of pure tin. In 1876 the company began to draw the larger part of the black plates it consumed from the United States Iron and Tin Plate Company, of Demmler, Pa. It now manufactures its own black plates. This New York firm was the pioneer in the United States in the manufacture of what was then known as deep French ware, now commonly called deep stamped seamless ware.

Tinned and iron and steel spoons were manufactured from foreign and domestic black plates in large quantities by G. I. Mix & Co., of Yalesville, Conn.; the R. Wallace & Sons Manufacturing Company, of Wallingford, Conn.; and the Oneida Community, also of Wallingford, Conn. Part of the product was also nickel plated after having been coated with tin. At least one of these establishments was engaged in this line of business as early as 1858.

About 1858 or 1859 Mr. John Grey, manager of Hussey's Copper Works, at Pittsburg, Pa., operated tinning pots in that city, black plates being procured from the Sligo Iron Works, of Pittsburg. These plates were pickled and placed in a furnace to remove the loose scales and were then cold rolled and annealed. From these ladles, skimmers, etc., were stamped and subsequently tinned. This business was continued until about 1866. In that year Mr. Grey began the erection of a rolling mill at Pittsburg for the production of black plates, but unexpected difficulties were encoun-

tered, and he failed to carry out his enterprise. Mr. Grey produced also tinned copper sheets, the molten tin being put on with a brush on one side of the sheets only. These sheets were largely used in the manufacture of kitchen ware and other household utensils. The careful housewife of the early sixties took especial pride in burnishing the outer side of her copper cooking vessels, all of which, for obvious reasons, were heavily coated with tin on the inner side.

While undoubtedly all of the stamping establishments named above had tinning pots in their plants, they consumed in their own works practically all the plates which they tinned or retinned. As a rule, too, these plants were very heavy purchasers of foreign tin plates, but their consumption of American-made black plates was at no time very large. With the exception of the Philadelphia enterprise mentioned above, the first attempt in the United States to make tin or terne plates for the general market appears to have been in 1872. In the spring of that year a small dipping plant was built in Pittsburg, Pa., near Dinwiddie street and Fifth avenue by four Welshmen, Evan H. Davies, Wm. Oak Davies, John Evans, and Thomas Morgan, who had been employed in tin plate works in their native country. This little plant was put in operation in June, 1872. Both tin plates and terne plates were successfully made and were readily disposed of at good prices. The black plates first used were obtained from the Soho Iron Works, at Pittsburg. They were rolled as sheet iron, sheared to the required size, and pickled in the galvanizing department of the Soho Works. Later plates were obtained from Rogers & Burchfield, at Leechburg, Pa. It was this little dipping plant at Pittsburg which led to the erection of tin plate works at Wellsville, Ohio, and at Demmler, Pa., in 1873, the machinery and tinning pots being removed from Pittsburg to Wellsville in the summer of that year. Evan H. Davies was subsequently connected with the Wellsville plant, and Wm. Oak Davies with the Demmler works.

The pioneer plants for the combined manufacture of black plates and tin and terne plates were established in the United States in 1873 and 1874 by Rogers & Burchfield at Leechburg, Pa., the American Tin Plate Company at Wellsville, Ohio, and the United States Iron and Tin Plate Company at Demmler, Pa.

The rolling mills for the Leechburg enterprise were erected about 1872, or perhaps earlier. It was at these mills in 1874 that natural gas was first used as a fuel in the manufacture of iron. For six months during the year named it was the only fuel used by the firm in its puddling and heating furnaces and for making steam. The tin and terne plate department was added in 1874, and terne plates were first produced in the same year. Tin plates were made in either 1874 or 1875. In the latter year the firm failed, and in May, 1877, the works were sold by the creditors. The purchasers, Kirkpatrick, Beale & Co., produced only terne plates in

their tinning department from 1877 to 1880. In the latter year they were compelled to give up the manufacture of *terne* plates on account of the low prices then prevailing for imported plates. The rolling-mill department was not closed, however, but continued to run on fine grades of sheet iron and sheet steel suitable for the manufacture of stamped ware. The tin and *terne* plate department was permanently abandoned in 1880.

In 1873 the American Tin Plate Company completed a rolling mill and a tin and *terne* plate plant at Wellsville, Ohio, the rolling mill being put in operation in September of that year. The first *terne* plates were produced in November, 1873, and in the spring of 1874 its first tin plates were turned out. In all, about 530 boxes of 14 by 20 bright plates were produced. The manufacture of both tin and *terne* plates was discontinued permanently in October, 1874. In 1880 the works were sold to the Wellsville Plate and Sheet Iron Company, which remodeled the plant and began the manufacture of fine grades of plate and sheet iron. It was not until after 1890 that the manufacture of black plates for tinning was resumed. The production of tin and *terne* plates was never again attempted at this plant.

The United States Iron and Tin Plate Company erected works at Demmler, Pa., in 1873-74, for the manufacture of black plates and tin and *terne* plates. *Terne* plates were first made in 1874 and in the following year tin plates were also produced. The black plates consumed in the dipping plant were produced in the rolling mill of the company. In 1877 the coating of iron or steel sheets with tin or with tin and lead was suspended, but black plates were still manufactured for the production of show cards, tea trays, black stamped ware, etc. In 1879 the manufacture of tin and *terne* plates was resumed, but in 1880 it was again discontinued, the company for a decade thereafter confining its operations to its rolling mill and to the production of specialties in fine sheet iron and sheet steel. In 1890 the manufacture of tin and *terne* plates was again revived.

Tin plates were produced about 1874 or 1875 by the Iron Clad Can Company at its works at Brooklyn, N. Y. This company, which subsequently changed its name to the Iron Clad Manufacturing Company, consumed in the manufacture of heavy "railroad" milk cans, etc., practically all the tin plates it produced. The black plates used were chiefly from No. 18 to No. 21 gauge in thickness and from 15 by 15 inches to 22 by 42 inches in size, and were obtained from Rogers & Burchfield, of Leechburg, Pa., from the United States Iron and Tin Plate Company, of Demmler, Pa., and later from the Canonsburg Iron and Steel Company, of Canonsburg, Pa. This plant is still engaged in the production of tin plates for its own use.

In 1876 or 1877 the Monitor Tin Plate Company began to manufacture tin plates for sale at its works at Horatio and Water streets, New York city. The black

plates used were purchased from P. H. Laufman & Co., of Apollo, Pa., and from the United States Iron and Tin Plate Company, of Demmler, Pa., and varied in thickness from No. 16 to No. 28 gauge and in size from 14 by 50 to 28 by 84 inches. After being tinned they were sold to manufacturers of milk cans, stamped ware, etc. The tinning of black plates was discontinued in 1878 or 1879. The similarity in the names of these two early New York establishments, "Iron Clad" and "Monitor," will not escape notice. Neither of these plants made *terne* plates, but the Iron Clad Manufacturing Company made at one time stamped iron shingles, and coated them with *terne* metal.

All the early enterprises named above used charcoal-iron sheets for the manufacture of both tin and *terne* plates. It was not until about 1876 that steel sheets were experimentally used by the United States Iron and Tin Plate Company, at Demmler, Pa. Some three or four years later establishments in England and Wales began to coat steel sheets with tin, but the honor of the discovery that good tin and *terne* plates could be made from soft steel sheets undoubtedly belongs to the United States. At the present time very few iron sheets are used in the manufacture of tin or *terne* plates either in the United States or in foreign countries.

