CENSUS BULLETIN.

No. 196. WASHINGTON, D. C. June 25, 1892.

STATISTICS OF MANUFACTURES: 1890.

OPERATING TELEPHONE COMPANIES.

DEPARTMENT OF THE INTERIOR,
CENSUS OFFICE,
WASHINGTON, D. C., June 1, 1892.

Herewith is presented a preliminary report on operating telephone companies for the year ended December 31, 1890, prepared by Mr. ALLEN R. FOOTE, expert special agent for the collection of statistics of the electrical industries, under direction of Mr. FRANK R. WILLIAMS, in charge of the collection of statistics relating to all branches of manufactures.

This report is deemed of special interest because of the great advance shown in this industry and the enormous increase developed in the demand for telephone service.

The aggregate increase or decrease in important items from 1880 to 1890 is exhibited in the following summary:

ITEMS.	1880	1890	Increase. (Amount and number.)	Decrease. (Number.)
Number of companies, firms, and persons reporting.	148	53	.....	95
Total investment	$14,605,787	$72,341,736	$57,735,949	.....
Gross earnings	3,098,081	16,404,583	13,306,502	.....
Gross expenses	2,373,703	11,143,871	8,770,168	.....
Net earnings	724,378	5,260,712	4,536,334	.....
Number of exchanges	437	1,241	804	.....
Number of telephones and transmitters (a)	108,638	467,356	358,718	.....
Miles of wire	34,305	240,412	206,107	.....
Number of employés	3,338	8,645	5,307	.....
Number of subscribers	48,414	227,357	178,943	.....
Number of conversations	.....	453,200,000	.....	.....

a The report of 1880 gives "Number of receiving telephones in use, 54,319". To make comparison with 1890, a transmitter is added for each telephone.

These increases show how necessary the telephone service has become in commercial and social affairs, and speak volumes for the enterprise that has attended the development of inventive genius in this branch of the electrical industries.

Robert P. Porter.
Superintendent of Census.

C. O. P.—8m

OPERATING TELEPHONE COMPANIES.

BY ALLEN R. FOOTE.

The report on telephones for the Tenth Census (1880) is presented in volume IV, commencing on page 787. Preceding the tables the following statement is made under the heading of "Remarks":

It is of the first importance to remember that the census year 1879–1880 was the year in which the telephone business passed through the stages of an unprecedented development. At the beginning of that year this business amounted to little or nothing. At the end of the year it represented one of the greatest interests of the country. Neither the census nor any other statistical agency can deal in a wholly satisfactory manner with anything which is subject to rapid and violent changes.

The tables exhibit 148 companies and private concerns, which aggregate 34,305 miles of wire, 54,319 receiving telephones, and 3,338 employés.

The collection of these statistics has been with a view to exhibit the telephone business in 1880 as completely as circumstances allowed, and for the purpose of establishing a basis for the future taking of such statistics.

The inquiry into this subject for the Eleventh Census is assigned to the Division of Manufactures to place it properly in the group of electrical industries in said division. The form of publication adopted for the Tenth Census disclosed the detailed statistics for each reporting company. The form of publication adopted for the Eleventh Census is particularly designed to avoid disclosing the individual statistics of any reporting company, firm, or person. For this reason, in presenting the statistics of operating telephone companies, a consolidated report is given, in which is grouped the statistics of all reporting companies, and comparison made with corresponding statistics for the year 1880, so far as the same are exhibited in the Tenth Census Report.

Examination of the report now presented will show that many items are reported for the Eleventh Census that do not occur in the report for 1880, thus broadening the basis of comparison for future reports.

The percentages of increase and decrease from 1880 to 1890, in those items of essential interest to the public, are shown in the following summary:

SUMMARY SHOWING PERCENTAGES OF INCREASE OR DECREASE FROM 1880 TO 1890.

ITEMS.	Increase. (Per cent.)	Decrease. (Per cent.)
Number of companies, firms, and persons reporting		64.19
Interest-bearing and profit-sharing investment	395.30	
Interest-bearing and profit-sharing investment per mile of wire		29.34
Interest-bearing and profit-sharing investment per subscriber	5.30	
Net earnings per mile of wire	3.60	
Net earnings per subscriber	54.68	
Number of exchanges	183.98	
Miles of wire per exchange	145.57	
Number of subscribers per exchange	64.86	
Number of employés per exchange		12.50
Miles of wire	600.81	
Miles of wire per subscriber	49.30	
Number of subscribers	369.61	
Number of employés	158.99	

The above summary shows that the number of subscribers has increased during the decade 369.61 per cent; the number of persons brought into communication per exchange has increased 64.86 per cent; the mileage of wire per subscriber has increased 49.30 per cent; while the interest-bearing and profit-sharing investment has increased but 5.30 per cent per subscriber.

Unfortunately, the census report for 1880 affords no basis of comparison for cost to subscribers per conversation. While these data possess considerable statistical value, it is impossible, by such methods, to convey a proper representation of the actual changes that have occurred in the business of operating telephone companies during the decade from 1880 to 1890. Improvements in instruments and exchange switch boards, changing from grounded to metallic circuits, placing wires underground, extension of lines to extraterritorial districts, and, finally, the introduction of long distance service, combine to make the service rendered in 1890 more valuable and satisfactory to subscribers than the service rendered in 1880.

The presence in the statistics for 1890, for the first time, of the items "5,029,438 feet of cables" and "54,690 miles of wire underground", requires a few words of explanation and comment. The rapidly increasing number of subscribers rendered it imperative to employ a very large number of wires for the service. This led to bunching of wires in cables. The average number of wires so bunched in present practice is about 50 pairs. The increasing number of wires and cables for various electrical purposes led to an urgent demand that the wires be placed underground in the congested districts of large cities.

A comparison of the cost of the two systems will be found in the subjoined table:

COST OF TELEPHONE LINE CONSTRUCTION.	Per mile of wire.	Per mile of productive wire. (*a*)
Aerial lines, individual wires	$35.00	$35.00
Aerial lines, cabled wires	*b*89.76	179.52
Underground lines, cabled wires	*c*121.44	242.88

a The cost per mile of productive wire is calculated on the basis of existing conditions as follows: In aerial lines of individual wires all wires placed are productive. In aerial lines of cabled wires the productive wires average one-half of all wires placed. In underground construction the productive ducts and wires average one-half of all ducts and wires placed. In the cities of Washington, D. C., and Baltimore, Md., there are 6,061 miles of wire underground. Of these wires 2,980 miles are productive and 3,081 miles are nonproductive at the present time (1892).

b At this rate per mile of wire, the 5,029,438 feet of cables reported in 1890, containing 50 wires to the cable, cost $4,275,022 placed.

c At this rate the 54,690 miles of underground wires reported in 1890 cost $6,641,553 placed. The feet of cables and mileage of wire underground is a duplication to the extent in which cables are placed underground.

The report for 1880 included the statistics of the American Bell Telephone Company, as at that time this company operated one exchange. The report for 1890 excludes the statistics of the American Bell Telephone Company, since it is not now an operating company.

The following tables show the number of operating telephone companies, the amount and character of investments, revenues and expenses, the facilities furnished for public and private use, as well as the use made by the general public of such facilities for 1890 in comparison with similar data for 1880, so far as the same is possible considering the enlarged scope of the inquiry for 1890.

Table 1 shows for 1880 and 1890 the number of operating telephone companies, the amount and racter of investments, revenues, and expenses:

LE 1.—COMPARATIVE STATEMENT, 1880–1890, OF OPERATING TELEPHONE COMPANIES' INVESTMENTS REVENUES, AND EXPENSES.

ITEMS.	1880	1890	INCREASE.		DECREASE.	
			Amount.	Per cent.	Number or amount.	Per cent.
ber of companies, firms, and persons reporting	148	53			95	64.19
stments:						
hare investments	$13,358,720.00	$67,349,171.00	$53,990,451.00	404.18		
ond investments	1,247,067.00	4,992,565.00	3,745,498.00	300.34		
otal interest-bearing and profit-sharing investments	14,605,787.00	72,341,736.00	57,735,949.00	395.3[illegible]		
ıvestment per mile of wire	426.00	301.00			$125.00	29.34
ıvestment per subscriber	302.00	318.00	16.00	5.30		
nues and expenses:						
ross earnings	$3,098,081.00	$16,404,583.00	$13,306,502.00	429.51		
ross expenses	2,373,703.00	11,143,871.00	8,770,168.00	369.47		
et earnings	724,378.00	5,260,712.00	4,536,334.00	626.24		
ggregate dividends	302,730.00	3,168,208.00	2,865,478.00	946.55		
urplus	421,648.00	2,092,504.00	1,670,856.00	396.27		
er cent of net earnings on total investment	4.96	7.27	2.31	46.57		
er cent of aggregate dividends on share investment	2.27	4.70	2.43	107.05		
ross earnings per mile of wire	$90.31	$68.24			$22.07	24.44
ross expense per mile of wire	69.19	46.36			22.83	33.00
et earnings per mile of wire	21.12	21.88	$0.76	3.60		
ggregate dividends per mile of wire	8.83	13.18	4.35	49.26		
urplus per mile of wire	12.29	8.70			3.59	29.21
ross earnings per subscriber	$63.99	$72.15	$8.16	12.75		
ross expense per subscriber	49.03	49.01			$0.02	0.04
et earnings per subscriber	14.96	23.14	8.18	54.68		
ggregate dividends per subscriber	6.25	13.94	7.69	123.04		
urplus per subscriber	8.71	9.20	0.49	5.63		

Table 2 shows for 1890 the facilities furnished for public and private use by operating telephone companies in comparison with similar data for 1880:

TABLE 2.—COMPARATIVE STATEMENT, 1880-1890, OF OPERATING TELEPHONE COMPANIES' FACILITIES FURNISHED FOR PUBLIC AND PRIVATE USE.

FACILITIES FURNISHED FOR PUBLIC AND PRIVATE USE.	1880	1890	INCREASE.		DECREASE.	
			Number.	Per cent.	Number.	Per cent.
Number of central exchanges		774				
Number of branch exchanges		467				
Total number of exchanges	437	1,241	804	183.98		
Number of employés per exchange	8	7			1	12.50
Number of telephones and transmitters (a)	108,638	467,356	358,718	330.20		
Length of cables in feet		5,029,438				
Miles of extraterritorial wire		50,921				
Miles of long distance wire		40,309				
Total mileage of extraterritorial and long distance wire		91,230				
Miles of wire on poles		171,498				
Miles of wire on buildings		13,445				
Miles of wire underground		54,690				
Miles of wire submarine		779				
Total miles of wire	34,305	240,412	206,107	600.81		
Miles of wire per subscriber	0.71	1.06	0.35	49.30		
Miles of wire per exchange	79	194	115	145.57		
Number of day operators		3,761				
Number of night operators		1,008				
Number of other employés		3,876				
Total number of employés	3,338	8,645	5,307	158.99		

a The report of 1880 gives "Number of receiving telephones in use, 54,319". To make comparison with 1890, a transmitter is added for each telephone.

Table 3 shows for 1890 the use made of the facilities furnished by operating telephone companies in comparison with the data obtained for 1880:

TABLE 3.—COMPARATIVE STATEMENT, 1880-1890, OF USE MADE OF OPERATING TELEPHONE FACILITIES.

USE MADE OF FACILITIES.	1880	1890	INCREASE.		DECREASE.	
			Number.	Per cent.	Number.	Per cent.
Exchange and toll stations		203,060				
Extra exchange toll stations		1,037				
Private lines and other stations		23,260				
Total number of subscribers	48,414	227,357	178,943	369.61		
Number of subscribers per exchange	111	183	72	64.86		
Number of exchange conversations		450,000,000				
Number of extraterritorial conversations		3,200,000				
Total number of conversations		453,200,000				
Average daily calls per subscriber:						
Exchanges with 100 or less subscribers		4.80				
Exchanges with 100 to 200 subscribers		6.25				
Exchanges with 200 to 500 subscribers		7.43				
Exchanges with 500 to 1,000 subscribers		8.00				
Exchanges with 1,000 to 1,500 subscribers		8.67				
Exchanges with 1,500 subscribers and over		8.86				
Average price paid per subscriber per call:						
Exchanges with 100 or less subscribers		3.25 cents.				
Exchanges with 100 to 200 subscribers		2.33 "				
Exchanges with 200 to 500 subscribers		2.40 "				
Exchanges with 500 to 1,000 subscribers		2.37 "				
Exchanges with 1,000 to 1,500 subscribers		2.14 "				
Exchanges with 1,500 subscribers and over		3.50 "				

[7-010]

CENSUS BULLETIN.

No. 197. WASHINGTON, D. C. June 28, 1892.

POPULATION BY COLOR, SEX, AND GENERAL NATIVITY: 1890.

NORTH CAROLINA, SOUTH CAROLINA, GEORGIA, AND FLORIDA.

DEPARTMENT OF THE INTERIOR.
CENSUS OFFICE,
WASHINGTON, D. C., June 4, 1892.

This bulletin gives the distribution of population by color, sex, and general nativity, as returned under the census of 1890, for North Carolina, South Carolina, Georgia, and Florida.

Similar results for Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut have been presented in Census Bulletin No. 175; for New York, New Jersey, and Pennsylvania in Census Bulletin No. 183, and for Delaware, Maryland, District of Columbia, Virginia, and West Virginia in Census Bulletin No. 187.

Other bulletins will follow, giving the same distribution of population by states and territories, grouped geographically, as follows:

NORTH CENTRAL DIVISION.

Ohio, Indiana, and Illinois.
Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
Iowa, Missouri, Nebraska, and Kansas.

SOUTH CENTRAL DIVISION.

Kentucky, Tennessee, Oklahoma, and Arkansas.
Alabama, Mississippi, Louisiana, and Texas.

WESTERN DIVISION.

Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, and California.

The figures contained in this bulletin are the results of the first detailed count of population according to color, sex, nativity, etc., and are subject to correction.

C. O. P.—10m

The following table gives for the 4 states under consideration the general distribution of population by sex, native and foreign born, and white and colored, and for white persons a further subdivision according to native white of native parents, native white of foreign parents, and foreign white:

STATES.	Total population.	SEX.		NATIVE AND FOREIGN BORN.		Aggregate white.	NATIVE WHITE.			Foreign white.	Total colored. (a)
		Male.	Female.	Native.	Foreign.		Total.	Native parents.	Foreign parents.		
Total for 4 states	4,997,871	2,493,358	2,504,513	4,952,830	45,041	2,720,696	2,680,821	2,627,458	53,363	39,875	2,277,175
North Carolina	1,617,947	799,149	818,798	1,614,245	3,702	1,055,382	1,051,720	1,044,483	7,237	3,662	562,565
South Carolina	1,151,149	572,337	578,812	1,144,879	6,270	462,008	455,865	445,195	10,670	6,143	689,141
Georgia	1,837,353	919,925	917,428	1,825,216	12,137	978,357	966,465	946,782	19,683	11,892	858,996
Florida	391,422	201,947	189,475	368,490	22,932	224,949	206,771	190,998	15,773	18,178	166,473

a By "colored" is meant not only persons of African descent but also Chinese, Japanese, and civilized Indians.

The following table shows for each of the states considered the aggregate population and the number of males and females as returned at each census since and including 1850, together with the number and per cent of increase during each decade:

STATES AND CENSUS YEARS.	AGGREGATE POPULATION.			MALES.			FEMALES.		
	Total.	Increase.		Total.	Increase.		Total.	Increase.	
		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.
North Carolina:									
1890	1,617,947	218,197	15.59	799,149	111,241	16.17	818,798	106,956	15.03
1880	1,399,750	328,389	30.65	687,908	169,204	32.62	711,842	159,185	28.80
1870	1,071,361	78,739	7.93	518,704	23,088	4.66	552,657	55,651	11.20
1860	992,622	123,583	14.22	495,616	64,712	15.02	497,006	58,871	13.44
1850	869,039	115,620	15.35	430,904	56,084	14.96	438,135	59,536	15.73
South Carolina:									
1890	1,151,149	155,572	15.63	572,337	81,929	16.71	578,812	73,643	14.58
1880	995,577	289,971	41.10	490,408	146,506	42.60	505,169	143,465	39.66
1870	705,606	1,898	0.27	343,902	*a*3,418	*a*0.98	361,704	5,316	1.49
1860	703,708	35,201	5.27	347,320	17,686	5.37	356,388	17,515	5.17
1850	668,507	74,109	12.47	329,634	36,596	12.49	338,873	37,513	12.45
Georgia:									
1890	1,837,353	295,173	19.14	919,925	156,944	20.57	917,428	138,229	17.74
1880	1,542,180	358,071	30.24	762,981	184,026	31.79	779,199	174,045	28.76
1870	1,184,109	126,823	12.00	578,955	47,010	8.84	605,154	79,813	15.19
1860	1,057,286	151,101	16.67	531,945	75,480	16.54	525,341	75,621	16.82
1850	906,185	214,793	31.07	456,465	105,222	29.96	449,720	109,571	32.21
Florida:									
1890	391,422	121,929	45.24	201,947	65,503	48.01	189,475	56,426	42.41
1880	269,493	81,745	43.54	136,444	41,896	44.31	133,049	39,849	42.76
1870	187,748	47,324	33.70	94,548	21,618	29.64	93,200	25,706	38.09
1860	140,424	52,979	60.59	72,930	27,003	58.80	67,494	25,976	62.57
1850	87,445	32,968	60.52	45,927	16,035	53.64	41,518	16,933	68.88

a Decrease.

The total population of the states of North Carolina, South Carolina, Georgia, and Florida in 1880 was 4,207,000; in 1890 the total population for these states was 4,997,871, an increase of 790,871, or 18.80 per cent. For these states, considered as a whole, the number of males has increased during the past decade 415,617, or 20.00 per cent, while the number of females has increased 375,254, or 17.62 per cent. Taking the entire period from 1850 to 1890, inclusive, there has been an increase in these

states of 2,466,695, or 97.45 per cent. During the same period the males have increased 97.43 per cent, while the females have increased 97.48 per cent.

A further classification of the population of these states as regards native and foreign born, and white and colored, at each of the last 5 censuses, together with the number and per cent of increase during each decade, is given in the following table:

STATES AND CENSUS YEARS.	NATIVE BORN.			FOREIGN BORN.			WHITE.			COLORED.		
	Total.	Increase.		Total.	Increase.		Total.	Increase.		Total.	Increase.	
		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.
North Carolina:												
1890	1,614,245	218,237	15.63	3,702	a40	a1.07	1,055,382	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1880	1,396,008	327,676	30.67	3,742	713	23.54	807,242	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1870	1,068,332	79,008	7.99	3,029	a269	a8.16	678,470	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1860	989,324	122,866	14.18	3,298	717	27.78	629,942	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1850	866,458	.....	.....	2,581	.....	.....	553,028	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
South Carolina:												
1890	1,144,879	156,988	15.89	6,270	a1,416	a18.42	492,008	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1880	987,891	290,359	41.63	7,686	a388	a4.81	391,105	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1870	697,532	3,810	0.55	8,074	a1,912	a19.15	289,667	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1860	693,722	33,922	5.14	9,986	1,279	14.69	291,300	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1850	659,800	.....	.....	8,707	.....	.....	274,563	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Georgia:												
1890	1,825,216	293,600	19.17	12,137	1,573	14.89	978,357	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1880	1,531,616	358,634	30.57	10,564	a563	a5.06	816,906	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1870	1,172,982	127,367	12.18	11,127	a544	a4.66	638,926	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1860	1,045,615	145,918	16.22	11,671	5,183	79.89	591,550	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1850	899,697	.....	.....	6,488	.....	.....	521,572	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Florida:												
1890	368,490	108,906	41.95	22,932	13,023	131.43	224,919	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1880	259,584	76,893	42.02	9,909	4,942	99.50	142,605	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1870	182,781	45,666	33.30	4,967	1,658	50.11	96,057	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1860	137,115	52,439	61.93	3,309	540	19.50	77,746	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1850	84,676	.....	.....	2,769	.....	.....	47,203	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

a Decrease.

In the above table the number and per cent of increase of native and foreign born for the decade ending with 1850 is not shown, as the foreign born population was not separately returned for the census of 1840.

The states of North Carolina and South Carolina show an actual decrease in the number of foreign born persons. In the state of Georgia the numerical increase in foreign born persons is 1,573, while the per cent of increase is 14.89. Florida shows an increase in the number of foreign born of 13,023, or 131.43 per cent, during the decade. In the same state the increase in native born persons during the decade was 108,906, or 41.95 per cent.

Considering the 4 states as a whole, the increase in the foreign born population since 1850 has been 41.19 per cent, while the increase in the native born population has been [illegible] per cent. In 1850 there were in these states an aggregate of 20,545 foreign born persons; in 1890 the number returned was 45,041. This shows an increase in 40 years of 24,496, or 119.23 per cent. The foreign born element in these states is very slight as compared with the total population.

A very marked decrease in the rate of increase of the colored population in these states will be observed. While for the decade ending with 1880 the rate of increase of the colored population of the state of North Carolina was 35.54 per cent, the rate of increase in the colored population for the decade ending with 1890 is 5.64 per cent. A decrease of from 45.23 per cent to 14.01 per cent occurs in the state of South Carolina. In the state of Georgia for the decade ending with 1880 the rate of increase of the colored population was 33.03 per cent, while for the decade ending with 1890 the rate of increase was 18.44 per cent. The state of Florida shows the largest percentage of increase in the colored population, but it shows a still greater rate of increase in the white population, and while the

rate of increase of the colored population was larger than in the other 3 states under consideration, still it is less than the rate of increase from 1870 to 1880. The rate in 1880 was 38.39 per cent, while in 1890 the rate of increase is 31.20 per cent. In each state it is noticeable that the rate of increase of the white population is greater than the rate of increase of the colored population, being due to the grossly deficient census of 1870 in the southern states, particularly as regards the colored population, as has already been demonstrated in Census Bulletin 16.

The distribution of the population at each of the last 5 censuses, according to the various elements presented in the foregoing tables, is shown in the following table, the total population in each case being considered as 100 per cent. This distribution has been expressed in percentages for each of the classes noted. The table of percentages follows:

STATES AND CENSUS YEARS.	SEX.		NATIVE AND FOREIGN BORN.		COLOR.	
	Male.	Female.	Native.	Foreign.	White.	Colored.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
North Carolina:						
1890	49.39	50.61	99.77	0.23	65.23	34.77
1880	49.15	50.85	99.73	0.27	61.96	38.04
1870	48.42	51.58	99.72	0.28	63.33	36.67
1860	49.93	50.07	99.67	0.33	63.46	36.54
1850	49.58	50.42	99.70	0.30	63.64	36.36
South Carolina:						
1890	49.72	50.28	99.46	0.54	40.13	59.87
1880	49.26	50.74	99.23	0.77	39.28	60.72
1870	48.74	51.26	98.86	1.14	41.05	58.95
1860	49.36	50.64	98.58	1.42	41.40	58.60
1850	49.31	50.69	98.70	1.30	41.07	58.93
Georgia:						
1890	50.07	49.93	99.34	0.66	53.25	46.75
1880	49.47	50.53	99.31	0.69	52.97	47.03
1870	48.89	51.11	99.06	0.94	53.96	46.04
1860	50.31	49.69	98.90	1.10	55.95	44.05
1850	50.37	49.63	99.28	0.72	57.56	42.44
Florida:						
1890	51.59	48.41	94.14	5.86	57.47	42.53
1880	50.63	49.37	96.32	3.68	52.92	47.08
1870	50.36	49.64	97.35	2.65	51.16	48.84
1860	51.94	48.06	97.64	2.36	55.37	44.63
1850	52.52	47.48	96.83	3.17	53.98	46.02

It will be seen from the above table that in North Carolina and South Carolina the females slightly predominate, while in Georgia and Florida the reverse is true.

The per cent of the foreign born of the total population is very slight in each of the states, being largest in Florida, where it is 5.86 per cent of the total population. In none of the other 3 states does this element amount to 1 per cent of the total population.

In South Carolina the colored population is 59.87 per cent, while the white population is 40.13 per cent, of the total population. This is a slight decrease in the proportion of colored to total population since 1880 and a corresponding increase in the proportion of white to total population. In the state of Georgia 46.75 per cent of the population is colored, while 53.25 per cent is white; in Florida 42.53 per cent is colored and 57.47 per cent is white, and in North Carolina 34.77 per cent is colored, while 65.23 per cent is white.

In 1880 and 1890 the white population was classified as to native and foreign born, and in 1890 a further classification has been made for native white according to parentage. Under this classification native parentage includes all native white persons having both parents native born, or one parent native born and one parent for whom the birthplace was returned as "unknown", as well as of cases where for native white persons the birthplace of both parents was reported as "unknown". Under foreign parentage are included all native white persons having one or both parents foreign born.

The distribution of the population in 1890 on this basis, and in 1880 according to native and foreign white only, for each state and for the 4 states as a whole, is indicated in the following table of percentages, the total population in each case being considered as 100 per cent:

STATES.	1890						1880			
	Total white.	NATIVE WHITE.			Foreign white.	Total colored.	Total white.	Native white.	Foreign white.	Total colored.
		Total.	Native parents.	Foreign parents.						
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Total for 4 states	54.44	53.64	52.57	1.07	0.80	45.56	52.72	52.[illegible]	[illegible]	47.28
North Carolina	65.23	65.00	64.55	0.45	0.23	34.77	61.96	61.[illegible]	[illegible]	38.04
South Carolina	40.13	39.60	38.67	0.93	0.53	59.87	39.28	38.53	[illegible]	60.72
Georgia	53.25	52.60	51.53	1.07	0.65	46.75	52.97	52.30	[illegible]	47.03
Florida	57.47	52.83	48.80	4.03	4.64	42.53	52.92	50.06	[illegible]	47.08

In these states the foreign white persons and native white persons of foreign parents are but a small element of the population. The relation of the colored to the total population has already been considered.

The following table gives the population in 1890 for each county in each of the states considered, classified as to color, sex, and general nativity:

STATES AND COUNTIES.	Total population.	SEX.		NATIVE AND FOREIGN BORN.		Aggregate white.	NATIVE WHITE			Foreign white.	Total colored.
		Male.	Female.	Native.	Foreign.		Total.	Native parents	Foreign parents		
North Carolina	1,617,947	799,149	818,798	1,614,245	3,702	1,055,382	1,051,720	1,044,483	7,237	3,662	562,565
Alamance	18,271	8,657	9,614	18,241	30	12,688	12,658	12,604	54	30	5,583
Alexander	9,430	4,558	4,872	9,430	.....	8,588	8,588	8,578	10	.....	842
Alleghany	6,523	3,233	3,290	6,519	4	6,061	6,057	6,021	36	4	462
Anson	20,027	9,846	10,181	20,007	20	10,237	10,217	10,175	42	20	9,790
Ashe	15,628	7,791	7,837	15,621	7	15,033	15,026	14,971	55	7	595
Beaufort	21,072	10,577	10,495	21,049	23	11,869	11,847	11,790	57	22	9,203
Bertie	19,176	9,465	9,711	19,168	8	7,885	7,877	7,863	14	8	11,291
Bladen	16,763	8,178	8,585	16,757	6	8,646	8,640	8,563	77	6	8,117
Brunswick	10,900	5,439	5,461	10,875	25	6,139	6,115	6,074	41	24	4,761
Buncombe	35,266	17,812	17,454	34,909	357	28,640	28,283	27,914	369	357	6,626
Burke	14,939	7,215	7,724	14,921	18	12,378	12,360	12,331	29	18	2,561
Cabarrus	18,142	8,817	9,325	18,122	20	12,683	12,663	12,615	48	20	5,459
Caldwell	12,298	5,969	6,329	12,292	6	10,737	10,731	10,692	39	6	1,561
Camden	5,667	2,875	2,792	5,664	3	3,347	3,344	3,335	9	3	2,320
Carteret	10,825	5,365	5,460	10,784	41	8,528	8,488	8,407	81	40	2,297
Caswell	16,028	7,857	8,171	16,024	4	6,639	6,635	6,615	20	4	9,389
Catawba	18,689	9,026	9,663	18,654	35	16,073	16,038	15,960	78	35	2,616
Chatham	25,413	12,523	12,890	25,372	41	17,214	17,173	17,105	68	41	8,199
Cherokee	9,976	4,991	4,985	9,966	10	9,655	9,645	9,620	25	10	321
Chowan	9,167	4,560	4,607	9,144	23	4,010	3,990	3,977	13	20	5,157
Clay	4,197	2,132	2,065	4,196	1	4,055	4,054	4,050	4	1	142
Cleveland	20,394	10,022	10,372	20,380	14	17,301	17,287	17,225	62	14	3,093
Columbus	17,856	8,667	9,189	17,832	24	11,804	11,780	11,730	50	24	6,052
Craven	20,533	9,810	10,723	20,435	98	7,175	7,080	6,921	159	95	13,358
Cumberland	27,321	13,373	13,948	27,248	73	14,952	14,879	14,661	218	73	12,369
Currituck	6,747	3,510	3,237	6,741	6	4,731	4,725	4,719	15	6	2,016
Dare	3,768	1,951	1,817	3,762	6	3,362	3,356	3,344	12	6	406
Davidson	21,702	10,581	11,121	21,681	21	18,174	18,154	18,089	65	20	3,528
Davie	11,621	5,659	5,962	11,609	12	8,769	8,757	8,729	28	12	2,852
Duplin	18,690	8,901	9,789	18,678	12	11,600	11,588	11,484	104	12	7,090
Durham	18,041	8,782	9,259	17,999	42	10,712	10,670	10,566	96	42	7,329
Edgecombe	24,113	11,769	12,344	24,075	38	8,513	8,475	8,374	101	38	15,600
Forsyth	28,434	14,203	14,231	28,354	80	19,433	19,355	19,234	121	78	9,001

STATES AND COUNTIES.	Total population.	SEX.		NATIVE AND FOREIGN BORN.		Aggregate white.	NATIVE WHITE.			Foreign white.	Total colored.
		Male.	Female.	Native.	Foreign.		Total.	Native parents.	Foreign parents.		
North Carolina—Cont'd.											
Franklin	21,090	10,453	10,637	21,070	20	10,755	10,737	10,715	22	18	10,335
Gaston	17,764	8,638	9,126	17,676	88	12,927	12,839	12,666	173	88	4,837
Gates	10,252	5,090	5,162	10,246	6	5,539	5,533	5,526	7	6	4,713
Graham	3,313	1,701	1,612	3,313	.....	3,137	3,137	3,130	7	.....	176
Granville	24,484	12,125	12,359	24,463	21	12,122	12,101	12,063	38	21	12,362
Greene	10,039	4,859	5,180	10,033	6	5,281	5,275	5,263	12	6	4,758
Guilford	28,032	13,760	14,292	27,855	177	19,820	19,645	19,398	247	175	8,232
Halifax	28,908	14,227	14,681	28,856	52	9,614	9,562	9,483	79	52	19,294
Harnett	13,700	6,787	6,913	13,684	16	9,453	9,437	9,365	72	16	4,247
Haywood	13,346	6,784	6,562	13,331	15	12,829	12,814	12,797	17	15	517
Henderson	12,589	6,243	6,346	12,507	82	11,211	11,129	10,994	135	82	1,378
Hertford	13,851	6,889	6,962	13,842	9	5,906	5,897	5,889	8	9	7,945
Hyde	8,903	4,480	4,423	8,900	3	4,962	4,959	4,944	15	3	3,941
Iredell	25,462	12,301	13,161	25,420	42	19,516	19,474	19,358	116	42	5,946
Jackson	9,512	4,761	4,751	9,497	15	8,680	8,665	8,637	28	15	832
Johnston	27,239	13,499	13,740	27,211	28	19,917	19,889	19,835	54	28	7,322
Jones	7,403	3,672	3,731	7,399	4	3,885	3,881	3,869	12	4	3,518
Lenoir	14,879	7,280	7,599	14,859	20	8,517	8,498	8,451	47	19	6,362
Lincoln	12,586	6,085	6,501	12,579	7	10,028	10,021	9,987	34	7	2,558
McDowell	10,939	5,405	5,534	10,902	37	9,114	9,077	9,049	28	37	1,825
Macon	10,102	4,966	5,136	10,086	16	9,436	9,420	9,386	34	16	666
Madison	17,805	9,151	8,654	17,790	15	17,095	17,080	17,025	55	15	710
Martin	15,221	7,621	7,600	15,216	5	7,838	7,833	7,821	12	5	7,383
Mecklenburg	42,673	21,119	21,554	42,424	249	23,141	22,898	22,343	555	243	19,532
Mitchell	12,807	6,518	6,289	12,786	21	12,252	12,232	12,205	27	20	555
Montgomery	11,239	5,651	5,588	11,223	16	8,982	8,966	8,898	68	16	2,257
Moore	20,479	10,271	10,208	20,428	51	13,985	13,934	13,699	235	51	6,494
Nash	20,707	10,468	10,239	20,697	10	12,186	12,177	12,141	36	9	8,521
New Hanover	24,026	11,294	12,732	23,481	545	10,089	9,549	8,742	807	540	13,937
Northampton	21,242	10,576	10,666	21,229	13	9,224	9,211	9,182	29	13	12,018
Onslow	10,303	5,210	5,093	10,298	5	7,392	7,388	7,378	13	4	2,911
Orange	14,948	7,636	7,312	14,937	11	9,705	9,696	9,652	44	9	5,243
Pamlico	7,146	3,597	3,549	7,140	6	4,767	4,761	4,750	11	6	2,379
Pasquotank	10,748	5,320	5,428	10,714	34	5,201	5,168	5,081	87	33	5,547
Pender	12,514	6,185	6,329	12,499	15	5,967	5,952	5,921	31	15	6,547
Perquimans	9,293	4,637	4,656	9,290	3	4,719	4,716	4,704	12	3	4,574
Person	15,151	7,627	7,524	15,148	3	8,251	8,248	8,231	14	3	6,900
Pitt	25,519	12,854	12,665	25,504	15	13,192	13,177	13,123	54	15	12,327
Polk	5,902	2,924	2,978	5,887	15	4,807	4,792	4,760	32	15	1,095
Randolph	25,195	12,421	12,774	25,170	25	21,848	21,823	21,759	64	25	3,347
Richmond	24,948	11,865	12,083	24,907	41	10,989	10,950	10,809	141	39	12,959
Robeson	31,483	15,645	15,838	31,450	33	16,629	16,597	16,409	188	32	14,854
Rockingham	25,363	12,602	12,761	25,304	59	15,197	15,138	15,067	71	59	10,166
Rowan	24,123	11,914	12,209	24,060	63	17,142	17,080	16,935	145	62	6,981
Rutherford	18,770	9,128	9,642	18,762	8	15,073	15,065	15,031	34	8	3,697
Sampson	25,096	12,054	13,042	25,083	13	15,960	15,947	15,902	45	13	9,136
Stanly	12,136	5,930	6,206	12,124	12	10,629	10,617	10,605	12	12	1,507
Stokes	17,199	8,529	8,670	17,189	10	14,386	14,376	14,347	29	10	2,813
Surry	19,281	9,604	9,677	19,267	14	16,926	16,912	16,864	48	14	2,355
Swain	6,577	3,373	3,204	6,549	28	5,652	5,624	5,598	26	28	925
Transylvania	5,881	2,885	2,996	5,868	13	5,368	5,355	5,320	35	13	513
Tyrrell	4,225	2,161	2,064	4,224	1	3,000	2,999	2,994	5	1	1,225
Union	21,259	10,763	10,496	21,246	13	15,712	15,699	15,663	36	13	5,547
Vance	17,581	8,720	8,861	17,458	123	6,434	6,311	6,207	104	123	11,147
Wake	49,207	24,624	24,583	49,033	174	26,093	25,921	25,639	282	172	23,114
Warren	19,360	9,382	9,978	19,214	146	5,880	5,734	5,614	120	146	13,480
Washington	10,200	5,194	5,006	10,176	24	4,961	4,937	4,891	46	24	5,239
Watauga	10,611	5,291	5,320	10,610	1	10,180	10,179	10,172	7	1	431
Wayne	26,100	12,740	13,360	26,027	73	15,115	15,042	14,871	171	73	10,985
Wilkes	22,675	10,894	11,781	22,670	5	20,633	20,628	20,592	36	5	2,042
Wilson	18,644	9,125	9,519	18,630	14	10,884	10,870	10,827	43	14	7,760
Yadkin	13,790	6,774	7,016	13,786	4	12,421	12,417	12,404	13	4	1,369
Yancey	9,490	4,753	4,737	9,489	1	9,197	9,196	9,191	5	1	293