One of the early establishments engaged in the manufacture of black plates for tinning was the firm of P. H. Laufman & Co., which commenced production at Apollo, Pa., in 1878, the plates being sent to New York city, where they were tinned by the Monitor Tin Plate Company. The plant at Apollo produced black plates for tinning for a short time only, the prevailing prices for tin plates being too low to justify the continuance of the New York tin plate enterprise.

In 1887 the Pittsburg Electro Plating Company, of Apollo, Pa., began the manufacture of electroplated steel sheets, coating them with copper, nickel, and other metals, but principally with copper. These sheets were afterwards polished on the electroplated side, and tinned on the other side, the molten tin being put on with a brush. They were used principally in the manufacture of wash boilers and kitchen ware. In 1890 the company began to manufacture *terne* plates, selling its product in the open market. In the fall of 1892 the plant was moved from Apollo to Butler Junction, Pa., and in 1893 the name of the company was changed to the Laufman Tin Plate Company. Neither of these companies produced tin plates.

Up to the year 1890 the manufacture of tin and *terne* plates in the United States was carried on under very great difficulties. About 1863 a firm in Pittsburg, Pa., had sent the manager of their copper works to England for the express purpose of learning the tin plate industry. About 1868 an iron company in Johnstown, Pa., also sent an experienced metallurgist and iron-mill worker to Europe for the same purpose. The reports of both gentlemen were unfavorable, each stating that

the industry could not possibly be successfully established in this country under the wage rate then prevailing.

After 1874, however, the Leechburg, Pa., Wellsville, Ohio, and Demmler, Pa., enterprises above mentioned attained considerable success and seriously threatened the monopoly which the English tin plate manufacturers had so long enjoyed in the United States. To meet this competition, English manufacturers reduced the selling price of their tin and terne plates in this country to such low figures that the manufacture for the general market became unprofitable here and for many years was entirely abandoned. Of the three pioneer black plate and tin and terne plate establishments referred to above, one only, the United States Iron and Tin Plate Company, continued operations under the same management; and this establishment operated its rolling-mill department only, its tin and terne plate department having been closed in 1880. From this year to 1890, very few tin or terne plates were made for sale in the United States.

Tin plates were first produced in Michigan in January, 1889, by the Buhl Stamping Company, of Detroit. Down to the close of the census year this was the only establishment in operation in the state. It consumes its entire output of tin plates in the manufacture of milk-can stock, tubular lanterns, gas meters, etc. This company has never manufactured terne plates.

In 1889 Missouri began to make tin and terne plates for the general market, its first terne plates being produced in April and its first tin plates in September of that year by the St. Louis Stamping Company, of St. Louis. Black plates were obtained from the rolling mill of the company, which was established in 1879, and which had long been engaged in the production of iron sheets suitable for the manufacture of stamped ware.

In the fall of 1889 tin plates were produced in the Western Pennsylvania Exposition Building, at Pittsburgh, Pa., by the American Tinned Plate Association. The plant was erected and operated for the purpose of demonstrating that tin plates equal in quality to imported plates could be successfully manufactured in this country. Several hundred boxes of tin plates of fine quality were produced. Terne plates were not made. After running for a short time, the plant was dismantled.

THE UNITED STATES SINCE 1890, BY STATES.

The great growth in the manufacture of tin and terne plates in the United States has taken place since 1890. The production increased from about 2,236,000 pounds in 1891 to over 849,000,000 pounds in 1900. Indeed, it is possible that the total production of tin and terne plates in this country in the year last named exceeded that of Great Britain. Exact statistics for the United Kingdom are not obtainable, but using the quantity exported as a basis of calculation, and allowing for the

ordinary home consumption, it is at least probable that the production of the United States in 1900 exceeded by several thousand tons the total production of Great Britain in that year. The development of the industry in the United States since 1890 will be followed by states.

Early in 1890 both tin and terne plates were made at Demmler, Pa., by the United States Iron and Tin Plate Manufacturing Company. The works were equipped with 6 sets with a weekly capacity of 2,000 boxes, and the company made its own black plates. The plant has since been greatly enlarged. John Hamilton, of Pittsburg, also produced terne plates in April, 1890. His works were equipped with 2 sets and could turn out weekly about 600 boxes of terne plates. Tin plates were not made, and the black plates used were purchased. In June, 1890, the Pittsburg Electro Plating Company, Limited, made terne plates at Apollo, Pa. The works were equipped with 3 sets and had a capacity of about 1,000 boxes weekly. Tin plates were not made, and the black plates used were obtained from the Apollo Sheet Iron Works. All these enterprises were located in the western part of the state. In the eastern part of Pennsylvania, the Penn Treaty Iron Works, of Marshall Bros. & Co., of Philadelphia, began to produce terne plates in January and tin plates in April, 1891. The works had a weekly capacity of 1,000 boxes, and were equipped with 4 sets, 2 of which were used for tin plates and 2 for terne plates. Black plates were also made. In the same year the N. & G. Taylor Company, also of Philadelphia, produced terne plates in April and tin plates in November. Its works were equipped with 3 sets, and 1,150 boxes of tin and terne plates could be produced weekly. Black plates were purchased. Other tin and terne plate enterprises were very shortly established, and Pennsylvania soon became the leading state in the manufacture of tin and terne plates. As shown by the figures for the census year, it still holds this position, its production in the twelve months ending with May 31, 1900, amounting to almost 40 per cent of the total for the United States.

Indiana began to manufacture tin and terne plates in the summer and fall of 1891, works having been erected at Anderson, Madison county, in the spring of that year by the Anderson Tin Plate Company. On July 4 the first box of tin plates was made, and in the following October terne plates also were produced. The works were equipped with 1 set only, tin and terne plates being made alternately. The weekly capacity of the plant was about 400 boxes, and the black plates used were all purchased.

In 1891 the American Tin Plate Company began the erection of a rolling mill and a tin plate plant at Elwood, in Madison county. Black plates were first produced in June, 1892, and in the following month tin and terne plates were also made. The annual capacity of the

rolling mill was about 6,500 gross tons of black plates, all of which were consumed by the company in its tin plate works. The weekly capacity of the tinning department, which was equipped with 10 sets, was 3,500 boxes of tin and terne plates. Natural gas was used for fuel in both the rolling mill and tin dipping works.

In 1892 the Indiana Tin Plate Manufacturing Company began the erection of a plant at Atlanta, in Hamilton county, for the manufacture of both tin and terne plates from purchased black plates. The works were not completed until early in 1893, the first tin plates being made in May and the first terne plates in June of that year. The plant was equipped with 3 sets, 2 of which were used for tin plates and 1 for terne plates. Its weekly capacity was 300 boxes of tin plates and 100 boxes of terne plates. The fuel was natural gas.

In 1893 the Morewood Company erected a rolling mill and tin plate plant at Gas City, in Grant county. Terne plates were made in June of the year named and tin plates in December. The rolling mill was not completed until late in 1893, and black plates were first produced in December of that year. The tinning department was equipped with 10 sets, 8 of which were used for manufacturing tin plates and 2 for terne plates, the latter sets being very large. The weekly capacity of the tinning department was 3,000 boxes of tin plates and 2,000 boxes of terne plates. In the rolling-mill department about 6,200 tons of black plates could be produced annually. Natural gas was used for fuel in all departments.

Early in 1894 the Emlyn Steel and Tin Plate Company began the erection of a black-plate mill and a tin and terne plate plant at Summitville, in Madison county. The buildings were not completed, however, and the enterprise was subsequently abandoned.