STATES AND COUNTIES.	Total population.	SEX.		NATIVE AND FOREIGN BORN.		Aggregate white.	NATIVE WHITE.			Foreign white.	Total colored.
		Male.	Female.	Native.	Foreign.		Total.	Native parents.	Foreign parents.		
South Carolina	1,151,149	572,337	578,812	1,144,879	6,270	462,008	455,865	445,195	10,670	6,143	689,141
Abbeville	46,854	23,446	23,408	46,757	97	15,142	15,050	14,793	257	92	31,712
Aiken	31,822	15,869	15,953	31,674	148	13,761	13,618	13,381	237	143	18,061
Anderson	43,696	21,745	21,951	43,521	175	25,268	25,093	24,765	328	175	18,428
Barnwell	44,613	22,379	22,234	44,538	75	14,194	14,119	13,959	160	75	30,419
Beaufort	34,119	16,641	17,478	33,887	232	2,695	2,482	2,268	214	213	31,424
Berkeley	55,428	28,371	27,057	55,241	187	7,687	7,503	7,308	195	184	47,741
Charleston	59,903	28,083	31,820	56,711	3,192	24,764	21,607	16,869	4,738	3,157	35,139
Chester	26,660	13,260	13,400	26,553	107	8,482	8,377	8,118	259	105	18,178
Chesterfield	18,468	9,055	9,413	18,439	29	10,988	10,959	10,853	106	29	7,480
Clarendon	23,233	11,896	11,337	23,207	26	6,987	6,963	6,892	71	24	16,246
Colleton	40,293	20,498	19,795	40,212	81	14,032	13,953	13,807	146	79	26,261
Darlington	29,134	14,534	14,600	29,094	40	11,749	11,710	11,637	73	39	17,385
Edgefield	49,259	24,956	24,303	49,211	48	17,340	17,301	17,230	71	39	31,919
Fairfield	28,599	14,178	14,421	28,489	110	7,139	7,029	6,769	260	110	21,460
Florence	25,027	12,418	12,609	24,947	80	10,471	10,392	10,218	174	79	14,556
Georgetown	20,857	10,140	10,717	20,777	80	4,053	3,980	3,842	138	73	16,804
Greenville	44,310	21,880	22,430	44,099	211	27,516	27,306	26,907	399	210	16,794
Hampton	20,544	10,273	10,271	20,511	33	6,827	6,795	6,728	67	32	13,717
Horry	19,256	9,601	9,655	19,242	14	13,706	13,693	13,655	38	13	5,550
Kershaw	22,361	10,864	11,497	22,303	58	8,550	8,493	8,359	134	57	13,811
Lancaster	20,761	10,369	10,392	20,744	17	10,411	10,394	10,350	44	17	10,350
Laurens	31,610	15,963	15,647	31,550	60	13,169	13,110	13,009	101	59	18,441
Lexington	22,181	11,163	11,018	22,153	28	13,769	13,741	13,681	60	28	8,412
Marion	29,976	14,558	15,418	29,942	34	14,519	14,486	14,350	136	33	15,457
Marlboro	23,500	11,650	11,850	23,493	7	9,062	9,055	8,979	76	7	14,438
Newberry	26,434	13,106	13,328	26,362	72	8,966	8,896	8,757	139	70	17,468
Oconee	18,687	9,313	9,374	18,533	154	13,678	13,524	13,260	264	154	5,009
Orangeburg	49,393	24,644	24,749	49,284	109	15,654	15,547	15,330	217	107	33,739
Pickens	16,389	8,372	8,017	16,382	7	12,253	12,246	12,169	77	7	4,136
Richland	36,821	18,338	18,483	36,461	360	11,933	11,586	10,930	656	347	24,888
Spartanburg	55,385	27,344	28,041	55,251	134	36,857	36,723	36,464	259	134	18,528
Sumter	43,605	21,571	22,034	43,520	85	11,813	11,733	11,555	178	80	31,792
Union	25,363	12,859	12,504	25,315	48	10,973	10,927	10,828	99	46	14,390
Williamsburg	27,777	13,505	14,272	27,732	45	9,355	9,316	9,259	57	39	18,422
York	38,831	19,495	19,336	38,744	87	18,245	18,158	17,916	242	87	20,586
Georgia	1,837,353	919,925	917,428	1,825,216	12,137	978,357	966,465	946,782	19,683	11,892	858,996
Appling	8,676	4,665	4,011	8,650	26	6,214	6,189	6,118	71	25	2,462
Baker	6,144	3,053	3,091	6,144	.....	1,595	1,595	1,593	2	.....	4,549
Baldwin	14,608	7,016	7,592	14,536	72	5,262	5,192	5,096	96	70	9,346
Banks	8,562	4,244	4,318	8,562	.....	6,999	6,999	6,992	7	.....	1,563
Bartow	20,616	10,157	10,459	20,556	60	14,574	14,516	14,367	149	58	6,042
Berrien	10,694	5,618	5,076	10,672	22	8,277	8,255	8,214	41	22	2,417
Bibb	42,370	20,772	21,598	41,640	730	19,029	18,305	17,286	1,019	724	23,341
Brooks	13,979	6,947	7,032	13,968	11	6,342	6,331	6,290	41	11	7,637
Bryan	5,520	2,947	2,573	5,504	16	2,833	2,818	2,807	11	15	2,687
Bulloch	13,712	7,310	6,402	13,692	20	9,023	9,003	8,930	73	20	4,689
Burke	28,501	14,467	14,034	28,466	35	5,817	5,787	5,753	34	30	22,684
Butts	10,565	5,262	5,303	10,559	6	5,167	5,162	5,145	17	5	5,398
Calhoun	8,438	4,267	4,171	8,436	2	2,239	2,237	2,229	8	2	6,199
Camden	6,178	3,140	3,038	6,151	27	2,041	2,015	1,943	72	26	4,137
Campbell	9,115	4,512	4,603	9,093	22	5,621	5,599	5,517	82	22	3,494
Carroll	22,301	11,256	11,045	22,279	22	18,450	18,428	18,340	88	22	3,851
Catoosa	5,431	2,795	2,636	5,391	40	4,795	4,755	4,664	91	40	636
Charlton	3,335	1,846	1,489	3,330	5	2,465	2,460	2,430	30	5	870
Chatham	57,740	28,156	29,584	54,050	3,690	22,965	19,364	13,863	5,501	3,601	34,775
Chattahoochee	4,902	2,491	2,411	4,900	2	1,837	1,835	1,830	5	2	3,065
Chattooga	11,202	5,443	5,759	11,187	15	9,204	9,189	9,141	48	15	1,998
Cherokee	15,412	7,675	7,737	15,394	18	13,904	13,886	13,816	70	18	1,508
Clarke	15,186	7,281	7,905	15,042	144	7,072	6,930	6,727	203	142	8,114

STATES AND COUNTIES.	Total population.	SEX.		NATIVE AND FOREIGN BORN.		Aggregate white.	NATIVE WHITE.			Foreign white.	Total colored.
		Male.	Female.	Native.	Foreign.		Total.	Native parents.	Foreign parents.		
Georgia—Continued.											
Clay	7,817	3,823	3,994	7,809	8	3,002	2,994	2,982	12	8	4,815
Clayton	8,295	4,128	4,167	8,283	12	5,220	5,208	5,166	42	12	3,075
Clinch	6,652	3,633	3,019	6,636	16	4,292	4,276	4,241	35	16	2,360
Cobb	22,286	10,838	11,448	22,205	81	15,510	15,430	15,257	173	80	6,776
Coffee	10,483	5,658	4,825	10,470	13	6,621	6,608	6,571	37	13	3,862
Colquitt	4,794	2,418	2,376	4,791	3	4,317	4,314	4,303	11	3	477
Columbia	11,281	5,676	5,605	11,271	10	3,243	3,233	3,202	31	10	8,038
Coweta	22,354	10,988	11,366	22,331	23	9,740	9,717	9,637	80	23	12,614
Crawford	9,315	4,753	4,562	9,314	1	4,159	4,158	4,143	15	1	5,156
Dade	5,707	3,266	2,441	5,657	50	4,614	4,567	4,495	72	47	1,093
Dawson	5,612	2,682	2,930	5,608	4	5,353	5,349	5,330	19	4	259
Decatur	19,949	9,845	10,104	19,916	33	9,116	9,083	9,004	79	33	10,833
Dekalb	17,189	8,814	8,375	16,870	319	11,214	10,895	10,759	136	319	5,975
Dodge	11,452	5,981	5,471	11,424	28	6,143	6,116	6,050	66	27	5,309
Dooly	18,146	9,567	8,579	18,119	27	9,232	9,205	9,169	36	27	8,914
Dougherty	12,206	6,074	6,132	12,094	112	1,975	1,864	1,703	161	111	10,231
Douglas	7,794	3,892	3,902	7,784	10	5,993	5,983	5,943	40	10	1,801
Early	9,792	5,039	4,753	9,787	5	3,670	3,665	3,637	28	5	6,122
Echols	3,079	1,648	1,431	3,078	1	2,059	2,058	2,053	5	1	1,020
Effingham	5,599	2,850	2,749	5,578	21	3,388	3,367	3,345	22	21	2,211
Elbert	15,376	7,872	7,504	15,353	23	7,492	7,470	7,419	51	22	7,884
Emanuel	14,703	7,743	6,960	14,672	31	9,396	9,365	9,336	29	31	5,307
Fannin	8,724	4,294	4,430	8,716	8	8,612	8,604	8,561	43	8	112
Fayette	8,728	4,297	4,431	8,720	8	5,654	5,646	5,631	15	8	3,074
Floyd	28,391	14,269	14,122	28,225	166	17,970	17,810	17,537	273	160	10,421
Forsyth	11,155	5,518	5,637	11,149	6	9,866	9,860	9,838	22	6	1,289
Franklin	14,670	7,502	7,168	14,664	6	11,372	11,366	11,336	30	6	3,298
Fulton	84,655	41,155	43,500	82,417	2,238	49,238	47,026	43,647	3,379	2,212	35,417
Gilmer	9,074	4,460	4,614	9,071	3	9,005	9,002	8,983	19	3	69
Glascock	3,720	1,832	1,888	3,717	3	2,552	2,549	2,546	3	3	1,168
Glynn	13,420	7,076	6,344	12,855	565	5,669	5,135	4,493	642	534	7,751
Gordon	12,758	6,387	6,371	12,745	13	11,030	11,018	10,962	56	12	1,728
Greene	17,051	8,496	8,555	17,024	27	5,332	5,305	5,264	41	27	11,719
Gwinnett	19,899	9,825	10,074	19,881	18	16,903	16,885	16,829	56	18	2,996
Habersham	11,573	5,787	5,786	11,477	96	9,984	9,888	9,778	110	96	1,589
Hall	18,047	8,865	9,182	18,006	41	15,280	15,239	15,146	93	41	2,767
Hancock	17,149	8,446	8,703	17,107	42	4,739	4,697	4,653	44	42	12,410
Haralson	11,316	5,680	5,636	11,247	69	10,199	10,130	10,002	128	69	1,117
Harris	16,797	8,371	8,426	16,795	2	5,999	5,997	5,974	23	2	10,798
Hart	10,887	5,421	5,466	10,866	21	7,930	7,909	7,887	22	21	2,957
Heard	9,557	4,756	4,801	9,553	4	6,215	6,211	6,209	2	4	3,342
Henry	16,220	8,067	8,153	16,212	8	8,629	8,621	8,582	39	8	7,591
Houston	21,613	10,724	10,889	21,586	27	5,272	5,247	5,204	43	25	16,341
Irwin	6,316	3,402	2,914	6,309	7	4,241	4,236	4,209	27	5	2,075
Jackson	19,176	9,596	9,580	19,170	6	13,780	13,774	13,743	31	6	5,396
Jasper	13,879	7,031	6,848	13,871	8	5,392	5,385	5,368	17	7	8,487
Jefferson	17,213	8,610	8,603	17,200	13	6,450	6,437	6,405	32	13	10,763
Johnson	6,129	3,153	2,976	6,124	5	4,673	4,668	4,648	20	5	1,456
Jones	12,709	6,387	6,322	12,703	6	3,931	3,925	3,912	13	6	8,778
Laurens	13,747	7,010	6,737	13,742	5	7,654	7,649	7,630	19	5	6,093
Lee	9,074	4,558	4,516	9,067	7	1,432	1,426	1,404	22	6	7,642
Liberty	12,887	6,695	6,192	12,859	28	4,207	4,181	4,125	56	26	8,680
Lincoln	6,146	3,098	3,048	6,140	6	2,473	2,467	2,453	14	6	3,673
Lowndes	15,102	7,699	7,403	15,068	34	7,128	7,094	7,022	72	34	7,974
Lumpkin	6,867	3,392	3,475	6,857	10	6,453	6,443	6,405	38	10	414
McDuffie	8,789	4,361	4,428	8,772	17	3,267	3,250	3,229	21	17	5,522
McIntosh	6,470	3,281	3,189	6,366	104	1,258	1,163	1,040	123	95	5,212
Macon	13,183	6,449	6,734	13,163	20	4,001	3,981	3,944	37	20	9,182
Madison	11,024	5,631	5,393	11,022	2	7,361	7,359	7,346	13	2	3,663
Marion	7,728	3,848	3,880	7,726	2	3,467	3,465	3,465	.....	2	4,261
Meriwether	20,740	10,282	10,458	20,721	19	9,201	9,182	9,156	26	19	11,539

ATES AND COUNTIES.	Total population.	SEX.		NATIVE AND FOREIGN BORN.		Aggregate white.	NATIVE WHITE.			Foreign white.	Total colored.
		Male.	Female.	Native.	Foreign.		Total.	Native parents.	Foreign parents.		
'gia—Continued.											
Miller	4,275	2,134	2,141	4,274	1	2,701	2,700	2,700	.....	1	1,574
Milton	6,208	3,128	3,080	6,205	3	5,536	5,533	5,520	13	3	672
Mitchell	10,906	5,371	5,535	10,899	7	4,800	4,793	4,777	16	7	6,106
Monroe	19,137	9,631	9,506	19,131	6	6,621	6,615	6,590	25	6	12,516
Montgomery	9,248	5,089	4,159	9,238	10	5,590	5,580	5,529	51	10	3,658
Morgan	16,041	8,011	8,030	16,023	18	5,043	5,025	4,974	51	18	10,998
Murray	8,461	4,217	4,244	8,450	11	7,977	7,967	7,926	41	10	484
Muscogee	27,761	12,785	14,976	27,438	323	12,395	12,073	11,388	685	322	15,366
Newton	14,310	7,206	7,104	14,295	15	7,146	7,131	7,104	27	15	7,164
Oconee	7,713	3,867	3,846	7,713	.....	3,881	3,881	3,861	20	.....	3,832
Oglethorpe	16,951	8,725	8,226	16,930	21	5,686	5,666	5,618	48	20	11,265
Paulding	11,948	5,983	5,965	11,942	6	10,443	10,437	10,408	29	6	1,505
Pickens	8,182	3,932	4,250	8,171	11	7,832	7,821	7,668	153	11	350
Pierce	6,379	3,434	2,945	6,357	22	4,396	4,376	4,344	32	20	1,983
Pike	16,300	8,166	8,134	16,285	15	8,223	8,210	8,180	30	13	8,077
Polk	14,945	7,622	7,323	14,897	48	10,289	10,242	10,174	68	47	4,656
Pulaski	16,559	8,375	8,184	16,526	33	6,558	6,526	6,450	76	32	10,001
Putnam	14,842	7,403	7,439	14,831	11	3,939	3,928	3,887	41	11	10,903
Quitman	4,471	2,151	2,320	4,468	3	1,421	1,418	1,409	9	3	3,050
Rabun	5,606	2,850	2,756	5,598	8	5,440	5,432	5,392	40	8	166
Randolph	15,267	7,446	7,821	15,244	23	5,794	5,771	5,724	47	23	9,473
Richmond	45,194	21,118	24,076	43,871	1,323	22,346	21,053	18,882	2,171	1,293	22,848
Rockdale	6,813	3,382	3,431	6,802	11	4,127	4,116	4,087	29	11	2,686
Schley	5,443	2,721	2,722	5,442	1	2,238	2,237	2,233	4	1	3,205
Screven	14,424	7,346	7,078	14,396	28	6,916	6,888	6,819	69	28	7,508
Spalding	13,117	6,329	6,788	13,075	42	5,835	5,794	5,729	65	41	7,282
Stewart	15,682	7,848	7,834	15,677	5	4,198	4,193	4,160	33	5	11,484
Sumter	22,107	11,000	11,107	22,045	62	7,008	6,946	6,863	83	62	15,099
Talbot	13,258	6,526	6,732	13,256	2	4,019	4,018	4,003	15	1	9,239
Taliaferro	7,291	3,679	3,612	7,277	14	2,464	2,450	2,425	25	14	4,827
Tattnall	10,253	5,560	4,693	10,244	9	7,138	7,129	7,101	28	9	3,115
Taylor	8,666	4,276	4,390	8,663	3	4,598	4,595	4,585	10	3	4,068
Telfair	5,477	2,927	2,550	5,468	9	3,142	3,134	3,111	23	8	2,335
Terrell	14,503	7,198	7,305	14,483	20	5,334	5,315	5,277	38	19	9,169
Thomas	26,154	12,735	13,419	26,047	107	11,122	11,018	10,823	195	104	15,032
Towns	4,064	2,101	1,963	4,064	.....	3,990	3,990	3,982	8	.....	74
Troup	20,723	10,129	10,594	20,693	30	7,062	7,032	6,965	67	30	13,661
Twiggs	8,195	4,184	4,011	8,191	4	2,748	2,744	2,736	8	4	5,447
Union	7,749	3,767	3,982	7,741	8	7,584	7,576	7,561	15	8	165
Upson	12,188	6,138	6,050	12,167	21	6,065	6,044	6,017	27	21	6,123
Walker	13,282	7,046	6,236	13,232	50	11,350	11,300	11,184	116	50	1,932
Walton	17,467	8,704	8,763	17,458	9	10,312	10,303	10,282	21	9	7,155
Ware	8,811	4,936	3,875	8,757	54	5,178	5,124	5,065	59	54	3,633
Warren	10,957	5,461	5,496	10,945	12	4,201	4,190	4,176	14	11	6,756
Washington	25,237	12,571	12,666	25,210	27	10,312	10,285	10,216	69	27	14,925
Wayne	7,485	4,065	3,420	7,468	17	5,290	5,273	5,254	19	17	2,195
Webster	5,695	2,788	2,907	5,694	1	2,423	2,422	2,415	7	1	3,272
White	6,151	3,044	3,107	6,129	22	5,489	5,467	5,439	28	22	662
Whitfield	12,916	6,335	6,581	12,817	99	10,984	10,885	10,746	139	99	1,932
Wilcox	7,980	4,660	3,320	7,972	8	4,825	4,817	4,793	24	8	3,155
Wilkes	18,081	9,011	9,070	18,040	41	5,616	5,575	5,453	122	41	12,465
Wilkinson	10,781	5,301	5,480	10,769	12	5,567	5,555	5,538	17	12	5,214
Worth	10,048	5,294	4,754	10,043	5	5,872	5,867	5,837	30	5	4,176

STATES AND COUNTIES.	Total population.	SEX.		NATIVE AND FOREIGN BORN.		Aggregate white.	NATIVE WHITE.			Foreign white.	Total colored.
		Male.	Female.	Native.	Foreign.		Total.	Native parents.	Foreign parents.		
Florida	391,422	201,947	189,475	368,490	22,932	224,949	206,771	190,998	15,773	18,178	166,473
Alachua	22,934	11,605	11,329	22,629	305	9,673	9,382	8,980	402	291	13,261
Baker	3,333	1,696	1,637	3,315	18	2,588	2,570	2,540	30	18	745
Bradford	7,516	3,854	3,662	7,422	94	5,961	5,869	5,749	120	92	1,555
Brevard	3,401	1,934	1,467	3,109	292	2,836	2,555	2,374	181	281	565
Calhoun	1,681	809	872	1,663	18	1,132	1,115	1,091	24	17	549
Citrus	2,394	1,331	1,063	2,382	12	2,090	2,078	2,058	20	12	304
Clay	5,154	2,729	2,425	4,965	189	3,632	3,446	3,276	170	186	1,522
Columbia	12,877	6,768	6,109	12,835	42	6,393	6,354	6,286	68	39	6,484
Dade	861	528	333	700	161	640	509	324	185	131	221
De Soto	4,944	2,731	2,213	4,857	87	4,805	4,720	4,649	71	85	139
Duval	26,800	13,278	13,522	25,425	1,375	11,970	10,741	9,466	1,275	1,229	14,830
Escambia	20,188	10,244	9,944	18,990	1,198	11,475	10,368	8,491	1,877	1,107	8,713
Franklin	3,308	1,778	1,530	3,145	163	1,950	1,794	1,452	342	156	1,358
Gadsden	11,894	5,779	6,115	11,745	149	4,446	4,299	4,184	115	147	7,448
Hamilton	8,507	4,416	4,091	8,500	7	5,337	5,332	5,299	33	5	3,170
Hernando	2,476	1,300	1,176	2,440	36	1,584	1,548	1,513	35	36	892
Hillsboro	14,941	8,147	6,794	12,666	2,275	11,996	10,119	8,881	1,238	1,877	2,945
Holmes	4,336	2,195	2,141	4,319	17	4,152	4,135	4,090	45	17	184
Jackson	17,544	8,751	8,793	17,524	20	6,332	6,318	6,264	54	14	11,212
Jefferson	15,757	7,713	8,044	15,680	77	3,558	3,482	3,327	155	76	12,199
Lafayette	3,686	1,954	1,732	3,684	2	3,447	3,445	3,440	5	2	239
Lake	8,034	4,342	3,692	7,558	476	6,190	5,714	5,377	337	476	1,844
Lee	1,414	790	624	1,294	120	1,334	1,219	1,094	125	115	80
Leon	17,752	8,461	9,291	17,631	121	3,121	3,003	2,858	145	118	14,631
Levy	6,586	3,458	3,128	6,486	100	4,457	4,358	4,219	139	99	2,129
Liberty	1,452	747	705	1,451	1	818	817	810	7	1	634
Madison	14,316	7,137	7,179	14,304	12	5,556	5,544	5,499	45	12	8,760
Manatee	2,895	1,567	1,328	2,785	110	2,714	2,606	2,457	149	108	181
Marion	20,796	10,861	9,935	20,199	597	9,310	8,740	8,305	435	570	11,486
Monroe	18,786	9,733	9,053	7,697	11,089	12,815	5,625	1,322	4,303	7,190	5,971
Nassau	8,294	4,364	3,930	8,097	197	3,951	3,792	3,586	206	159	4,343
Orange	12,584	6,793	5,791	11,540	1,044	9,039	8,008	7,281	727	1,031	3,545
Osceola	3,133	1,724	1,409	3,002	131	2,657	2,527	2,446	81	130	476
Pasco	4,249	2,354	1,895	4,048	201	3,872	3,671	3,353	318	201	377
Polk	7,905	4,264	3,641	7,631	274	7,121	6,852	6,637	215	269	784
Putnam	11,186	5,938	5,248	10,663	523	6,404	5,890	5,394	496	514	4,782
St. John	8,712	4,504	4,208	8,229	483	5,508	5,050	4,600	450	458	3,204
Santa Rosa	7,961	4,080	3,881	7,814	147	5,768	5,621	5,416	205	147	2,193
Sumter	5,363	2,917	2,446	5,288	75	3,864	3,789	3,696	93	75	1,499
Suwannee	10,524	5,425	5,099	10,504	20	5,581	5,561	5,483	78	20	4,943
Taylor	2,122	1,112	1,010	2,122	.....	1,971	1,971	1,968	3	.....	151
Volusia	8,467	4,478	3,989	7,924	543	6,004	5,465	4,930	535	539	2,463
Wakulla	3,117	1,571	1,546	3,104	13	1,738	1,726	1,704	22	12	1,379
Walton	4,816	2,427	2,389	4,781	35	4,072	4,039	3,894	145	33	744
Washington	6,426	3,360	3,066	6,343	83	5,087	5,004	4,935	69	83	1,339

A further classification by sex is given for the details of white and colored, by counties, in the following table:

STATES AND COUNTIES.	AGGREGATE WHITE.		NATIVE WHITE.						FOREIGN WHITE.		TOTAL COLORED.	
			Total.		Native parents.		Foreign parents.					
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
North Carolina	523,155	532,227	520,839	530,881	517,126	527,357	3,713	3,524	2,316	1,346	275,994	286,571
Alamance	6,054	6,634	6,036	6,622	6,007	6,597	29	25	18	12	2,603	2,980
Alexander	4,146	4,442	4,146	4,442	4,144	4,434	2	8	.....	.....	412	430
Alleghany	3,020	3,041	3,018	3,039	3,000	3,021	18	18	2	2	213	249
Anson	5,030	5,207	5,014	5,203	4,972	5,163	42	40	16	4	4,816	4,974
Ashe	7,493	7,540	7,487	7,539	7,452	7,519	35	20	6	1	298	297
Beaufort	5,957	5,912	5,939	5,908	5,908	5,882	31	26	18	4	4,620	4,583
Bertie	3,959	3,926	3,953	3,924	3,944	3,919	9	5	6	2	5,506	5,785
Bladen	4,297	4,349	4,292	4,348	4,252	4,311	40	37	5	1	3,881	4,236
Brunswick	3,082	3,057	3,063	3,052	3,040	3,034	23	18	19	5	2,357	2,404
Buncombe	14,462	14,178	14,255	14,028	14,087	13,827	168	201	207	150	3,350	3,276
Burke	6,054	6,324	6,042	6,318	6,023	6,308	19	10	12	6	1,161	1,400
Cabarrus	6,173	6,510	6,157	6,506	6,128	6,487	29	19	16	4	2,644	2,815
Caldwell	5,207	5,530	5,203	5,528	5,179	5,513	24	15	4	2	762	799
Camden	1,716	1,631	1,713	1,631	1,708	1,627	5	4	3	.....	1,159	1,161
Carteret	4,242	4,286	4,217	4,271	4,169	4,238	48	33	25	15	1,122	1,174
Caswell	3,253	3,386	3,250	3,385	3,242	3,373	8	12	3	1	4,604	4,785
Catawba	7,751	8,322	7,727	8,311	7,685	8,275	42	36	24	11	1,275	1,341
Chatham	8,509	8,705	8,486	8,687	8,451	8,654	35	33	23	18	4,014	4,185
Cherokee	4,832	4,823	4,826	4,819	4,812	4,808	14	11	6	4	159	162
Chowan	2,022	1,988	2,008	1,982	2,000	1,977	8	5	14	6	2,538	2,619
Clay	2,054	2,001	2,053	2,001	2,051	1,999	2	2	1	.....	78	64
Cleveland	8,467	8,834	8,457	8,830	8,426	8,799	31	31	10	4	1,555	1,538
Columbus	5,880	5,924	5,861	5,919	5,842	5,888	19	31	19	5	2,787	3,265
Craven	3,536	3,639	3,476	3,604	3,403	3,518	73	86	60	35	6,274	7,084
Cumberland	7,292	7,660	7,250	7,629	7,142	7,519	108	110	42	31	6,081	6,288
Currituck	2,452	2,279	2,448	2,277	2,443	2,267	5	10	4	2	1,658	958
Dare	1,754	1,608	1,748	1,608	1,741	1,603	7	5	6	.....	197	209
Davidson	8,833	9,341	8,820	9,334	8,789	9,300	31	34	13	7	1,748	1,780
Davie	4,256	4,513	4,251	4,506	4,231	4,498	20	8	5	7	1,403	1,449
Duplin	5,710	5,890	5,700	5,888	5,649	5,835	51	53	10	2	3,191	3,899
Durham	5,213	5,499	5,190	5,480	5,155	5,435	35	45	23	19	3,569	3,760
Edgecombe	4,144	4,369	4,118	4,357	4,078	4,296	40	61	26	12	7,625	7,975
Forsyth	9,556	9,877	9,504	9,851	9,443	9,791	61	60	52	26	4,647	4,354
Franklin	5,368	5,387	5,355	5,382	5,341	5,374	14	8	13	5	5,085	5,250
Gaston	6,220	6,707	6,150	6,689	6,042	6,624	108	65	70	18	2,418	2,419
Gates	2,775	2,764	2,770	2,763	2,767	2,759	3	4	5	1	2,315	2,398
Graham	1,607	1,530	1,607	1,530	1,604	1,526	3	4	.....	.....	94	82
Granville	5,953	6,169	5,935	6,166	5,918	6,145	17	21	18	3	6,172	6,190
Greene	2,597	2,684	2,594	2,681	2,589	2,674	5	7	3	3	2,262	2,496
Guilford	9,703	10,117	9,606	10,039	9,476	9,922	130	117	97	78	4,057	4,175
Halifax	4,822	4,792	4,791	4,771	4,754	4,729	37	42	31	21	9,405	9,889
Harnett	4,727	4,726	4,716	4,721	4,681	4,684	35	37	11	5	2,060	2,187
Haywood	6,524	6,305	6,513	6,301	6,500	6,297	13	4	11	4	260	257
Henderson	5,542	5,669	5,499	5,630	5,424	5,570	75	60	43	39	701	677
Hertford	2,887	3,019	2,882	3,015	2,878	3,011	4	4	5	4	4,002	3,943
Hyde	2,555	2,407	2,554	2,405	2,544	2,400	10	5	1	2	1,925	2,016
Iredell	9,451	10,065	9,425	10,049	9,357	10,001	68	48	26	16	2,850	3,006
Jackson	4,341	4,339	4,331	4,334	4,318	4,319	13	15	10	5	420	412
Johnston	9,881	10,036	9,863	10,026	9,829	10,006	34	20	18	10	3,618	3,704
Jones	1,950	1,935	1,948	1,933	1,943	1,926	5	7	2	2	1,722	1,796
Lenoir	4,304	4,213	4,289	4,209	4,265	4,186	24	23	15	4	2,976	3,386
Lincoln	4,851	5,177	4,845	5,176	4,826	5,161	19	15	6	1	1,234	1,324
McDowell	4,511	4,603	4,488	4,589	4,473	4,576	15	13	23	14	894	931
Macon	4,645	4,791	4,638	4,782	4,623	4,763	15	19	7	9	321	345
Madison	8,728	8,367	8,715	8,365	8,681	8,344	34	21	13	2	423	287
Martin	3,954	3,884	3,952	3,881	3,947	3,874	5	7	2	3	3,667	3,716
Mecklenburg	11,547	11,594	11,392	11,506	11,119	11,224	273	282	155	88	9,572	9,960