In 1893 the Irondale Steel and Iron Company began to erect a rolling mill at Middletown, in Henry county, utilizing machinery brought from its former mill at Anderson, which had been destroyed by fire. The new mill was completed and put in operation in 1894, trains of rolls for the manufacture of black plates being added. Prior to the fire, the works had made a specialty of fine sheet iron. A department for the manufacture of tin and terne plates was added in the fall of 1894, both products being made in November of that year. Eight tinning sets were installed, 7 of which were used for tin plates and 1 for terne plates. The weekly capacity of the tinning department was 4,400 boxes of tin plates and 600 boxes of terne plates. In the rolling mill 10,000 tons of black plates could be produced annually. Natural gas was used for fuel in all departments.

In 1894 the Montpelier Sheet and Tin Plate Company began the erection of a rolling mill and tin plate plant at Montpelier, in Blackford county. The rolling mill was put in operation in May, 1895, and in the following June tin and terne plates were produced. The tinning department was equipped with 12 sets, 11 of which were

used for tin plates and 1 for terne plates. The weekly capacity of the plant was about 3,000 boxes of tin plates. In addition, 250 boxes of terne plates, 20 by 28 inches, 216 pounds to the box, could be produced. In the rolling mill about 9,000 gross tons of black plates could be turned out annually. As in the other Indiana tin plate plants, natural gas was used for fuel in all departments.

Late in 1894 the National Tin Plate Company began the erection of a black-plate mill and a tin and terne plate plant at Anderson. Both departments were completed in 1895, black plates and tin and terne plates being first produced in August of that year. The rolling mill had an annual capacity of 13,000 gross tons of black plates, and in the tinning department about 4,000 boxes of tin and terne plates could be produced weekly. Natural gas was the only fuel used in the works.

Although on May 31, 1900, there were only five completed dipping establishments in Indiana, this state ranked second in the quantity and value of tin and terne plates produced during the census year.

After the manufacture of tin and terne plates had been abandoned by the Wellsville enterprise, apparently neither tin nor terne plates were made in commercial quantities in Ohio until 1891. In the summer of that year, the Cincinnati Corrugating Company commenced to manufacture terne plates at Piqua, in Miami county, its first products being turned out on August 16. The works were equipped with 1 tinning set only, and had a weekly capacity of about 250 boxes. The black plates used were obtained from the Piqua Rolling Mill Company. On October 31 of the same year, the Cleveland Tin Plate Company, which had erected works in Cleveland in the summer and fall of 1891, turned out its first tin plates, and on December 14 of the same year its first terne plates were produced. This plant was equipped with 2 sets, 1 for tin plates and 1 for terne plates, its total weekly capacity being about 250 boxes of each product. The black plates used, probably, were obtained from the Britton Rolling Mill Company, of Cleveland, which had erected a plant for their manufacture in 1890-91, and had turned out its first rolled products in May of the latter year. In November, 1891, the firm of W. T. Simpson & Co., of Cincinnati, began the manufacture of terne plates at Riverside, a suburb of Cincinnati. The plant was equipped with 1 set and produced terne plates only, the weekly capacity being about 300 boxes, of 280 pounds each. The black plates used were obtained from the Cincinnati Rolling Mill Company, which a short time previously had equipped its works with hot and cold trains of rolls for the manufacture of plates of this character.

In 1891-2 the firm of Wallace, Banfield & Co., Limited, of Irondale, added 6 tinning pots and 4 automatic tinning machines to its long-established rolling mill. Both tin and terne plates, probably, were produced in

1891, but information regarding the months in which they were made does not seem to be obtainable. The weekly capacity was 2,800 boxes of tin plates and 200 boxes of terne plates. The black plates used were obtained from the rolling mill operated by the firm, the necessary hot and cold trains of rolls having been installed about the time the tinning pots were erected.

Early in 1892 the Record Manufacturing Company, of Conneaut, installed 2 tinning sets and began the manufacture of tin plates. The tinning sets were imported from Wales, workmen from that country having been brought over by the company to start the machines. Tin plates were first made on February 28, 1892. The weekly capacity of the plant was about 480 boxes. Terne plates were not made, and the black plates used were purchased in the open market.

In 1891 the Columbia Tin Plate Company began the erection of a plant at Piqua, Ohio, for the manufacture of tin and terne plates. The works were not completed and the necessary machinery installed, however, until the spring of 1892. In March of that year, tin plates were first made; and in the following June, terne plates also were produced. This plant was equipped with 2 sets, and its weekly capacity was 350 boxes of tin plates and 350 boxes of terne plates. Purchased black plates were used.

Several other establishments for the manufacture of tin and terne plates were erected in Ohio in 1893 and subsequent years. The state ranked third in the manufacture of these articles during the census year.

According to the most reliable information at hand, tin plates were first produced in Illinois in commercial quantities in November, 1890, by Norton Brothers, of Chicago, at their plant at Maywood, in Cook county. Black plates were at first obtained from England and were tinned in Morewood sets, but in November, 1893, American black plates were substituted, and the use of imported black plates was thereafter discontinued. The tin plates made were used by the firm in the manufacture of tin cans. No terne plates were produced.

The second establishment to produce tin plates in Illinois was the Chicago Stamping Company, its first tin plates being turned out in January, 1892. The works of this company were established as early as 1865, its specialty being stamped ware. Tinning pots were erected in 1866 and were used for retinning purposes. Three tinning sets were added in 1891, and tin plates were first regularly produced in 1892. The black plates used were purchased, and terne plates were not made. The weekly capacity of the works was 600 boxes of tin plates, practically all of which were used by the company in its stamping works.

In 1893 the Burn Manufacturing Company erected a tinning set and began the production of tin plates at its works at Chicago Ridge, in Cook county. Purchased black plates were used. The tin plates made were consumed by the company in its stamping works in the

manufacture of milk-can stock and other products. The weekly capacity of the plant was about 200 boxes.

During the same year the Chicago Tin Plate Manufacturing Company erected a plant at Wentworth avenue and Fortieth street for the manufacture of both tin and terne plates. Tin plates were first made on September 18, 1893; and ten days later, terne plates also were produced. The plant was equipped with 3 sets, 2 of which were used for the manufacture of tin plates and 1 for terne plates. Its weekly capacity was 700 boxes of 14 by 20 inch tin plates and 400 boxes of 20 by 28 inch terne plates. Black plates were purchased in the general market, but whether of foreign or domestic manufacture we have not been able to ascertain definitely. So far as can be learned, this company was the first to manufacture terne plates in Illinois. It was also the first company in this state to produce either tin or terne plates for sale in the general market, the three establishments previously mentioned having consumed in their own works practically all of the tin plates made.

In October, 1893, the Western Tin Plate Works began to manufacture terne plates at Belleville, in St. Clair county. The works of this company were equipped with 1 set only, and tin plates were never made. The weekly capacity was about 240 boxes of 20 by 28 inch terne plates. Purchased black plates were used.

The first establishment in Illinois to produce both tin and terne plates from black plates made in its own rolling mill was the Great Western Tin Plate Company, of Joliet. The rolling mill had been erected in 1891-92 by the Joliet Sheet Rolling Mill Company for the manufacture of sheet steel, and had turned out its first rolled products in May, 1892. Subsequently it passed into the control of the Great Western Tin Plate Company, and mills for the manufacture of black plates for tinning were installed. In 1895, 6 tinning sets were added, 3 for tin plates and 3 for terne plates, the first products being turned out in March of that year. The weekly capacity of the tinning department was 1,500 boxes of 14 by 20 inch tin plates and 750 boxes of 20 by 28 inch terne plates. The rolling mill could produce annually about 6,000 gross tons of finished black plates.