STATES AND COUNTIES.	AGGREGATE WHITE.		NATIVE WHITE.						FOREIGN WHITE.		TOTAL COLORED.	
			Total.		Native parents.		Foreign parents.					
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
North Carolina—Cont'd.												
Mitchell	6,247	6,005	6,231	6,001	6,215	5,990	16	11	16	4	271	284
Montgomery	4,499	4,483	4,486	4,480	4,452	4,446	34	34	13	3	1,152	1,105
Moore	6,893	7,092	6,859	7,075	6,741	6,958	118	117	34	17	3,378	3,116
Nash	6,200	5,986	6,192	5,985	6,172	5,969	20	16	8	1	4,268	4,253
New Hanover	4,888	5,201	4,566	4,983	4,164	4,578	402	405	322	218	6,406	7,531
Northampton	4,646	4,578	4,637	4,574	4,617	4,565	20	9	9	4	5,930	6,088
Onslow	3,750	3,642	3,747	3,641	3,738	3,637	9	4	3	1	1,460	1,451
Orange	5,015	4,690	5,011	4,685	4,987	4,665	24	20	4	5	2,621	2,622
Pamlico	2,408	2,359	2,403	2,358	2,399	2,351	4	7	5	1	1,189	1,190
Pasquotank	2,643	2,558	2,623	2,545	2,590	2,491	33	54	20	13	2,677	2,870
Pender	3,014	2,953	3,000	2,952	2,980	2,941	20	11	14	1	3,171	3,376
Perquimans	2,379	2,340	2,377	2,339	2,371	2,333	6	6	2	1	2,258	2,316
Person	4,110	4,141	4,107	4,141	4,100	4,134	7	7	3	.....	3,517	3,383
Pitt	6,717	6,475	6,705	6,472	6,679	6,444	26	28	12	3	6,137	6,190
Polk	2,389	2,418	2,384	2,408	2,363	2,397	21	11	5	10	535	560
Randolph	10,767	11,081	10,751	11,072	10,719	11,040	32	32	16	9	1,654	1,693
Richmond	5,353	5,636	5,327	5,623	5,257	5,552	70	71	26	13	6,512	6,447
Robeson	8,177	8,452	8,156	8,441	8,062	8,347	94	94	21	11	7,468	7,386
Rockingham	7,529	7,668	7,491	7,647	7,464	7,603	27	44	38	21	5,073	5,093
Rowan	8,521	8,621	8,479	8,601	8,405	8,530	74	71	42	20	3,393	3,588
Rutherford	7,312	7,761	7,306	7,759	7,286	7,745	20	14	6	2	1,816	1,881
Sampson	7,841	8,119	7,829	8,118	7,809	8,093	20	25	12	1	4,213	4,923
Stanly	5,149	5,480	5,143	5,474	5,137	5,468	6	6	6	6	781	726
Stokes	7,113	7,273	7,105	7,271	7,086	7,261	19	10	8	2	1,416	1,397
Surry	8,413	8,513	8,401	8,511	8,374	8,490	27	21	12	2	1,191	1,164
Swain	2,901	2,751	2,884	2,740	2,864	2,734	20	6	17	11	472	453
Transylvania	2,630	2,738	2,620	2,735	2,604	2,716	16	19	10	3	255	258
Tyrrell	1,560	1,440	1,559	1,440	1,556	1,438	3	2	1	.....	601	624
Union	7,980	7,732	7,971	7,728	7,954	7,709	17	19	9	4	2,783	2,764
Vance	3,209	3,225	3,144	3,167	3,083	3,124	61	43	65	58	5,511	5,636
Wake	12,961	13,132	12,847	13,074	12,708	12,931	139	143	114	58	11,663	11,451
Warren	2,869	3,011	2,780	2,954	2,713	2,901	67	53	89	57	6,513	6,967
Washington	2,529	2,432	2,515	2,422	2,484	2,407	31	15	14	10	2,665	2,574
Watauga	5,073	5,107	5,072	5,107	5,069	5,103	3	4	1	.....	218	213
Wayne	7,570	7,545	7,527	7,515	7,450	7,421	77	94	43	30	5,170	5,815
Wilkes	9,893	10,740	9,892	10,736	9,871	10,721	21	15	1	4	1,001	1,041
Wilson	5,464	5,420	5,455	5,415	5,427	5,400	28	15	9	5	3,661	4,099
Yadkin	6,091	6,330	6,088	6,329	6,083	6,321	5	8	3	1	683	686
Yancey	4,603	4,594	4,603	4,593	4,598	4,593	5	.....	.....	1	150	143
South Carolina	230,405	231,603	226,814	229,051	221,517	223,678	5,297	5,373	3,591	2,552	341,932	347,209
Abbeville	7,500	7,642	7,433	7,617	7,288	7,505	145	112	67	25	15,946	15,766
Aiken	6,863	6,898	6,776	6,842	6,652	6,729	124	113	87	56	9,006	9,055
Anderson	12,451	12,817	12,352	12,741	12,187	12,578	165	163	99	76	9,294	9,134
Barnwell	7,213	6,931	7,164	6,955	7,082	6,877	82	78	49	26	15,166	15,253
Beaufort	1,358	1,337	1,221	1,261	1,115	1,153	106	108	137	76	15,283	16,141
Berkeley	4,028	3,659	3,904	3,599	3,804	3,501	100	95	124	60	24,343	23,398
Charleston	11,826	12,938	10,138	11,469	7,892	8,977	2,246	2,492	1,688	1,469	16,257	18,882
Chester	4,179	4,303	4,117	4,260	4,003	4,115	114	145	62	43	9,081	9,097
Chesterfield	5,449	5,539	5,434	5,525	5,382	5,471	52	54	15	14	3,606	3,874
Clarendon	3,559	3,428	3,541	3,422	3,508	3,384	33	38	18	6	8,337	7,909
Colleton	7,121	6,911	7,068	6,885	6,998	6,809	70	76	53	26	13,377	12,884
Darlington	5,911	5,838	5,887	5,823	5,847	5,790	40	33	24	15	8,623	8,762
Edgefield	8,761	8,579	8,730	8,571	8,690	8,540	40	31	31	8	16,195	15,724
Fairfield	3,536	3,603	3,465	3,564	3,318	3,451	147	113	71	39	10,642	10,818
Florence	5,287	5,184	5,236	5,156	5,151	5,067	85	89	51	28	7,131	7,425
Georgetown	2,056	1,997	2,016	1,964	1,941	1,901	75	63	40	33	8,084	8,720
Greenville	13,649	13,867	13,514	13,792	13,320	13,587	194	205	135	75	8,231	8,563
Hampton	3,498	3,329	3,470	3,325	3,435	3,293	35	32	28	4	6,775	6,942

STATES AND COUNTIES.	AGGREGATE WHITE.		NATIVE WHITE.						FOREIGN WHITE.		TOTAL COLORED.	
			Total.		Native parents.		Foreign parents.					
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
South Carolina—Cont'd.												
Horry	6,857	6,849	6,818	6,845	6,829	6,826	19	19	9	4	2,744	2,806
Kershaw	4,254	4,296	4,222	4,271	4,156	4,203	66	68	32	25	6,610	7,201
Lancaster	5,149	5,262	5,137	5,257	5,116	5,234	21	23	12	5	5,220	5,130
Laurens	6,681	6,488	6,638	6,472	6,573	6,436	65	36	43	16	9,282	9,159
Lexington	6,881	6,888	6,860	6,881	6,827	6,854	33	27	21	7	4,282	4,130
Marion	7,055	7,464	7,035	7,451	6,968	7,382	67	69	20	13	7,503	7,954
Marlboro	4,519	4,543	4,513	4,542	4,480	4,499	33	43	6	1	7,131	7,307
Newberry	4,430	4,536	4,383	4,513	4,304	4,453	79	60	47	23	8,676	8,792
Oconee	6,845	6,833	6,760	6,764	6,636	6,624	124	140	85	69	2,468	2,541
Orangeburg	7,888	7,766	7,810	7,737	7,688	7,642	122	95	78	29	16,756	16,983
Pickens	6,215	6,038	6,211	6,035	6,166	6,003	45	32	4	3	2,157	1,979
Richland	5,968	5,965	5,756	5,830	5,424	5,506	332	324	212	135	12,370	12,518
Spartanburg	18,200	18,657	18,123	18,600	17,985	18,479	138	121	77	57	9,144	9,384
Sumter	5,845	5,968	5,791	5,942	5,700	5,855	91	87	54	26	15,726	16,066
Union	5,539	5,434	5,509	5,418	5,459	5,369	50	49	30	16	7,320	7,070
Williamsburg	4,720	4,635	4,693	4,623	4,660	4,599	33	24	27	12	8,785	9,637
York	9,114	9,131	9,059	9,099	8,933	8,983	126	116	55	32	10,381	10,205
Georgia	489,707	488,650	482,285	484,180	472,500	474,282	9,785	9,898	7,422	4,470	430,218	428,778
Appling	3,228	2,986	3,205	2,984	3,170	2,948	35	36	23	2	1,437	1,025
Baker	808	787	808	787	806	787	2	.....	.....	.....	2,245	2,304
Baldwin	2,467	2,795	2,428	2,764	2,383	2,713	45	51	39	31	4,549	4,797
Banks	3,426	3,573	3,426	3,573	3,423	3,569	3	4	.....	.....	818	745
Bartow	7,174	7,400	7,140	7,376	7,062	7,305	78	71	34	24	2,983	3,059
Berrien	4,152	4,125	4,135	4,120	4,111	4,103	24	17	17	5	1,466	951
Bibb	9,892	9,137	9,430	8,875	8,958	8,328	472	547	462	262	10,880	12,461
Brooks	3,130	3,212	3,121	3,210	3,096	3,194	25	16	9	2	3,817	3,820
Bryan	1,475	1,358	1,464	1,354	1,455	1,352	9	2	11	4	1,472	1,215
Bulloch	4,674	4,349	4,660	4,343	4,628	4,302	32	41	14	6	2,636	2,053
Burke	2,974	2,843	2,950	2,837	2,934	2,819	16	18	24	6	11,493	11,191
Butts	2,570	2,597	2,566	2,596	2,555	2,590	11	6	4	1	2,692	2,706
Calhoun	1,111	1,128	1,109	1,128	1,105	1,124	4	4	2	.....	3,156	3,043
Camden	1,047	994	1,027	988	978	965	49	23	20	6	2,093	2,044
Campbell	2,771	2,850	2,757	2,842	2,709	2,808	48	34	14	8	1,741	1,753
Carroll	9,274	9,176	9,257	9,171	9,211	9,129	46	42	17	5	1,982	1,869
Catoosa	2,444	2,351	2,417	2,338	2,365	2,299	52	39	27	13	351	285
Charlton	1,283	1,182	1,278	1,182	1,258	1,172	20	10	5	.....	563	307
Chatham	11,697	11,268	9,660	9,704	6,984	6,879	2,676	2,825	2,037	1,564	16,459	18,316
Chattahoochee	923	914	921	914	918	912	3	2	2	.....	1,568	1,497
Chattooga	4,415	4,789	4,404	4,785	4,378	4,763	26	22	11	4	1,028	970
Cherokee	6,923	6,981	6,910	6,976	6,874	6,942	36	34	13	5	752	756
Clarke	3,352	3,720	3,271	3,659	3,173	3,554	98	105	81	61	3,929	4,185
Clay	1,471	1,531	1,468	1,526	1,458	1,524	10	2	3	5	2,352	2,463
Clayton	2,594	2,626	2,585	2,623	2,559	2,607	26	16	9	3	1,534	1,541
Clinch	2,188	2,104	2,175	2,101	2,158	2,083	17	18	13	3	1,445	915
Cobb	7,552	7,958	7,510	7,920	7,432	7,825	78	95	42	38	3,286	3,490
Coffee	3,417	3,204	3,404	3,204	3,383	3,188	21	16	13	.....	2,241	1,621
Colquitt	2,132	2,185	2,129	2,185	2,123	2,180	6	5	3	.....	286	191
Columbia	1,633	1,610	1,624	1,609	1,613	1,589	11	20	9	1	4,043	3,995
Coweta	4,753	4,987	4,733	4,984	4,688	4,949	45	35	20	3	6,235	6,379
Crawford	2,122	2,037	2,121	2,037	2,115	2,028	6	9	1	.....	2,631	2,525
Dade	2,407	2,207	2,377	2,190	2,341	2,154	36	36	30	17	859	234
Dawson	2,550	2,803	2,550	2,799	2,542	2,788	8	11	.....	4	132	127
Decatur	4,530	4,586	4,509	4,574	4,473	4,531	36	43	21	12	5,315	5,518
Dekalb	5,607	5,607	5,344	5,551	5,281	5,478	63	73	263	56	3,207	2,768
Dodge	3,079	3,064	3,062	3,054	3,020	3,030	42	24	17	10	2,902	2,407
Dooly	4,760	4,472	4,737	4,468	4,719	4,450	18	18	23	4	4,807	4,107
Dougherty	995	980	922	942	852	851	70	91	73	38	5,079	5,152
Douglas	2,968	3,025	2,963	3,020	2,943	3,000	20	20	5	5	924	877

STATES AND COUNTIES.	AGGREGATE WHITE.		NATIVE WHITE.						FOREIGN WHITE.		TOTAL COLORED.	
			Total.		Native parents.		Foreign parents.					
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Georgia—Continued.												
Early	1,893	1,777	1,890	1,775	1,876	1,761	14	14	3	2	3,146	2,976
Echols	1,053	1,006	1,052	1,006	1,049	1,004	3	2	1	.....	595	425
Effingham	1,692	1,696	1,677	1,690	1,665	1,680	12	10	15	6	1,158	1,053
Elbert	3,795	3,697	3,778	3,692	3,746	3,673	32	19	17	5	4,077	3,807
Emanuel	4,803	4,593	4,774	4,591	4,756	4,580	18	11	29	2	2,940	2,367
Fannin	4,246	4,366	4,243	4,361	4,226	4,335	17	26	3	5	48	64
Fayette	2,806	2,848	2,799	2,847	2,793	2,838	6	9	7	1	1,491	1,583
Floyd	9,012	8,958	8,899	8,911	8,765	8,772	134	139	113	47	5,257	5,164
Forsyth	4,857	5,009	4,854	5,006	4,844	4,994	10	12	3	3	661	628
Franklin	5,771	5,601	5,767	5,599	5,754	5,582	13	17	4	2	1,731	1,567
Fulton	24,977	24,261	23,612	23,414	21,885	21,762	1,727	1,652	1,365	847	16,178	19,239
Gilmer	4,422	4,583	4,421	4,581	4,412	4,571	9	10	1	2	38	31
Glascock	1,266	1,286	1,264	1,285	1,261	1,285	3	.....	2	1	566	602
Glynn	3,084	2,585	2,694	2,441	2,346	2,147	348	294	390	144	3,992	3,759
Gordon	5,479	5,551	5,473	5,545	5,442	5,520	31	25	6	6	908	820
Greene	2,627	2,705	2,607	2,698	2,587	2,677	20	21	20	7	5,869	5,850
Gwinnett	8,309	8,594	8,297	8,588	8,272	8,557	25	31	12	6	1,516	1,480
Habersham	5,034	4,950	4,980	4,908	4,922	4,856	58	52	54	42	753	836
Hall	7,504	7,776	7,476	7,763	7,429	7,717	47	46	28	13	1,361	1,406
Hancock	2,307	2,432	2,282	2,415	2,253	2,400	29	15	25	17	6,139	6,271
Haralson	5,096	5,103	5,053	5,077	4,997	5,005	56	72	43	26	584	533
Harris	2,978	3,021	2,977	3,020	2,967	3,007	10	13	1	1	5,393	5,405
Hart	3,920	4,010	3,908	4,001	3,899	3,988	9	13	12	9	1,501	1,456
Heard	3,121	3,094	3,117	3,094	3,116	3,093	1	1	4	.....	1,635	1,707
Henry	4,301	4,328	4,293	4,328	4,272	4,310	21	18	8	.....	3,766	3,825
Houston	2,590	2,682	2,574	2,673	2,554	2,650	20	23	16	9	8,134	8,207
Irwin	2,196	2,045	2,191	2,045	2,178	2,031	13	14	5	.....	1,206	869
Jackson	6,882	6,898	6,876	6,898	6,860	6,883	16	15	6	.....	2,714	2,682
Jasper	2,708	2,684	2,704	2,681	2,694	2,674	10	7	4	3	4,323	4,164
Jefferson	3,235	3,215	3,227	3,210	3,207	3,198	20	12	8	5	5,375	5,388
Johnson	2,377	2,296	2,372	2,296	2,361	2,287	11	9	5	.....	776	680
Jones	1,990	1,941	1,985	1,940	1,977	1,935	8	5	5	1	4,397	4,381
Laurens	3,840	3,814	3,835	3,814	3,822	3,808	13	6	5	.....	3,170	2,923
Lee	754	678	750	676	738	666	12	10	4	2	3,804	3,838
Liberty	2,185	2,022	2,172	2,009	2,145	1,980	27	29	13	13	4,510	4,170
Lincoln	1,286	1,187	1,282	1,185	1,274	1,179	8	6	4	2	1,812	1,861
Lowndes	3,595	3,533	3,575	3,519	3,544	3,478	31	41	20	14	4,104	3,870
Lumpkin	3,179	3,274	3,170	3,273	3,151	3,254	19	19	9	1	213	201
McDuffie	1,628	1,639	1,616	1,634	1,606	1,623	10	11	12	5	2,733	2,789
McIntosh	660	598	596	567	527	513	69	54	64	31	2,621	2,591
Macon	1,971	2,030	1,956	2,025	1,933	2,011	23	14	15	5	4,478	4,704
Madison	3,737	3,624	3,735	3,624	3,729	3,617	6	7	2	.....	1,894	1,769
Marion	1,725	1,742	1,723	1,742	1,723	1,742	.....	.....	2	.....	2,123	2,138
Meriwether	4,498	4,703	4,481	4,701	4,468	4,688	13	13	17	2	5,784	5,755
Miller	1,368	1,333	1,367	1,333	1,367	1,333	.....	.....	1	.....	766	808
Milton	2,794	2,742	2,791	2,742	2,784	2,736	7	6	3	.....	334	338
Mitchell	2,373	2,427	2,367	2,426	2,358	2,419	9	7	6	1	2,998	3,108
Monroe	3,298	3,323	3,293	3,322	3,280	3,310	13	12	5	1	6,333	6,183
Montgomery	2,938	2,652	2,929	2,651	2,901	2,628	28	23	9	1	2,151	1,507
Morgan	2,565	2,478	2,551	2,474	2,519	2,455	32	19	14	4	5,446	5,552
Murray	3,979	3,998	3,972	3,995	3,951	3,975	21	20	7	3	238	246
Muscogee	5,836	6,559	5,646	6,427	5,328	6,060	318	367	190	132	6,949	8,417
Newton	3,654	3,492	3,640	3,491	3,625	3,479	15	12	14	1	3,552	3,612
Oconee	1,911	1,970	1,911	1,970	1,898	1,963	13	7	.....	.....	1,956	1,876
Oglethorpe	2,898	2,788	2,884	2,782	2,861	2,757	23	25	14	6	5,827	5,438
Paulding	5,199	5,244	5,197	5,240	5,178	5,230	19	10	2	4	784	721
Pickens	3,757	4,075	3,747	4,074	3,718	3,950	29	124	10	1	175	175
Pierce	2,238	2,158	2,221	2,155	2,200	2,144	21	11	17	3	1,196	787
Pike	4,068	4,155	4,057	4,153	4,041	4,139	16	14	11	2	4,098	3,979
Polk	5,112	5,177	5,078	5,164	5,049	5,125	29	39	34	13	2,510	2,146

STATES AND COUNTIES.	AGGREGATE WHITE.		NATIVE WHITE.						FOREIGN WHITE.		TOTAL COLORED.	
			Total.		Native parents.		Foreign parents.					
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Georgia—Continued.												
Pulaski	3,317	3,241	3,297	3,229	3,258	3,192	39	37	20	12	5,058	4,943
Putnam	1,968	1,971	1,958	1,970	1,942	1,945	16	25	10	1	5,435	5,468
Quitman	676	745	674	744	667	742	7	2	2	1	1,475	1,575
Rabun	2,768	2,672	2,762	2,670	2,745	2,647	17	23	6	2	82	84
Randolph	2,796	2,998	2,777	2,994	2,752	2,972	25	22	19	4	4,650	4,823
Richmond	10,616	11,730	9,897	11,156	8,868	10,014	1,029	1,142	719	574	10,562	12,346
Rockdale	2,018	2,109	2,009	2,107	1,994	2,093	15	14	9	2	1,364	1,322
Schley	1,147	1,091	1,146	1,091	1,144	1,089	2	2	1	.....	1,574	1,631
Screven	3,529	3,387	3,509	3,379	3,473	3,346	36	33	20	8	3,817	3,691
Spalding	2,838	2,997	2,809	2,985	2,776	2,953	33	32	29	12	3,491	3,791
Stewart	2,141	2,057	2,137	2,056	2,120	2,040	17	16	4	1	5,707	5,777
Sumter	3,576	3,432	3,529	3,417	3,486	3,377	43	40	47	15	7,424	7,675
Talbot	1,962	2,057	1,961	2,057	1,951	2,052	10	5	1	.....	4,561	4,675
Taliaferro	1,271	1,193	1,261	1,189	1,254	1,171	7	18	10	4	2,408	2,419
Tattnall	3,740	3,398	3,731	3,398	3,712	3,389	19	9	9	.....	1,820	1,295
Taylor	2,271	2,327	2,270	2,325	2,265	2,320	5	5	1	2	2,005	2,063
Telfair	1,632	1,510	1,624	1,510	1,611	1,500	13	10	8	.....	1,295	1,040
Terrell	2,698	2,636	2,684	2,631	2,659	2,618	25	13	14	5	4,560	4,669
Thomas	5,532	5,590	5,466	5,552	5,371	5,452	95	100	66	38	7,203	7,829
Towns	2,057	1,933	2,057	1,933	2,053	1,929	4	4	.....	.....	44	30
Troup	3,496	3,566	3,473	3,559	3,445	3,520	28	39	23	7	6,633	7,028
Twiggs	1,382	1,366	1,380	1,364	1,374	1,362	6	2	2	2	2,802	2,645
Union	3,696	3,888	3,689	3,887	3,683	3,878	6	9	7	1	71	94
Upson	3,023	3,042	3,005	3,039	2,989	3,028	16	11	18	3	3,115	3,008
Walker	5,895	5,455	5,856	5,444	5,782	5,402	74	42	39	11	1,151	781
Walton	5,082	5,230	5,076	5,227	5,064	5,218	12	9	6	3	3,622	3,533
Ware	2,797	2,381	2,758	2,366	2,717	2,348	41	18	39	15	2,129	1,494
Warren	2,053	2,148	2,045	2,145	2,033	2,143	12	2	8	3	3,408	3,348
Washington	5,242	5,070	5,221	5,064	5,173	5,043	48	21	21	6	7,329	7,596
Wayne	2,720	2,570	2,704	2,569	2,692	2,562	12	7	16	1	1,345	850
Webster	1,176	1,247	1,176	1,246	1,171	1,244	5	2	.....	1	1,612	1,660
White	2,731	2,758	2,717	2,750	2,700	2,739	17	11	14	8	313	349
Whitfield	5,373	5,611	5,310	5,575	5,238	5,508	72	67	63	36	962	970
Wilcox	2,628	2,197	2,622	2,195	2,607	2,186	15	9	6	2	2,032	1,123
Wilkes	2,814	2,802	2,791	2,784	2,750	2,703	41	81	23	18	6,197	6,268
Wilkinson	2,734	2,833	2,725	2,830	2,718	2,820	7	10	9	3	2,567	2,647
Worth	2,967	2,905	2,964	2,903	2,946	2,891	18	12	3	2	2,327	1,849
Florida	117,766	107,183	106,865	99,906	98,846	92,152	8,019	7,754	10,901	7,277	84,181	82,292
Alachua	4,948	4,725	4,773	4,609	4,559	4,421	214	188	175	116	6,657	6,604
Baker	1,312	1,276	1,302	1,268	1,292	1,248	10	20	10	8	384	361
Bradford	3,031	2,930	2,984	2,885	2,912	2,837	72	48	47	45	823	732
Brevard	1,583	1,253	1,393	1,162	1,305	1,069	88	93	190	91	351	214
Calhoun	512	620	501	614	489	602	12	12	11	6	207	252
Citrus	1,151	939	1,141	937	1,129	929	12	8	10	2	180	124
Clay	1,873	1,759	1,754	1,692	1,655	1,621	99	71	119	67	856	666
Columbia	3,385	3,008	3,362	2,992	3,328	2,958	34	34	23	16	3,383	3,101
Dade	386	254	293	216	184	140	109	76	93	38	142	79
De Soto	2,622	2,183	2,558	2,162	2,532	2,117	26	45	64	21	109	30
Duval	6,089	5,881	5,360	5,381	4,739	4,727	621	654	729	500	7,189	7,641
Escambia	5,904	5,571	5,123	5,245	4,216	4,275	907	970	781	326	4,340	4,373
Franklin	1,047	903	938	856	774	678	164	178	109	47	731	627
Gadsden	2,201	2,245	2,112	2,187	2,053	2,131	59	56	89	58	3,578	3,870
Hamilton	2,786	2,551	2,783	2,549	2,764	2,535	19	14	3	2	1,630	1,540
Hernando	858	726	837	711	817	696	20	15	21	15	442	450
Hillsboro	6,502	5,494	5,273	4,846	4,642	4,239	631	607	1,229	648	1,645	1,300
Holmes	2,101	2,051	2,088	2,047	2,064	2,026	24	21	13	4	94	90
Jackson	3,241	3,091	3,233	3,085	3,204	3,060	29	25	8	6	5,510	5,702
Jefferson	1,791	1,767	1,742	1,740	1,659	1,668	83	72	49	27	5,922	6,277

STATES AND COUNTIES.	AGGREGATE WHITE.		NATIVE WHITE.						FOREIGN WHITE.		TOTAL COLORED.	
			Total.		Native parents.		Foreign parents.					
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Florida—Continued.												
Lafayette	1,816	1,631	1,814	1,631	1,810	1,630	4	1	2	.....	138	101
Lake	3,334	2,856	3,031	2,683	2,850	2,527	181	156	303	173	1,008	836
Lee	741	593	652	567	586	508	66	59	89	26	49	31
Leon	1,525	1,596	1,452	1,551	1,370	1,488	82	63	73	45	6,936	7,695
Levy	2,352	2,105	2,276	2,082	2,199	2,020	77	62	76	23	1,106	1,023
Liberty	431	387	430	387	424	386	6	1	1	.....	316	318
Madison	2,763	2,793	2,751	2,793	2,731	2,768	20	25	12	.....	4,374	4,386
Manatee	1,458	1,256	1,400	1,206	1,323	1,134	77	72	58	50	109	72
Marion	5,013	4,297	4,648	4,092	4,404	3,901	244	191	365	205	5,848	5,638
Monroe	6,767	6,048	2,875	2,750	719	603	2,156	2,147	3,892	3,298	2,966	3,005
Nassau	2,102	1,849	1,999	1,793	1,886	1,700	113	93	103	56	2,262	2,081
Orange	4,871	4,168	4,241	3,767	3,876	3,405	365	362	630	401	1,922	1,623
Osceola	1,418	1,239	1,323	1,204	1,284	1,162	39	42	95	35	306	170
Pasco	2,080	1,792	1,957	1,714	1,780	1,573	177	141	123	78	274	103
Polk	3,806	3,315	3,624	3,228	3,507	3,130	117	98	182	87	458	326
Putnam	3,410	2,994	3,109	2,781	2,850	2,544	259	237	301	213	2,528	2,254
St. John	2,841	2,667	2,580	2,470	2,347	2,253	233	217	261	197	1,663	1,541
Santa Rosa	2,956	2,812	2,843	2,778	2,755	2,661	88	117	113	34	1,124	1,069
Sumter	2,084	1,780	2,036	1,753	1,978	1,718	58	35	48	27	833	666
Suwannee	2,868	2,713	2,854	2,707	2,820	2,663	34	44	14	6	2,557	2,386
Taylor	1,035	936	1,035	936	1,034	934	1	2	.....	.....	77	74
Volusia	3,141	2,863	2,841	2,624	2,560	2,370	281	254	300	239	1,337	1,126
Wakulla	887	851	877	849	865	839	12	10	10	2	684	695
Walton	2,057	2,015	2,036	2,003	1,975	1,919	61	84	21	12	370	374
Washington	2,687	2,400	2,631	2,373	2,596	2,339	35	34	56	27	673	666

For all places having 8,000 inhabitants or more in 1890, results similar to those given for counties are also presented. The first table, showing color, sex, and general nativity, is as follows:

STATES AND CITIES.	Total population.	SEX.		NATIVE AND FOREIGN BORN.		Aggregate white.	NATIVE WHITE.			Foreign white.	Total colored.
		Male.	Female.	Native.	Foreign.		Total.	Native parents.	Foreign parents.		
North Carolina:											
Asheville	10,235	5,111	5,124	10,016	219	6,668	6,449	6,252	197	219	3,567
Charlotte	11,557	5,388	6,169	11,371	186	6,417	6,237	5,826	411	180	5,140
Raleigh	12,678	6,507	6,171	12,573	105	6,327	6,224	6,030	194	103	6,351
Wilmington	20,056	9,287	10,769	19,544	512	8,731	8,224	7,448	776	507	11,325
Winston	8,018	4,168	3,850	7,979	39	3,331	3,294	3,255	39	37	4,687
South Carolina:											
Charleston	54,955	25,605	29,350	51,822	3,133	23,919	20,821	16,163	4,658	3,098	31,036
Columbia	15,353	7,603	7,750	15,022	331	6,563	6,243	5,653	590	320	8,790
Greenville	8,607	3,964	4,643	8,464	143	4,526	4,383	4,168	215	143	4,081
Georgia:											
Athens	8,639	3,964	4,675	8,504	135	4,505	4,372	4,195	177	133	4,134
Atlanta	65,533	31,351	34,182	63,662	1,871	37,416	35,569	32,669	2,900	1,847	28,117
Augusta	33,300	15,315	17,985	32,092	1,208	17,395	16,216	14,276	1,940	1,179	15,905
Brunswick	8,459	4,342	4,117	7,987	472	4,527	4,076	3,490	586	451	3,932
Columbus	17,303	7,880	9,423	17,003	300	9,276	8,977	8,341	636	299	8,027
Macon	22,746	11,126	11,620	22,147	599	11,538	10,944	10,131	813	594	11,208
Savannah	43,189	20,729	22,460	39,781	3,408	20,211	16,880	11,767	5,113	3,331	22,978
Florida:											
Jacksonville	17,201	8,403	8,798	16,137	1,064	7,372	6,444	5,487	957	928	9,829
Key West	18,080	9,265	8,815	7,339	10,741	12,390	5,348	1,224	4,124	7,042	5,690
Pensacola	11,750	5,865	5,885	10,802	948	6,001	5,138	3,747	1,391	863	5,749

The second table, for places of 8,000 inhabitants or more in 1890, showing sex for the details of white and colored, is as follows:

STATES AND CITIES.	AGGREGATE WHITE.		NATIVE WHITE.						FOREIGN WHITE.		TOTAL COLORED.	
			Total.		Native parents.		Foreign parents.					
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
North Carolina:												
Asheville	3,413	3,255	3,282	3,167	3,183	3,069	99	98	131	88	1,698	1,869
Charlotte	3,108	3,309	2,993	3,244	2,804	3,022	189	222	115	65	2,280	2,860
Raleigh	3,111	3,216	3,039	3,185	2,947	3,083	92	102	72	31	3,396	2,955
Wilmington	4,217	4,514	3,920	4,304	3,533	3,915	387	389	297	210	5,070	6,255
Winston	1,728	1,603	1,699	1,595	1,680	1,575	19	20	29	8	2,440	2,247
South Carolina:												
Charleston	11,418	12,501	9,763	11,058	7,566	8,597	2,197	2,461	1,655	1,443	14,187	16,849
Columbia	3,237	3,326	3,045	3,198	2,750	2,903	295	295	192	128	4,366	4,424
Greenville	2,163	2,363	2,074	2,309	1,977	2,191	97	118	89	54	1,801	2,280
Georgia:												
Athens	2,125	2,380	2,052	2,320	1,965	2,230	87	90	73	60	1,839	2,295
Atlanta	18,951	18,465	17,836	17,733	16,367	16,302	1,469	1,431	1,115	732	12,400	15,717
Augusta	8,207	9,188	7,564	8,652	6,650	7,626	914	1,026	643	536	7,108	8,797
Brunswick	2,437	2,090	2,113	1,963	1,797	1,693	316	270	324	127	1,905	2,027
Columbus	4,354	4,922	4,175	4,802	3,882	4,459	293	343	179	120	3,526	4,501
Macon	6,131	5,407	5,763	5,181	5,394	4,737	369	444	368	226	4,995	6,213
Savannah	10,236	9,975	8,366	8,514	5,877	5,890	2,489	2,624	1,870	1,461	10,493	12,485
Florida:												
Jacksonville	3,741	3,631	3,187	3,257	2,740	2,747	447	510	554	374	4,662	5,167
Key West	6,526	5,864	2,727	2,621	671	553	2,056	2,068	3,799	3,243	2,739	2,951
Pensacola	3,055	2,946	2,458	2,680	1,794	1,953	664	727	597	266	2,810	2,939

The following table gives for each of the cities and towns considered the percentage of native and foreign population for 1890 and 1880, the per cent of native and foreign born for each state as a whole being also reproduced for purposes of comparison:

STATES AND CITIES.	1890		1880	
	Native born.	Foreign born.	Native born.	Foreign born.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
North Carolina	99.77	0.23	99.73	0.27
Asheville	97.86	2.14	.....	.....
Charlotte	98.39	1.61	97.28	2.72
Raleigh	99.17	0.83	98.20	1.80
Wilmington	97.45	2.55	96.96	3.04
Winston	99.51	0.49	.....	.....
South Carolina	99.46	0.54	99.23	0.77
Charleston	94.30	5.70	92.10	7.90
Columbia	97.84	2.16	96.63	3.37
Greenville	98.34	1.66	97.84	2.16
Georgia	99.34	0.66	99.31	0.69
Athens	98.44	1.56	97.77	2.23
Atlanta	97.14	2.86	96.21	3.79
Augusta	96.37	3.63	94.53	5.47
Brunswick	94.42	5.58	.....	.....
Columbus	98.27	1.73	97.10	2.90
Macon	97.37	2.63	96.19	3.81
Savannah	92.11	7.89	90.25	9.75
Florida	94.14	5.86	96.32	3.68
Jacksonville	93.81	6.19	90.46	9.54
Key West	40.59	59.41	45.99	54.01
Pensacola	91.93	8.07	92.10	7.90

Key West, Florida, is the only city in which the foreign born element is any considerable part of the population. In Key West in 1890 the foreign born population was 59.41 per cent of the total population as against 54.01 per cent in 1880. In the other places mentioned, while the percentage of foreign born of the total population is greater than in the states as a whole, yet the percentage is small.