The only establishment in Missouri for the manufacture of tin and terne plates was that previously referred to, located at St. Louis.

West Virginia did not engage in the manufacture of either tin or terne plates until 1894. In February of that year the Wheeling Corrugating Company began to manufacture terne plates at Wheeling, and in the following month produced tin plates also. The plant was equipped with 4 sets, and about 1,000 boxes of tin or terne plates could be produced weekly on single turn. The black plates used were purchased.

In the summer of 1895 the La Belle Iron Works, of Wheeling, added a tinning plant to their rolling mill. Tin plates were first made in July, 1895, and terne

plates in August. The plant was equipped with 6 sets, 4 of which were used for tin plates and 2 for terne plates, and had a weekly capacity of 2,300 boxes of tin plates and 500 boxes of terne plates. The black plates used were made in the company's rolling mill.

According to the best available information, tin plates were first made in Maryland in April, 1892, by the firm of Mathai Ingram & Co., of Baltimore, manufacturers of stamped ware. All the tin plates produced were consumed by the company in its stamping works. Terne plates were not made, and the black plates used were purchased. The works were equipped with 2 sets, and about 375 boxes of tin plates could be made weekly. On May 11 of the same year, the Locust Point Iron and Steel Works, at Locust Point, in the city of Baltimore, began to manufacture tin plates for the general market. Terne plates also were made, but the exact date when they were first turned out does not seem to be obtainable. The works were equipped with 7 sets. A black-plate mill was connected with this establishment.

In 1892 a plant for the manufacture of tin and terne plates was erected at Canton, in the city of Baltimore, tin plates being made for the first time in January, 1893. The date when terne plates were first made is not known. The plant was equipped with 8 sets, 7 of which were used for tin plates and 1 for terne plates. Its weekly capacity was 3,000 boxes of tin plates and 450 boxes of terne plates. This plant was operated by the Baltimore Iron, Steel, and Tin Plate Company, which soon afterwards acquired the works at Locust Point, and removed the machinery described above from its Canton works to that place. Black plates were obtained from the rolling mill at Locust Point.

In 1895 the Stickney Iron Company erected and put into operation a black plate mill and a tin dipping plant at Canton, in the city of Baltimore. Both tin plates and terne plates were produced. The tinning department was equipped with 4 sets, and had a weekly capacity of 1,500 boxes of tin and terne plates.

In 1896 the Norton Tin Plate and Can Company commenced to manufacture tin plates at Baltimore for the use of its tin can department, its first product being turned out in March. Its works were equipped with 16 sets, and had a weekly capacity of 10,000 boxes. The black plates used were purchased.

Of the 5 Maryland enterprises named above, only 2 were in existence and in operation during the census year, namely, Mathai, Ingram & Co. (operated by the National Enameling and Stamping Company) and the Norton Tin Plate and Can Company. The rolling mills and tin dipping departments of the other plants mentioned were abandoned and dismantled before the opening of the census year. Neither of the 2 plants in Maryland in operation during the census year produced tin plates for the general market, the quantity made being entirely consumed by the companies themselves in the manufacture of their various specialties.

After the Monitor Tin Plate Company gave up the manufacture of tin plates in 1879, no tin-coated sheets were produced in New York state for the general market until 1892, in which year the Somerton Tin Plate Works were started at Brooklyn by Somers Brothers. The plant, which included a rolling mill for the manufacture of black plates, was equipped with 4 tinning sets and had a weekly capacity of 1,800 boxes. No terne plates were produced, and the plant has since been abandoned. During the same year the American Stamping Company, of Brooklyn, produced tin plates, but its entire production was consumed in its own works in the manufacture of stamped ware. It used imported black plates exclusively.

Early in 1891 a plant to manufacture terne plates in commercial quantities for the general market was erected in New York city by the East River Lead Company. This establishment purchased the black plates used and did not make tin plates. The plant has been abandoned.

New York did not produce any black plates for tinning during the census year. In 1891 a rolling mill for their manufacture was erected at Brooklyn by Somers Brothers for the purpose of supplying their tin dipping works with black plates. Black plates were first produced in October, 1892. The rolling mill was dismantled in 1900, having produced its last black plates in 1897.

The only establishment in operation in Michigan during the census year was the Buhl Stamping Company, of Detroit, previously mentioned. Soon after the close of the census year a plant for the manufacture of both tin and terne plates for the general market was completed and put in operation at Muskegon by the Champion Iron and Steel Company. Tin and terne plates were produced in August, 1900, the black plates used being obtained from the company's rolling mill.

Kentucky did not engage in the manufacture of tin and terne plates until 1895, its first tin plates being produced in March and its first terne plates in August of that year by the Licking Rolling Mill Company, at Covington. The tinning department was equipped with 2 sets, 1 for tin plates and 1 for terne plates. Its weekly capacity was about 375 boxes of each product. Black plates were obtained from the rolling mill of the company, which was erected in 1845, the necessary rolls for the manufacture of black sheets having been added in 1894-95. During the census year the company made terne plates only.

The only tin and terne plate plant in Virginia is located at Richmond and is operated by the Old Dominion Iron and Nail Works Company. Tin and terne plates were first produced in November, 1894. The works are equipped with 3 sets, 1 for tin plates and 2 for terne plates. About 350 boxes of tin plates and 700 boxes of terne plates can be produced weekly. The company also operates a rolling mill at Richmond, but it is not

equipped with machinery for the manufacture of black plates, which are therefore purchased from other manufacturers. Terne plates only were made during the census year.

New Jersey did not produce tin or terne plates commercially during the census year, although at one plant, located at Newark, 4 double sets of tinning pots were in operation between June 1, 1899, and May 31, 1900. These were, however, engaged entirely in tinning black stamped ware or in retinning ware stamped from tinned sheets, the company which operated the pots purchasing from other manufacturers the black plates and tinned sheets consumed in its works.

A few years ago New Jersey manufactured small quantities of both tin and terne plates, which were sold in the open market. According to the best information obtainable, it appears that in New Jersey terne plates were first made in October, and tin plates in December, 1892, at Elizabethport, by the Morewood Tin Plate Manufacturing Company. The works were equipped with 8 sets, 6 of which were used for tin plates and 2 for terne plates. The weekly capacity of the plant was 2,400 boxes of tin plates and 2,000 boxes of terne plates. The black plates used were purchased. In November, 1892, the firm of Saunders, Fielding & Bond, of New York city, established a small plant, equipped with 1

set, at Jersey City, N. J., and commenced the manufacture of terne plates. Tin plates were not produced, and the black plates used were purchased. The two enterprises just named are now abandoned.

On December 15, 1898, the American Tin Plate Company was organized, with a capital stock of \$50,000,000. This company acquired a large number of completed plants equipped for the manufacture of tin or terne plates or both, as well as for the manufacture of black plates or sheets for tinning. During the census year the company operated 31 tin or terne dipping plants and 34 plants for the manufacture of black sheets. Of the 31 dipping plants 4 produced tin plates only, while at the remaining 27 plants both tin and terne plates were manufactured. The 31 plants of the company had a daily capacity on single turn of 1,527,050 pounds of tin plates and 433,950 pounds of terne plates; on double turn, an annual capacity of 916,230,000 pounds of tin plates and 260,370,000 pounds of terne plates; a total of 1,176,600,000 pounds. The tin dipping works of the company were distributed as follows: Pennsylvania, 15; West Virginia, 1; Ohio, 9; Indiana, 5; and Illinois, 1. As there were 57 tin or terne plate plants in operation during the census year, it will be observed that more than one-half of the active establishments were operated by this company.