The following table shows for all places of 8,000 inhabitants or more the percentage of white and colored as returned under the censuses of 1890 and 1880, the percentage of these states as a whole being also reproduced for purposes of comparison:

STATES AND CITIES.	1890		1880	
	White.	Colored.	White.	Colored.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
North Carolina	65.23	34.77	61.96	38.04
Asheville	65.15	34.85	.....	.....
Charlotte	55.52	44.48	52.93	47.07
Raleigh	49.91	50.09	53.01	46.99
Wilmington	43.53	56.47	39.70	60.30
Winston	41.54	58.46	.....	.....
South Carolina	40.13	59.87	39.28	60.72
Charleston	43.52	56.48	45.41	54.59
Columbia	42.75	57.25	43.22	56.78
Greenville	52.59	47.41	54.69	45.31
Georgia	53.25	46.75	52.97	47.03
Athens	52.15	47.85	49.47	50.53
Atlanta	57.09	42.91	56.35	43.65
Augusta	52.24	47.76	53.77	46.23
Brunswick	53.52	46.48	.....	.....
Columbus	53.61	46.39	55.78	44.22
Macon	50.73	49.27	48.35	51.65
Savannah	46.80	53.20	48.98	51.02
Florida	57.47	42.53	52.92	47.08
Jacksonville	42.86	57.14	52.17	47.83
Key West	68.53	31.47	68.21	31.79
Pensacola	51.07	48.93	51.92	48.08

While in each of the states mentioned the percentage of colored of the total population is less as returned under the present census than it was in 1880, yet most of the cities mentioned in the foregoing table show an increase in the percentage of colored of the total population. The percentages for 1890 vary from 31.47 per cent in Key West, Florida, to 58.46 per cent in Winston, North Carolina. Raleigh, Wilmington, and Winston, North Carolina; Charleston and Columbia, South Carolina; Savannah, Georgia, and Jacksonville, Florida, show a percentage greater than 50 per cent of the colored of the total population.

In the published reports of previous censuses the term "school age" has been applied only to persons from 5 to 17 years of age, both inclusive, although in the different states and territories the significance of the term varies considerably. In the present census results are given for persons from 5 to 17 years, and from 18 to 20 years, together with a total for persons from 5 to 20 years, both years in each case being inclusive.

The whole number of persons from 5 to 20 years, inclusive, classified by sex, native and foreign born, native white of native and foreign parents, foreign white, and colored, is presented for each of the states under consideration in the following table:

STATES, AGE, AND SEX.	All classes.	Native born.	Foreign born.	Aggregate white.	NATIVE WHITE.			Foreign white.	Total colored.
					Total.	Native parents.	Foreign parents.		
North Carolina:									
5 to 17 years	572,004	571,709	295	357,593	357,303	355,043	2,260	290	214,411
Males	289,064	288,903	161	181,343	181,185	180,030	1,155	158	107,721
Females	282,940	282,806	134	176,250	176,118	175,013	1,105	132	106,690
18 to 20 years	101,401	101,245	156	63,304	63,149	62,693	456	155	38,097
Males	48,449	48,359	90	31,127	31,037	30,792	245	90	17,322
Females	52,952	52,886	66	32,177	32,112	31,901	211	65	20,775
Total 5 to 20 years	673,405	672,954	451	420,897	420,452	417,736	2,716	445	252,508
Males	337,513	337,262	251	212,470	212,222	210,822	1,400	248	125,043
Females	335,892	335,692	200	208,427	208,230	206,914	1,316	197	127,465
South Carolina:									
5 to 17 years	427,499	427,214	285	159,629	159,353	155,986	3,367	276	267,870
Males	215,799	215,646	153	81,313	81,166	79,485	1,681	147	134,486
Females	211,700	211,568	132	78,316	78,187	76,501	1,686	129	133,384
18 to 20 years	73,894	73,694	200	28,515	28,322	27,498	824	193	45,379
Males	34,268	34,153	115	13,690	13,579	13,217	362	111	20,578
Females	39,626	39,541	85	14,825	14,743	14,281	462	82	24,801
Total 5 to 20 years	501,393	500,908	485	188,144	187,675	183,484	4,191	469	313,249
Males	250,067	249,799	268	95,003	94,745	92,702	2,043	258	155,064
Females	251,326	251,109	217	93,141	92,930	90,782	2,148	211	158,185
Georgia:									
5 to 17 years	652,342	651,579	763	336,525	335,771	329,471	6,300	754	315,817
Males	329,899	329,491	408	170,367	169,966	166,839	3,127	401	159,532
Females	322,443	322,088	355	166,158	165,805	162,632	3,173	353	156,285
18 to 20 years	118,685	118,306	379	59,950	59,579	58,047	1,532	371	58,735
Males	55,889	55,673	216	28,676	28,466	27,760	706	210	27,213
Females	62,796	62,633	163	31,274	31,113	30,287	826	161	31,522
Total 5 to 20 years	771,027	769,885	1,142	396,475	395,350	387,518	7,832	1,125	374,552
Males	385,788	385,164	624	199,043	198,432	194,599	3,833	611	186,745
Females	385,239	384,721	518	197,432	196,918	192,919	3,999	514	187,807
Florida:									
5 to 17 years	130,050	126,686	3,364	72,550	70,042	64,208	5,834	2,508	57,500
Males	65,251	63,510	1,741	37,192	35,864	32,971	2,893	1,328	28,059
Females	64,799	63,176	1,623	35,358	34,178	31,237	2,941	1,180	29,441
18 to 20 years	25,626	24,236	1,390	13,417	12,435	11,441	994	982	12,209
Males	12,744	12,027	717	6,596	6,060	5,584	476	536	6,148
Females	12,882	12,209	673	6,821	6,375	5,857	518	446	6,061
Total 5 to 20 years	155,676	150,922	4,754	85,967	82,477	75,649	6,828	3,490	69,709
Males	77,995	75,537	2,458	43,788	41,924	38,555	3,369	1,864	34,207
Females	77,681	75,385	2,296	42,179	40,553	37,094	3,459	1,626	35,502

Of the total number of persons from 5 to 17 years, inclusive, in 1890, in the 4 states presented in this bulletin, only 4,707, or 0.26 per cent, are foreign born; of the number returned as being from 18 to 20 years, only 2,125, or 0.66 per cent, are foreign born, and of the whole number of persons from 5 to 20 years, inclusive, 6,832, or 0.33 per cent, are foreign born.

The following table shows for the 4 states as a whole and for each state the number of persons from 5 to 17 years, from 18 to 20 years, and from 5 to 20 years, both years in each case being inclusive, returned at the censuses of 1880 and 1890, with the increase in number and per cent during the decade:

STATES.	5 TO 17 YEARS, INCLUSIVE.				18 TO 20 YEARS, INCLUSIVE.				5 TO 20 YEARS, INCLUSIVE.			
	1890	1880	Increase.		1890	1880	Increase.		1890	1880	Increase.	
			Number.	Per cent.			Number.	Per cent.			Number.	Per cent.
Total for 4 states...	1,781,895	1,382,787	399,108	28.86	319,606	280,719	38,887	13.85	2,101,501	1,663,506	437,995	26.33
North Carolina.....	572,004	452,164	119,840	26.50	101,401	93,738	7,663	8.17	673,405	545,902	127,503	23.36
South Carolina.....	427,499	330,623	96,876	29.30	73,894	64,756	9,138	14.11	501,393	395,379	106,014	26.81
Georgia	652,342	511,555	140,787	27.52	118,685	104,635	14,050	13.43	771,027	616,190	154,837	25.13
Florida.....	130,050	88,445	41,605	47.04	25,626	17,590	8,036	45.67	155,676	106,035	49,641	46.82

The whole number of persons from 5 to 17 years, inclusive, in 1890 for the 4 states as a whole is 1,781,895 as against 1,382,787 returned in 1880, an increase of 399,108, or 28.86 per cent, during the decade. The total number of persons from 18 to 20 years of age returned in 1890 was 319,606, an increase over the number returned in 1880, or 280,719, of 38,887, or 13.85 per cent. This makes a combined increase in the number of persons of the ages 5 to 20 years, inclusive, of 437,995, or 26.33 per cent, during the decade for the 4 states.

Florida shows the largest increase in the number of persons of these ages, namely, an increase of 46.82 per cent during the decade. South Carolina shows an increase of 26.81 per cent, Georgia 25.13 per cent, and North Carolina 23.36 per cent, in the number of persons from 5 to 20 years of age during the decade.

The number of males returned as being of the ages 18 to 44 years, inclusive, which is the militia age, and the number of males of 21 years of age and over, or of voting age, classified by native and foreign born, native white of native and foreign parents, foreign white, and colored, are presented for each state considered as follows:

STATES, AGE, AND SEX.	All classes.	Native born.	Foreign born.	Aggregate white.	NATIVE WHITE.			Foreign white.	Total colored.
					Total.	Native parents.	Foreign parents.		
MILITIA AGES, MALES 18 TO 44 YEARS, INCLUSIVE.									
North Carolina	273,834	272,786	1,048	188,104	187,070	185,793	1,277	1,034	85,730
South Carolina.....	196,059	194,444	1,615	85,088	83,521	81,154	2,367	1,567	110,971
Georgia.....	336,295	332,267	4,028	183,684	179,798	175,401	4,397	3,886	152,611
Florida.....	79,604	71,850	7,754	46,643	40,461	37,655	2,806	6,182	32,961
VOTING AGE, MALES 21 YEARS AND OVER.									
North Carolina.....	342,653	340,572	2,081	233,307	231,250	229,388	1,862	2,057	109,346
South Carolina.....	235,606	232,200	3,406	102,657	99,334	96,587	2,747	3,323	132,949
Georgia.....	398,122	391,168	6,954	219,094	212,325	207,488	4,837	6,769	179,028
Florida.....	96,213	85,561	10,652	58,068	49,198	46,044	3,154	8,870	38,145

The following table shows the number of males returned as being of militia age in each state in 1890 and in 1880, together with the number and per cent of increase during the decade:

STATES.	MILITIA AGES, MALES 18 TO 44 YEARS, INCLUSIVE.			
	1890	1880	Increase.	
			Number.	Per cent.
Total for 4 states	885,792	739,684	146,108	19.75
North Carolina	273,834	241,140	32,694	13.56
South Carolina	196,059	170,922	25,137	14.71
Georgia	336,295	275,815	60,480	21.93
Florida	79,604	51,807	27,797	53.65

The following table gives for each state the whole number of males of voting age in 1890 and in 1880, together with the number and per cent of increase since 1880:

STATES.	VOTING AGES, MALES 21 YEARS AND OVER.			
	1890	1880	Increase.	
			Number.	Per cent.
Total for 4 states	1,072,594	883,676	188,918	21.38
North Carolina	342,653	294,750	47,903	16.25
South Carolina	235,606	205,789	29,817	14.49
Georgia	398,122	321,438	76,684	23.86
Florida	96,213	61,699	34,514	55.94

Classifying males of voting age in 1890 according to white and colored, the following results, expressed in percentages, are obtained, the total number of males 21 years of age and over representing 100 per cent:

STATES.	MALES OF VOTING AGE.	
	White.	Colored.
	Per cent.	*Per cent.*
Total for 4 states	57.16	42.84
North Carolina	68.09	31.91
South Carolina	43.57	56.43
Georgia	55.03	44.97
Florida	60.35	39.65

For the 4 states as a whole, 57.16 per cent of the males of voting age are white and 42.84 per cent are colored. In North Carolina 31.91 per cent of the males of voting age are colored, in South Carolina 56.43 per cent, in Georgia 44.97 per cent, and in Florida 39.65 per cent.

[7-010]

CENSUS BULLETIN.

No. 198. WASHINGTON, D. C. July 7, 1892.

AGRICULTURE.—IRRIGATION IN WASHINGTON.

DEPARTMENT OF THE INTERIOR,
CENSUS OFFICE,
WASHINGTON, D. C., June 16, 1892.

This bulletin, the tenth of the series devoted to irrigation in the arid states and territories, has been prepared by Mr. F. H. NEWELL, special agent of the Census Office for the collection of statistics of irrigation, under the direction of Mr. JOHN HYDE, special agent in charge of the statistics of all branches of agriculture, and relates to the state of Washington, in which there are 1,046 farms that are irrigated out of a total of 11,237 farms in the 13 counties in which irrigation is practiced. The total area of land upon which crops were raised by irrigation in the census year ending May 31, 1890, was 48,799 acres. The average size of the irrigated farms or, more strictly, of irrigated portions of farms on which crops were raised is 47 acres. The average first cost of water right is $4.03 per acre, and the average cost of preparing the soil for cultivation, including the purchase price of the land, is $10.27 per acre. The average present value of the irrigated land of the state, including buildings, etc., is reported as $50.00 per acre, showing an apparent profit of $34.45 per acre, less cost of buildings. The average annual cost of water is $1.75 per acre, which, deducted from the average annual value of products per acre, leaves an average annual return of $16.35 per acre.

The tendency throughout the entire arid region to describe as irrigated all land to which water has been applied within any recent period by artificial means, land to which ditches, perhaps so far destitute of water, have been constructed, and even land for which water rights merely are claimed, has placed the Census Office under the necessity of absolutely restricting itself in its official bulletins on irrigation to land on which crops were actually raised by the artificial application of water during the year 1889.

Robert P. Porter.
Superintendent of Census.

C. O. P.—10m

IRRIGATION IN WASHINGTON.

BY F. H. NEWELL.

In Washington crops were raised by irrigation in the census year ending May 31, 1890, on 48,799 acres, or 76.25 square miles, about eleven-hundredths of 1 per cent of the entire land surface of the state. The enumerators' schedules indicate that a little over one-half of this crop area was devoted to the raising of various kinds of forage. The irrigated areas were confined to 13 counties out of 34, the 13 comprising nearly one-half of the area of the state. The aggregate number of farms in these 13 counties on June 1, 1890, was 11,237, very nearly two-thirds of the whole number in the state. Of these farms 1,046, or nearly one-tenth, contained irrigated areas. The total crop area irrigated on the 1,046 farms was only 17 per cent of the total area of lands owned by the irrigators.

The average size of irrigated farms, or rather of irrigated portions of farms on which crops were raised, was 47 acres. The following classification according to size has been made of these irrigated areas: 5 of 640 acres or upward, 11 of from 320 to 639 acres, inclusive, and 36 of from 160 to 319 acres, inclusive. These 52 irrigated crop areas contained an average of about 324 acres each, and had a total area of 16,856 acres, a little over one-third of the entire area watered. The remaining 994 crop areas, comprising over 65 per cent of the total crop area, averaged about 32 acres each.

COUNTIES.	Number of irrigators in 1889.	Total irrigated acreage in crop in 1889.	Average size of irrigated farms in acres in 1889. (a)	Average value of products per acre in 1889.
Total	1,046	48,799	47	$17.09
Asotin	32	320	10	37.50
Columbia	15	139	9	36.80
Douglas	34	1,016	30	25.60
Franklin	3	44	15	8.50
Garfield	24	229	10	15.80
Kittitas	350	25,212	72	16.60
Klickitat	71	1,702	24	20.25
Lincoln	12	238	20	20.80
Spokane	3	80	27	.....
Stevens	66	1,350	20	18.30
Wallawalla	121	2,809	23	36.90
Whitman	22	531	24	20.70
Yakima	293	15,129	52	17.30

a Crop areas only.

The results shown in the above table were obtained by compilation of the enumerators' returns of the area of crops and value of products for each irrigator in the state. The average value of products per acre was obtained by dividing the total value of products sold, consumed, or on hand in 1889 by the irrigated crop acreage.

The average first cost of constructing irrigating ditches and bringing water to the land is estimated from the statements of farmers to have been $4.03 per acre, the amount ranging from $1.00 to $5.00 or more per acre. The average selling value placed by the irrigators upon their water rights is $13.15 per acre. This is the price which the water rights, if transferable without the land, might be expected to bring per acre.

The average annual expense of maintaining the ditches is estimated by the farmers at 75 cents per acre, the averages for the different counties ranging from 25 cents to $2.00 per acre. These repairs are usually of a very simple character, consisting merely in the cleaning out of the ditch at points

where sediment has been deposited, and in repairing breaks in the ditches, which have, for the most part, been hastily and cheaply constructed.

The cost of preparing the ground for cultivation, excluding the cost of bringing the water to the land but including such items as clearing the land, where necessary, of trees and brush, and also plowing and fencing, was $10.27 per acre. Adding to this amount the cost of bringing water to the land, $4.03 per acre, and the original cost of the land at the government price of $1.25 per acre, the total cost of the cultivated land to the irrigator was $15.55 per acre. In comparison with this, the estimated average value of the land upon which crops were raised by irrigation is placed at $50.00 per acre, showing an apparent profit of $34.45 per acre, less cost of buildings.

Deducting the average annual expense for water, 75 cents per acre, from the average annual value of products, $17.09 per acre, it appears that the average annual return per acre is $16.34.

In the following table the more important of the foregoing statements are compared with the corresponding returns for the neighboring states of Oregon, Idaho, and Montana, the first adjoining Washington on the south, and the second on the east, while Montana is separated from it only by the narrow part of Idaho. These figures accordingly show the general condition of irrigation in the northern part of the arid region.

ITEMS.	Washington.	Oregon.	Idaho.	Montana.
Total irrigated acreage in crop, 1889	48,799	177,944	217,005	350,582
Total number of irrigators, 1889	1,046	3,150	4,323	3,706
Average size of irrigated crop areas, in acres, 1889	47	56	50	95
Average size of irrigated crop areas of 160 acres and upward, in acres.	324	300	270	307
Per cent of acreage of irrigated crop areas of 160 acres and upward to total acreage irrigated.	35	43	26	50
Average size of irrigated crop areas under 160 acres, in acres	32	35	39	56
Average first cost of water per acre cultivated by irrigation	$4.03	$4.64	$4.74	$4.63
Average annual cost of water per acre cultivated by irrigation	$0.75	$0.94	$0.80	$0.95
Average first cost per acre of preparation for cultivation	$10.27	$12.59	$9.31	$8.29
Average value of irrigated land, including buildings, etc., per acre, 1889.	$50.00	$57.00	$46.50	$49.50
Average annual value of products per acre irrigated, 1889	$17.09	$13.00	$12.93	$12.96

Of these 4 states, Washington contains the smallest number of irrigators and the smallest acreage of crop irrigated. The average size of crop areas is somewhat less than in the case of the neighboring states, and the average annual value of products per acre is decidedly greater. This latter fact is due largely to the peculiar relation which the irrigated areas bear to the country as a whole. In many localities irrigation is not absolutely essential, but is practiced in order to raise larger crops and to insure against loss by drought. There is in these cases a tendency to attribute to the irrigated portions of the farms a production disproportionally large, which tendency is far greater than in the states where irrigation is necessary for crops of every kind. The irrigated portions of farms where cereals are grown by dependence upon rainfall are devoted mainly to orchards, gardens, and the raising of alfalfa, of which last-named crop from two to four cuttings are made annually, and thus the value of products per acre is larger than in more arid regions where field crops are irrigated.