THE PROCESS OF MANUFACTURE.

The following account of the mode of manufacturing tin and terne plates is taken from a lecture on the tin plate industry, delivered by Mr. W. C. Cronmeyer, of Demmler, Pa., before the German Engineers' Society, of Pittsburgh, Pa., in the spring of 1899:

When tin plates were first made they were hammered out of blooms, and soon after that came the rolling process. The raw material consisted of either coke or charcoal blooms, which were made in knobbling fires with charcoal or coke as fuel. When charcoal pig iron was used it was generally refined in a run-out fire, and then run in a molten state to the knobbling fire. The blooms made from charcoal pig iron were as a rule used to manufacture tin plates for deep stamping. When the blooms came out of the knobbling fire they were put under a large hammer to further refine them by the hammering process. They were then reheated in a heating furnace and rolled into bars in a bar mill.

When we started to manufacture tin plates in this country in 1873, charcoal only was used in the knobbling fire. For the manufacture of coke plates we used the puddling furnace. As the sheets made from puddled iron did not have a sufficiently smooth surface, we used bars made from hammered charcoal blooms for the top and bottom of the pile. These bars, after being rolled, were cut to lengths of about 27 inches and piled on top of one another, a charcoal bar being put on the top and another on the bottom. The pile was then placed in a heating furnace, hammered once more, and, after reheating, rolled into tin bars. For the cheaper grades of plates this second hammering was omitted, the pile being simply heated and rolled into tin bars direct. All these processes have been done away with by the introduction of soft steel.

The first use of steel for tin plate purposes was made in this country about the year 1876 at the works of the United States Iron

and Tin Plate Company, at Demmler, Pa. Capt. William R. Jones was then superintendent of the Edgar Thomson Steel Works. John Cole was superintendent of the United States Works, and I was secretary and business manager of the latter. The two plants being close together we were often with each other, and experiments were made, at the suggestion of Captain Jones, with soft Bessemer steel, which we rolled into shovel steel, etc. Then the idea occurred to us that the same material could be used for tin plates, and after a few experiments it was carried out, Captain Jones having the steel billets made and John Cole superintending the further process of rolling them into bars and then into black plates for tinning. We met with entire success, and found that the percentage of wasters (imperfect plates) in tinning was only about 10 per cent with steel, and even less, while with charcoal iron the wasters generally amounted to 25 per cent. The trade conditions in this country not being at that time ripe for a profitable carrying on of the industry, the use of steel plates for tin or terne plates was not continued here. About three years later, however, in 1879, English manufacturers commenced to use steel instead of iron plates in their tin plate plants. It is an interesting historical fact, and one worthy of preservation, that steel was used in the United States for the manufacture of tin plates at least three years prior to its use for the same purpose by English tin plate manufacturers.

In the manufacture of black plates as now carried on, steel billets are subjected to a welding heat and rolled in grooved rolls into long flat bars, 6, 7, 8, 10, or 12 inches wide, and from three-eighths of an inch to 1 inch thick, according to the required thickness or weight of the finished plates. These bars are cut into shorter pieces (the length of which is about equal to the width of the finished plate), and are heated in furnaces especially constructed for the purpose. The length of the bar becomes the width of the plate, allowing a trifle for scrap. Two of these bars are rolled side-wise, one right after the other, until of the required length, when they are matched and put back into a different furnace from the

one in which they were originally heated. After a second heating they are again rolled, doubled, and put back into the furnace, and, after a third heating, are withdrawn from the furnace, rolled again, and doubled the second time, making eight thicknesses. After a fourth heating the packs are rolled out to the required size. The finished pack is then trimmed, or the rough edges sheared off, and cut into two pieces, 20 by 28 inches, or four pieces, 14 by 20 inches, or, if plates of other dimensions are desired, into sizes that approximate these standards. As there are eight layers in each pack, these layers must be separated. If the packs open well 32 pieces of 14 by 20-inch plates are obtained from the two pieces of bar.

The plates, after being separated, are sent to the pickling room, where they are cleared of the scale formed during heating and rolling. This process consists of immersing the plates in heated diluted sulphuric acid and then cleaning away all traces of the acid by washing the plates in clean water. This is now generally done by the aid of patent pickling machines. The plates are placed in a cradle or receptacle, which, according to the construction of the machine, rises and drops, or revolves, by hydraulic or steam power within a tank, so as to make the liquid rush between the sheets. After being subjected to the action of the acid for some time, the cradle is lifted and dropped into another tank containing an ample supply of clean water only, the cradle being shifted, as in the acid tank, so that the water may rush between the sheets and wash away all traces of the acid. When taken out the plates are bright and clean.

The plates are now ready for the first annealing. For this purpose they are carefully packed on cast or wrought iron "pans" or "stands" having a shallow flange all around, and are covered with cast-iron or wrought-iron covers, known as "annealing boxes" or "pots." The space between the boxes and the flange is filled with sand to exclude the air. The packed "pans" when covered with the annealing boxes are then run into an annealing furnace. Here they are kept at a red heat until the sheets are thoroughly softened. After being taken out the closed boxes are allowed to cool before being unpacked.

The plates are next taken to the "cold-rolling" department. Here they are passed through cold rolls two, three, or more times, as may be deemed necessary, three being the usual number. These rolls are highly polished and are set very accurately in order to give the plates a perfectly flat "set" and a well-polished surface. After this rolling the plates are annealed at a lower temperature than the first time, as the surface of the plates is damaged by the slightest degree of sticking or adhering together.

To finally prepare the plates for tinning they are again pickled and treated as before, except that the liquid is much weaker, after which they are looked over singly, and the unclean spots, if any, scoured with sand and hemp. The plates are then placed in a trough under the surface of clean water to prevent re-oxidation before the "tinman" is ready to dip them.

This is a general outline of the process of manufacture as it has been carried on in Wales for a number of years, and in this country as well. But as soon as the manufacture of tin plates was commenced in the United States, American enterprise and inventive genius took up the matter of introducing improvements so as to reduce the labor involved, cheapen the cost of manufacture, and lessen the consumption of raw materials. So successful has this movement been that the tin plate manufacturing plants of America are, in point of equipment and management, far ahead of those located in England or Wales, where but tardily has any effort been made to increase the efficiency of the tin plate works.

One of the most valuable innovations in tin plate manufacture is the use of electric traveling cranes. Electric cranes are now considered essential parts of all up-to-date tin plate plants. The electric crane is usually of the three-motor type, and spans the hot and cold rolling mills and roll lathe, thus permitting the ready changing of rolls and the carrying of them to and from the lathe in which they are turned. The same crane, or another one, serves to carry the plates from one department to another. This system

of crane carriage is very much superior to the old way of wheeling the plates around on hand bogies or otherwise.

The old style of charging the annealing boxes into the furnace was by a hand-charging bogie consisting simply of a long arm running near one end over an axle with a wheel at each end. Beyond this axle were two prongs, which were inserted between the legs of the annealing stand, and a number of men bearing down on the long end served to raise the box and wheeled it into the furnace. These men were busy only when the boxes were being charged or were being withdrawn, and for the balance of the time it was frequently difficult to find suitable employment for them. Now there are a number of efficient machines for charging the boxes, and with any of them the labor is very much reduced. One consists of a long carriage which runs into the furnace on a track. Its top, carrying the boxes, is arranged so that it can be raised or lowered. The boxes are placed on it by a crane, when in a raised position, and in such manner that the flat bottoms of the stands rest on the top of the carriage, while the legs protrude downwards over the side. After running the loaded carriage into the furnace, the top is dropped, so that the boxes are left standing on their legs in the furnace and the bogie is run out from under. Some of these machines are so arranged that the electric crane furnishes the power for moving the bogie; others do this by a separate motor. Another device is a long arm carrying a counterpoise at one end and a box at the other. This is swung by the crane from a point near the middle, and the iron box can thus be run into the furnace and deposited in any position desired.

Another essential improvement has been made in the sheet doubler, or doubling shear. The old Welsh style of running the doubling shear is by a long arm extending underground and connected to the mill shaft, so that the shear makes a stroke for each revolution of the rolls; the speed therefore can not be varied. In the United States the practice is to drive the doubling shears by separate power, either one engine for a line of shears, or, more generally, an engine or electric motor for each shear. The electric motor is well incased, and can be started and stopped with the greatest ease—a very important point, as the doubling shear is not in use all the time that rolling is going on.

In the cold-rolling department some important improvements have also been made. With the old style all the cold mills were arranged in the same line, and the plates, after being fed through the first time, had to be carried around the line to be fed into the second stand, and so on. Now the cold mills are usually arranged "tandem," so that the plates passing through the first stand may be taken on straight to the next. When boys are employed to do this, the mills are frequently arranged so that by turning part way around they can take a bunch of plates which have come from the previous mill and feed them into the next mill without getting up. The latest improvement, however, is to have feed rollers between the mills, so that when the plate is fed into the first stand it is mechanically fed through the other two. There are several devices by which a plate, after it has passed between the first or second pair of rolls, can be thrown out if its edge has been turned or if it has been pinched. Such a plate would seriously injure the surface of the other rolls if it were allowed to pass through them. One of these attachments consists of a lever which a boy throws, the defective plate then passing up and out of the line of feed. The boy's duty is merely to watch the plates as they come out of the first stand of rolls and throw the lever every time a spoiled plate comes along.

Now comes the last process of tinning. The plates are uncoated thus far. After the second annealing and second pickling, as heretofore described, they are taken to the tin house in troughs mounted on wheels and filled with clean water. There are two tinning processes, the so-called "acid" process and the "palm-oil" process. The latter is the older and is not so much used now as the former. By the oil process a batch of plates is boiled in palm oil for about twenty minutes, thus evaporating the water and any acid which

could possibly adhere to the plates. The sheets are next passed to another pot, containing molten tin or terne, the latter being the name given to the mixture of tin and lead. There is oil floating on the top of this molten metal. After being dipped in this metal the sheets are taken to the second pot of metal, where they are allowed to soak for some time. From this pot they are taken by the tinman, who lays them on the "hob," a space between the second and third metal pots, which is covered with iron plates. Here they are brushed thoroughly with hemp on each side to remove any oxide or dross which might adhere. The plates then go to the third metal pot, which contains metal of extra purity. After being dipped in this pot they are taken to a pot containing rolls running in oil, by which the surface is smoothed and by the aid of which the amount of coating can be regulated. In the other tinning process the flux used is muriate of zinc, which is so energetic in its action that it is only necessary to have a thin layer of it floating on the surface of the single bath of molten tin. The plates are passed down through this flux into the tin and come out of the tin at another place in the pot, where the surface is covered with oil. Rolls and guides are used in the tin and in the oil to convey the plates. The rolls through which the plates pass are of very correct shape, and must be carefully adjusted to regulate the amount of coating on the plates. To produce an extra good quality of roofing plates, the best plates are selected from those previously coated by the first described palm-oil process, and re-dipped successively in other receptacles containing molten metal and palm oil, without the use of rolls, and in such a manner as to cause a much larger quantity of coating to adhere to the surface. The coating can be regulated by the speed with which the plates are drawn out after immersion in the metal pot; also by the length of time they remain in the oil pot. When the plates come out of the last bath a coating of oil adheres to them. This is removed by passing them through bran or middlings, and then polishing them with sheepskin. The old English method of doing this work by hand has been almost entirely supplanted in the United States by branning and polishing or dusting machines.

In the tin house it is a common practice now to drive all the machinery by electric motors. As each one of these machines requires but a small power, and as it is desirable to arrange them independently of the requirements of shafting, belts, etc., the advantage of electric driving, with a separate motor for each machine or line of machines, is very apparent. Electric motors are commonly used for driving the tinning machines, branning machines, dusters, and slitting shears, the last named being located in the assorting room, away from the dust of the tin house.

Concerning the use of the terms "coke" and "charcoal" as applied to tin and terne plates, Mr. Crone-meyer says that they are now misnomers and that they refer at the present time "only to the thickness of the tin coating, a 'coke' plate having on it the lightest coating of tin, while a 'charcoal' plate has a heavier coating. Both may be made from identically the same black plate. The use of these terms originated when charcoal iron and coke iron were both used in tin plate making. Charcoal iron, being of better quality, was given a heavier coating of tin, while coke iron was used only for the cheaper grades, which were given a lighter coating. When steel came to be universally used the terms remained, referring then only to the quantity of the coating." In the present nomenclature an additional distinction is made between plates made of Bessemer, and open-hearth or Siemens steel, so that the terms now used are Bessemer charcoal and Bessemer coke plates, as well as open-hearth charcoal and open-hearth coke plates.

PRODUCTION AND CONSUMPTION OF PIG TIN.

Pig tin has not been produced in the United States since the calendar year 1893, in which year 8,938 pounds were smelted, valued at \$1,788, as compared with 162,000 pounds in 1892, valued at \$32,400, and 125,289 pounds in 1891, valued at \$25,058. Almost all of this tin was produced at the Temescal mines in San Bernardino county, Cal. Prior to 1891 statistics of the production of pig tin in this country do not appear to have been collected, although, according to a correspondent of the London Financial News for March 27, 1890, pig tin was produced commercially at the Temescal (or San Jacinto) tin mines in California as early as 1869, the quantity smelted being "50 bars, weighing 100 pounds each," or about 5,000 pounds in all. One of these bars is probably the one now on exhibition at the Smithsonian Institution, at Washington, D. C. It weighs 70 pounds, and the inscription, which is dated March, 1870, states that it is made from tin ore obtained from the mines of the San Jacinto (Tin) Company, of California. Its number is 16,096. A small ingot of tin smelted in 1840 from ore found at Jackson, N. H., is also exhibited by this institution. The correspondent mentioned above also says that sheets of American iron coated with Temescal or San Jacinto tin, some of which were

manufactured into various articles of domestic use, were placed on exhibition at the Seventh Industrial Fair, held at San Francisco, Cal., in 1870. He adds that boxes of tin plates, bars of pig tin, etc., were also exhibited, and were awarded a gold medal (first prize). This statement is doubtless correct, for among the collection of tinned sheets at the Smithsonian Institution is specimen No. 16,095, which is evidently a piece of the American sheet iron mentioned by the correspondent. The inscription states that it is coated with tin from the San Jacinto mines.

The United States is now entirely dependent upon other countries for the pig tin used in coating the tin and terne plates it produces. Its chief source of supply is the East Indies, whence it imported in the calendar year 1900, 32,984,136 pounds, valued at \$9,090,611; in 1899, 47,905,836 pounds, valued at \$10,819,391; and in 1898, 43,376,454 pounds, valued at \$5,934,945. From the United Kingdom, which sends to the United States annually large quantities of pig tin, 30,954,341 pounds, valued at \$8,891,682, were imported in 1900; 18,962,290 pounds, valued at \$4,801,607, in 1899; and 15,362,383 pounds, valued at \$2,247,348, in 1898. Between 4,000,000 and 5,000,000 pounds of pig tin are

also imported annually from the Netherlands and other countries.

During the calendar year 1900 the total imports of tin into the United States in bars, blocks, pigs, etc., were 69,068,568 pounds, valued at \$19,458,586; in 1899 they were 71,248,407 pounds, valued at \$16,746,105; and in 1898, 62,748,399 pounds, valued at \$8,770,221. The average value of this tin at the foreign port of shipment was over 28 cents per pound in 1900 and over 23.5 cents per pound in 1899. In 1898, however, it was a little less than 14 cents per pound, the increase in price in 1900 as compared with 1898 amounting to over 100 per cent.

The world's production of pig tin has largely increased in late years, especially since the development of the tin plate industry in the United States. In 1884, according to the best available statistics, the world's production amounted to 50,299 metric tons of 2,204 pounds. In 1890 the production had increased to 61,538 tons, in 1891 to 65,062 tons, in 1892 to 69,560 tons, in 1893 to 74,658 tons, in 1894 to 83,387 tons, and

in 1895 to 83,425 tons. In 1896 it fell to about 83,250 tons, in 1897 to about 75,400 tons, and in 1898 to about 75,200 tons. In 1899 it increased to about 78,850 tons, and in 1900 to approximately 80,000 tons.

Reducing to gross tons the imports of pig tin into the United States in 1900, 1899, and 1898, and assuming that the entire quantity was consumed within its boundaries, which is practically the case, it will be found that in 1900 this country consumed 30,834 tons of pig tin; in 1899, 31,807 tons; and in 1898, 28,013 tons; in each case more than three-eighths of the world's total production for the year. During the decade from 1880 to 1890, however, and before the establishment of a tin plate industry in this country, the imports of pig tin amounted on an average to about 12,215 gross tons, the total quantity imported in the fiscal year 1884 being 11,621 gross tons, or less than one-fourth of the world's production in that year. A large part of the pig tin imported prior to 1890 was consumed by the stamping companies of the United States in the production of their various specialties.

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TABLE 21.—THE TIN AND TERNE DIPPING INDUSTRY: BY STATES, 1900.

	United States.	Illinois.	New York.	Ohio.	Pennsylvania.	All other states. ¹
Number of establishments.....	57	3	4	12	25	13
Character of organization:						
Individual.....	2	1	—	—	1	—
Firm and limited partnership.....	5	—	1	—	4	—
Incorporated company.....	50	2	3	12	20	13
Capital:						
Aggregate.....	\$6,790,047	\$413,055	\$245,579	\$1,203,265	\$3,042,029	\$1,886,119
Direct investment, total.....	\$6,650,047	\$413,055	\$245,579	\$1,153,265	\$3,027,029	\$1,811,119
Land.....	\$429,400	\$32,000	\$20,100	\$53,300	\$233,500	\$90,500
Buildings.....	\$619,085	\$36,000	\$14,300	\$101,335	\$207,947	\$170,103
Machinery, tools, and implements.....	\$1,973,355	\$158,000	\$85,179	\$405,327	\$915,349	\$459,500
Cash and sundries.....	\$3,627,607	\$187,055	\$146,000	\$593,303	\$1,610,233	\$1,091,016
Value of rented property.....	\$140,000	—	—	\$50,000	\$15,000	\$75,000
Proprietors and firm members.....	15	1	2	1	11	—
Salaried officials, clerks, etc.:						
Total number.....	333	16	23	88	189	67
Total salaries.....	\$291,323	\$19,323	\$23,430	\$33,301	\$147,202	\$68,067
Officers of corporations—						
Number.....	28	1	1	4	14	8
Salaries.....	\$73,221	\$2,500	\$1,500	\$8,400	\$36,221	\$24,600
General superintendents, managers, clerks, etc.—						
Total number.....	305	15	22	34	175	59
Total salaries.....	\$218,102	\$16,823	\$21,930	\$24,901	\$110,981	\$43,467
Men—						
Number.....	281	13	21	33	153	56
Salaries.....	\$209,528	\$15,573	\$21,280	\$24,601	\$105,487	\$42,587
Women—						
Number.....	24	2	1	1	17	3
Salaries.....	\$8,574	\$1,250	\$650	\$300	\$5,494	\$880
Wage-earners, including pieceworkers, and total wages:						
Greatest number employed at any one time during the year.....	5,326	224	76	1,031	2,363	1,632
Least number employed at any one time during the year.....	3,433	117	53	686	1,665	907
Average number.....	3,671	166	55	697	1,678	1,175
Wages.....	\$1,889,917	\$88,061	\$25,399	\$394,676	\$813,692	\$568,089
Men, 16 years and over—						
Average number.....	3,014	151	55	564	1,284	960
Wages.....	\$1,711,475	\$83,943	\$25,399	\$353,619	\$736,818	\$511,666
Women, 16 years and over—						
Average number.....	625	15	—	133	288	189
Wages.....	\$172,568	\$4,118	—	\$41,027	\$75,760	\$51,663
Children, under 16 years—						
Average number.....	32	—	—	—	6	26
Wages.....	\$5,874	—	—	—	\$1,114	\$4,760
Average number of wage-earners, including pieceworkers, employed during each month:						
Men, 16 years and over—						
January.....	3,168	66	64	692	1,305	1,051
February.....	3,371	144	72	697	1,416	1,042
March.....	3,300	170	73	652	1,341	1,064
April.....	3,433	182	75	697	1,545	984
May.....	3,534	187	76	645	1,545	1,080
June.....	3,303	145	59	644	1,365	1,000
July.....	2,187	134	20	443	898	702
August.....	3,061	185	20	644	1,233	979
September.....	3,273	183	51	534	1,496	1,010
October.....	2,861	170	47	476	1,332	836
November.....	2,683	147	54	412	1,173	897
December.....	1,940	97	54	245	769	775
Women, 16 years and over—						
January.....	623	10	—	148	262	203
February.....	690	18	—	178	291	203
March.....	693	20	—	178	292	203
April.....	705	20	—	178	306	201
May.....	672	20	—	143	303	201
June.....	659	16	—	145	297	201
July.....	467	6	—	113	244	89
August.....	642	12	—	145	285	200
September.....	686	14	—	127	344	201
October.....	619	16	—	100	315	188
November.....	619	18	—	82	318	201
December.....	481	10	—	49	196	176
Children, under 16 years—						
January.....	30	—	—	—	7	23
February.....	30	—	—	—	6	24
March.....	31	—	—	—	9	22
April.....	31	—	—	—	7	24
May.....	28	—	—	—	5	23
June.....	36	—	—	—	5	31
July.....	42	—	—	—	7	35
August.....	42	—	—	—	5	37
September.....	44	—	—	—	6	38
October.....	27	—	—	—	6	21
November.....	23	—	—	—	4	19
December.....	23	—	—	—	8	20
Miscellaneous expenses:						
Total.....	\$236,456	\$29,993	\$14,053	\$38,963	\$82,169	\$71,273
Rent of works.....	\$6,495	—	—	\$1,800	\$1,175	\$3,520
Taxes, not including internal revenue.....	\$27,776	\$1,719	\$1,161	\$3,631	\$11,202	\$10,063
Rent of offices, insurance, interest, and all sundry expenses not hitherto included.....	\$202,185	\$28,274	\$12,897	\$33,532	\$69,792	\$57,690
Materials used:						
Total cost.....	\$26,723,150	\$1,773,043	\$366,409	\$5,012,175	\$10,364,034	\$9,207,434
Black plates or sheets for tinning—						
Domestic—						
Pounds.....	825,556,992	47,221,710	9,203,923	157,575,523	821,828,795	289,727,041
Cost.....	\$20,590,566	\$1,367,602	\$278,718	\$3,826,777	\$7,810,211	\$7,307,258
Foreign—						
Pounds.....	2,353,607	—	—	—	2,156,607	202,000
Cost.....	\$73,282	—	—	—	\$71,128	\$7,154
Pig tin—						
Pounds.....	20,282,778	1,236,673	224,766	3,954,389	8,154,999	6,661,976
Cost.....	\$4,523,473	\$361,153	\$62,850	\$826,969	\$1,797,220	\$1,430,281
Pig lead—						
Pounds.....	6,371,480	25,033	164,800	1,673,566	4,003,431	999,645
Cost.....	\$393,617	\$3,858	\$6,592	\$103,095	\$228,312	\$51,760

¹ Includes establishments distributed as follows: Indiana, 5, all controlled by one company; Kentucky, 1; Maryland, 2; Michigan, 1; Missouri, 1; Virginia, 1; West Virginia, 2.

TABLE 21.—THE TIN AND TERNE DIPPING INDUSTRY: BY STATES, 1900—Continued.

	United States.	Illinois.	New York.	Ohio.	Pennsylvania.	All other states. ¹
Material used—Continued.						
Total cost—Continued.						
Palm oil—						
Pounds.....	5,511,645	198,046	45,390	1,309,820	2,572,428	1,885,961
Cost.....	\$282,227	\$10,439	\$2,837	\$64,492	\$133,672	\$70,787
Sulphuric acid, tinning flux, bran, and pink meal.....	\$187,318	\$18,642	\$2,255	\$30,018	\$86,703	\$49,705
Boxes and nails.....	\$303,316	\$300	\$2,200	\$70,568	\$145,742	\$84,206
Fuel:						
Anthracite coal and culm—						
Tons.....	4,456		180		4,276	
Cost.....	\$6,465		\$880		\$5,585	
Bituminous coal and slack—						
Tons.....	35,048	5,661	501	7,829	11,820	9,287
Cost.....	\$48,059	\$8,281	\$1,525	\$7,352	\$16,038	\$14,913
Coke—						
Tons.....	975				25	950
Cost.....	\$2,000				\$100	\$1,900
Charcoal—						
Bushels.....	556		300			256
Cost.....	\$122		\$70			\$52
Natural gas.....	\$34,110			\$7,037	\$18,778	\$8,295
Oil.....	\$700	\$700				
Rent of power and heat.....	\$2,000					\$2,000
Mill supplies.....	\$49,198	\$6,105	\$595	\$7,143	\$26,758	\$8,597
All other materials.....	\$164,345	\$718	\$1,081	\$61,927	\$5,518	\$95,101
Freight.....	\$52,352		\$9,806	\$1,302	\$18,319	\$20,425
Products:						
Total value.....	\$31,892,011	\$2,081,837	\$463,199	\$6,023,814	\$12,530,991	\$10,792,670
Tin plates—						
Pounds.....	707,718,239	47,296,727	5,591,050	132,163,383	256,879,332	265,787,747
Value.....	\$25,553,021	\$1,999,489	\$268,199	\$4,623,930	\$9,137,483	\$9,633,920
Terne plates—						
Pounds.....	141,285,788		3,900,000	30,146,921	77,123,648	30,109,214
Value.....	\$5,731,124		\$205,000	\$1,176,773	\$3,263,769	\$1,085,582
Other sheet iron or sheet steel, tinned or terne plated—						
Pounds.....	1,000,473	800,000			200,473	
Value.....	\$86,492	\$80,000			\$6,492	
All other products.....	\$481,674	\$2,348		\$204,611	\$123,247	\$151,408
Custom work and repairing.....	\$39,700			\$18,000		\$21,700
Tin and terne plates exported during the year:						
Pounds.....	17,939				17,939	
Value.....	\$897				\$897	
Daily capacity of plant—single turn:						
Total.....	2,732,901	142,000	47,800	495,500	1,198,001	849,600
Tin plates, pounds.....	2,003,538	142,000	27,800	358,500	791,888	683,350
Terne plates, pounds.....	729,363		20,000	137,000	406,113	166,250
Comparison of products:						
Number of establishments reporting for both years.....	20	1	3	2	8	6
Value for census year.....	\$6,146,455	\$1,395,387	\$404,699	\$249,004	\$2,250,073	\$1,846,392
Value for preceding business year.....	\$4,014,302	\$946,117	\$288,401	\$162,045	\$1,704,592	\$1,223,207
Power:						
Number of establishments reporting.....	56	8	4	12	24	13
Total horsepower, owned.....	3,913	480	152	612	1,620	1,049
Engines, steam—						
Number.....	71	4	4	17	29	17
Horsepower.....	3,505	880	140	580	1,416	989
Electric motors—						
Number.....	16	2	1	1	10	2
Horsepower.....	398	100	12	32	194	60
Other power—						
Number.....	1				1	
Horsepower.....	10				10	
Establishments classified by number of persons employed, not including proprietors and firm members:						
Total number of establishments.....	57	8	4	12	25	13
5 to 20.....	6		3	1	1	1
21 to 50.....	9	1		1	6	1
51 to 100.....	20	1	1	7	7	4
101 to 250.....	19	1		8	9	6
251 to 500.....	3				2	1

¹ Includes establishments distributed as follows: Indiana, 5, all controlled by one company; Kentucky, 1; Maryland, 2; Michigan, 1; Missouri, 1; Virginia, 1; West Virginia, 2.

TABLE 22.—THE TIN AND TERNE DIPPING INDUSTRY: IDLE AND BUILDING ESTABLISHMENTS, BY STATES, 1900.

	IDLE ESTABLISHMENTS.			BUILDING ESTABLISHMENTS.		
	United States.	Ohio.	Pennsylvania.	United States.	Michigan.	Pennsylvania.
Number of establishments.....	2	1	1	2	1	1
Character of organization:						
Incorporated company.....	2	1	1	2	1	1
Capital:						
Total.....	\$27,225	\$2,225	\$25,000	\$580,259	\$529,259	\$51,000
Land.....	\$10,725	\$725	\$10,000	\$90,000	\$20,000	\$10,000
Buildings.....	\$10,500	\$500	\$10,000	\$40,000	\$20,000	\$20,000
Machinery, tools, and implements.....	\$6,000	\$1,000	\$5,000	\$322,250	\$317,250	\$5,000
Cash and sundries.....				\$188,009	\$172,009	\$16,000
Daily capacity of plant—single turn:						
Tin plates, pounds.....	15,900		15,000			
Terne plates, pounds.....	12,000	5,000	7,000			
Power:						
Number of establishments reporting.....	2	1	1			
Total horsepower, owned.....	840	800	40			
Engines, steam—						
Number.....	13	12	1			
Horsepower.....	840	800	40			