In regard to the ownership of irrigated areas in large bodies and by few owners, Washington stands intermediate between Idaho and Oregon, while in the average size of small crop areas, those under 160 acres, it stands at one extreme of the list, these averaging only 32 acres each. This would seem to indicate a higher degree of cultivation by the irrigator, for it may be taken as a general rule that the smaller the crop areas the better are they attended to, and the higher will be the value of the products.

The first cost of water is small, from the fact that such of the ditches as were in use in 1889 have been built in the most favorable localities, that they are short, and are simple in construction, the cost per acre irrigated being far less than in the case of the more comprehensive systems of later date.

The state of Washington, at least in its southern half, is similar to Oregon in climate and topography. As in the latter state, the most conspicuous feature of surface relief is the Cascade

range, which trends in a direction a little east of north across the state and at a distance of from 120 to 150 miles from the ocean. This range divides the state into two great parts, differing in climate and agricultural capabilities. On the western side of the range the annual precipitation is heavy and a dense forest covers the mountains and smaller hills, while east of the mountains the rainfall is much less and vegetation is comparatively scanty.

The great plains of the Columbia form the most striking topographic feature. These extend from the foothills of the Cascade range eastward to the mountains of Idaho, and from the mountainous or broken region below the border of British Columbia southward across the state. The Columbia river coming from the British possessions flows in a direction a little west of south until it has fairly entered the plain or plateau region, where it is diverted sharply toward the west, and with many meanderings flows for some distance in the latter direction, then bends toward the south and southeast, describing roughly a half circle around the greater part of these high plains. Throughout this distance the river has cut for itself a deep gorge, in which it flows from 1,000 to 2,000 feet below the general level.

These plains owe their existence, in part at least, to extensive sheets of lava, which in former times flowed out over portions of southern Idaho, eastern Oregon, and Washington, filling pre-existing valleys and burying the older sedimentary beds. These sheets of basaltic rocks now stretch from the Cascade range, itself a row of recently extinct volcanoes, away to the eastward and southeastward to the limiting mountain ranges which lie to the west of the Rockies. The surface features have, however, to a large extent been modified by deformation and erosion of the rocks, and also by the sedimentation in lakes of comparatively recent geologic time, some of which lakes have been of large area. In many places the basaltic rocks are deeply carved by former drainage channels known as "coulees", having steep, almost vertical, walls of several hundred feet in depth. The bottoms of these coulees, however, are far above the level of the Columbia, to which stream their relation is not as yet evident. Much of the drainage on the surface of the plains is of the lost river type; that is to say, the streams flow into some small lake or swamp from which the water is lost by evaporation, or disappears by percolation or by channels through or between layers of the basaltic rocks.

The water supply of the plains of the Columbia is exceedingly small. In the river itself there is an amount sufficient for all the needs of irrigation should it be possible or desirable to introduce it, but unfortunately the river is hundreds of feet below the level of the arable land and its waters can be taken out only upon a very narrow strip of sandy bottoms. The estimated summer discharge of the river at a point above its junction with the Snake is a little under 60,000 second-feet, carrying at least 12 times as much water as the Missouri river in Montana. Fortunately, however, for the state of Washington, crops can be raised without irrigation nearly every year over a great part of these plains. Wheat is the staple crop, and when planted in the fall and the ground properly cultivated it yields heavily, the rains of winter and spring furnishing sufficient moisture to bring it to maturity. Wherever there is an available water supply, however, the farmers have begun to make use of it for irrigation in a small way, especially for watering such plants as are injured by the long summer droughts. Vegetables, fruit and shade trees, and the hay crops are thus irrigated wherever possible, and, although the farmer can be successful by dependence upon the rainfall, yet it is slowly being recognized that the greatest prosperity can come only by a thorough employment of the available waters of the region.

The greater part of the irrigation of Washington is being done on the eastern edge of the Columbia plains or well within the foothills of the Cascade range, in Kittitas and Yakima counties. Here the rainfall is probably less than it is further to the east on the plains, but, on the other hand, the water supply is large and conveniently located. In short, there is no other portion of Washington which enjoys such facilities for the bringing out of water upon large bodies of fertile land. The rivers have not cut their channels into the late sedimentary deposits to a depth so great as to render it a matter of difficulty to divert water, and, coming from high mountains, they carry during the summer comparatively large amounts of water, thus rendering possible the construction of canals covering hundreds or thousands of acres of fertile land.

Besides the rivers which flow from the eastern slopes of the Cascade range into the Columbia, the other streams important in irrigation are those flowing from the Blue mountains in the northeastern

corner of Oregon, the principal of these forming the Wallawalla river. Northerly from this system of drainage, and on the other side of the Snake, are rivers and creeks flowing from the mountains of Idaho in a general westerly course and uniting in the Palouse or the Spokane river. These waters are comparatively little used, partly on account of the character of the topography, but mainly from the fact that irrigation is not considered essential. The floods in all these rivers occur early in the season, the rivers draining the lower foothills having their maximum discharge in March or April, while those from the more elevated mountains reach their highest point in May or June.

The Columbia river, as shown by the diagram of river heights published in the annual report of the chief of engineers for 1889, page 2551, as a rule increases gradually in discharge through February, March, April, and May, reaching its maximum in June. It then declines rapidly through July, August, September, and October, reaching its minimum in November or December. It is probable that the floods in the main river occur later in the season than those in the smaller tributaries, from which water is taken for irrigation.

The average amount discharged by the Columbia river has not been ascertained, although a few measurements, mainly at low water, have been made. At Vancouver, just above the mouth of the Willamette, the low-water discharge as estimated by Major Thomas H. Hanbury, corps of engineers, was approximately 77,000 second-feet, while at a point above the Snake, as previously stated, the probable summer discharge has been placed at 60,000 second-feet. In comparison with this may be quoted the low-water discharge of the Willamette, 15,000 second-feet, the highest known flood of this latter stream, that of February, 1890, reaching probably 400,000 second-feet.

There are comparatively few stations east of the Cascade range at which the rainfall has been measured for a number of years. At Pleasant Grove and Ellensburg, in Kittitas county, the results of measurements continued a little over 2 years, as shown by the records of the signal office, give an annual precipitation of a trifle less than 10 inches, and at Fort Simcoe, in Yakima county, about 50 miles southerly from Ellensburg, the rainfall for 2 years averaged 10.6 inches. At Kennewick, near the mouth of the Yakima river, the mean rainfall for 3 years was 6.6 inches, and about 25 miles south of this point, at Umatilla, Oregon, the mean rainfall for 5 years was 9.8 inches. Further to the east, at Wallawalla, on the river of the same name, the average rainfall for over 4 years was 16.2 inches, and at the fort south of the city the mean for 15 years was 17.0 inches. The elevation of Wallawalla is given at 930 feet above sea level.

Going easterly from the Columbia river toward the higher mountainous region of Idaho the amount of rainfall increases. For example, at Dayton, in Columbia county, where the elevation is approximately 1,600 feet, the average rainfall as obtained by 6 years' observation was 26.7 inches. At Pomeroy, in Garfield county, where the elevation is 1,900 feet, 2 years' observation of rainfall gave an average of 20.3 inches. At Colfax, in Whitman county, where the elevation is 1,974 feet, the average rainfall for 2 years was 26.1 inches.

This increase of rainfall from the plains region toward the mountains at the east is shown also in the case of the records at Fort Spokane and those at the city of Spokane. In the first instance, that at the fort, which is near the junction of the Spokane and Columbia rivers, at an elevation of 1,600 feet, the average rainfall for 7 years was 12.4 inches, while at Spokane, 50 miles further east, and at an elevation of 1,910 feet, the mean annual rainfall for 9 years was 19.1 inches. Further to the north, at Fort Colville, in Stevens county, the rainfall for 18 years averaged 17.2 inches. In comparison with the precipitation in eastern Washington may be noted that on the coast, where at one point the average has been upward of 110 inches per annum, the maximum being over 130 inches.

The distribution of precipitation by months has been obtained by compiling the records of the signal office relating to the principal rainfall stations of eastern Washington. The greatest amount of rain usually falls in January and the least in August, the amount increasing rapidly through the fall. Taking the mean of all the stations of eastern Washington at which observations have been continued for several years, it appears that in January there fell 16.0 per cent of the total precipitation of the year; in February, 13.0 per cent; in March, 7.4; April, 7.0; May, 7.0; June, 6.3; July, 3.7; August, 2.0; September, 5.0; October, 8.3; November, 9.3, and in December, 15.0 per cent. In December, January, and February 44 per cent of the total annual rainfall fell, while in July, August, and September only 10.7 per cent was precipitated.

Comparing the discharge of the rivers with the precipitation as regards distribution through the year, it is apparent that while the quantity of rain steadily diminishes from January until August, the amount of water available, on the contrary, rapidly increases to May or June, and then falls off, the minimum river flow occurring a month or more after the time of least precipitation, both of these increasing toward winter.

The climate of the state has been discussed in publications prepared under the direction of the chief signal officer, one of these written in 1885 by Lieutenant Frank Green being a report on the interior wheat lands of Oregon and Washington. A second report by General A. W. Greely, on the climate of Oregon and Washington territory, printed in 1889, gives tables and diagrams illustrating the precipitation and temperature. Mention should also be made of the report by Lieutenant Thomas W. Symons of an examination of the upper Columbia river and the territory in its vicinity in September and October, 1881, and published in 1882. Briefly stated, it may be said that the climate of Washington is wonderfully mild, the fluctuations of temperature being within relatively narrow limits. The winters are short and seldom severe except in the Big Bend country. The chief drawbacks are the long dry summer and the prevalence of winds, especially throughout the level country.

From what has already been stated it will be apparent that the relation of irrigation to agriculture in Washington is determined largely by convenience and the question of expense; that is to say, in eastern Washington agriculture is fairly successful in nearly every county without the artificial application of water, but wherever water can be obtained at moderate expense irrigation has been introduced, and the results obtained by this method of agriculture have demonstrated its value. On the other hand, where water can not be obtained the farmers claim that irrigation is unnecessary and seem to be content with the ordinary methods of farming, although it is apparent that many crops can not survive the scanty rainfall of summer combined with the effect of the almost ceaseless winds.

In most counties irrigation is still in the experimental stage, being used to tide over an occasional drought, and even in western Washington flooding of the lands is occasionally resorted to in order to increase the forage crops. For example, in Cowlitz and Skamania counties some of the smaller streams have been dammed in order to create artificial marshes, and even in Chehalis county the yield has been doubled by summer irrigation.

One fact tending to retard the development of irrigation is the low selling value of cereals, together with the high rates of transportation. It obviously will not pay to irrigate lands to raise wheat when the farmers who are producing it in large quantities without irrigation can barely live.

There is a common saying among the inhabitants of eastern Washington that the bunch-grass land, that is, the areas on which the rich, nutritious bunch grass grows, does not require irrigation. Wherever this flourishes wheat can be raised by proper cultivation. The bunch grass, which has the valuable property of self-curing or becoming a natural hay during the droughts of summer, is one of the most valuable of forage plants, and is so highly regarded that its name has become a synonym for anything valuable or prosperous. On the contrary, the lands on which the sagebrush grows, although having a rich soil, are too dry for cultivation without watering, and sagebrush land without water supply conveys ideas of worthlessness and poverty.

The methods of irrigation do not differ materially from those used elsewhere, the general practice being to flood the lands on which hay or cereals are raised, or to conduct the water through small furrows between rows of vegetables, corn, or other plants. Occasionally more systematic measures are used, as, for example, having the ground leveled and provided with low ridges of earth or checks by which the water is retained at a uniform depth over the inclosed area. The size of the space within the checks is regulated by the slope of the land, the more nearly level the larger the space. In one case the checks inclosed upward of 5 acres, and an irrigating stream was used sufficiently large to cover this ground in 2.5 hours. When one area is full, the water, unless the ground is very dry, is drawn off into the next area inclosed by checks, other water being run in at the same time by means of the small lateral ditches.

Adams county is a little east of the center of Washington, comprising a portion of the high plains or prairie partially surrounded by the great bend of the Columbia. No irrigation has been

practiced in this county on account of the difficulty of obtaining water, but it is surrounded by counties in which small areas are watered for the purpose of producing fruit, vegetables, or alfalfa. The soil is rich, and in spite of the summer droughts retains sufficient moisture to enable wheat, rye, oats, and barley to mature. It is reported, however, that corn is not always successful.

The country has been settled but a few years, and the principal occupation is wheat raising. Difficulty is experienced in obtaining sufficient water for domestic purposes, and frequently it must be brought a distance of 4 or 5 miles. Wells are sunk usually to a depth of from 100 to 200 feet, and occasionally without success. It is probable that in future a small amount of irrigation will be introduced by the use of the water of the Palouse river, which flows along the southeastern corner of the county, or by the storing of some of the flood waters of early spring.

ASOTIN COUNTY is in the southeastern corner of Washington, adjoining Wallowa county, Oregon, and separated from Nez Perces county, Idaho, by the Snake river. It comprises a portion of the high plateau country between the Blue mountains and the deep gorges of that stream. The Grand Ronde river enters the southern part and flows easterly into the Snake, and to the north of this are a number of smaller streams flowing from the mountains in the same general direction. All these streams, as well as the Snake river itself, are bordered by precipitous walls, rising in places to a height of several hundred and even a thousand feet.

The surface of the high divides between the streams is usually nearly level, and is covered by a rich soil, which, with an abundant rainfall, produces heavy crops. In 1885 there is reported to have been an unusual amount of precipitation; large crops were raised and settlers flocked in. After that time there was a succession of years during which the rain apparently diminished in quantity; the crops were scanty, so much so that many of the settlers were compelled to seek homes elsewhere. In many localities the population in the census year is alleged to have been one-third less than it was 4 years before, and the production of wheat fell in one instance from 30 bushels per acre to about 12. The principal industry at present is stock raising, the cattle depending almost entirely upon the native bunch grass, which is about the only forage plant adapted to the dry climate.

A little irrigation is practiced on the bottom lands bordering the Snake river and Asotin creek, water being brought to the small level areas by ditches from side streams wherever practicable. Great difficulty is experienced in taking water from the river itself, as the topography is such that ditches can not readily be built. In a few cases pumps have been tried, and 3 pulsometers have been in use. The cost of a pumping plant capable of delivering 300 gallons per minute, or 0.66 of a second-foot, to a height of 60 feet, is reported to be $1,000. The expense of operating this is $6 per day of 10 hours, this representing the cost of wood for fuel and the wages of one man. At the rate given a pump would deliver nearly one-half acre-foot of water per day, and thus an acre-foot would cost over $12. The water must evidently be used with very great care, and a high duty obtained in order to make this profitable.

Another method of raising water to the top of the steep banks along the Snake is by means of waterwheels driven by the current. These are usually modifications of the ancient Egyptian noria, an undershot waterwheel carrying buckets upon its rim. A new device lately introduced consists of a wheel mounted upon a boat or raft securely fastened to the bank. This carries a tower 60 feet in height, to the top of which extends an endless belt carrying elevator scoops. The current drives the waterwheel, and this in turn causes the scoops to carry water to the top of the tower, where it is discharged into a pipe leading down the tower, out to the shore, and up the bank nearly to the level of the top of the tower, where the pipe empties into a ditch.

COLUMBIA COUNTY is in southeastern Washington, extending in a narrow strip from the Snake river southward over the summits of the Blue mountains to the Oregon line. It is similar in topography and climate to Asotin county, from which it is separated by the narrow area of Garfield county. As in the case of these localities, wheat and other cereals and fruits are raised on the high rolling plateaus or hill lands, at elevations of from 1,500 to 3,000 feet. As a rule the higher grounds receive or retain more moisture than the lower, and crops are generally successful on them. In 1888, 1889, and 1890 the crops were lighter than usual, owing to the deficiency of rainfall.

The streams rising in the Blue mountains flow for a short distance northerly, and then unite to form the Touchet river, whose general direction for a time is west, parallel with the Snake. After entering Wallawalla county it turns southward and empties into Wallawalla river, a tributary of the Snake. All these streams, like those of Asotin county, have cut deep gorges, rivaling that in which the Snake river flows. In the bottoms of these gorges are narrow strips of land, the soil of which requires irrigation in order to support plant life during the summer. With plently of moisture the yield of fruit, alfalfa, and grasses for forage is very large, and therefore farmers have been induced to attempt irrigation wherever practicable. The ditches are small, serving merely to irrigate a few acres of the bottom lands along the stream.

Douglas county is a trifle east of the center of Washington, and comprises a large part of the area known as the Big Bend country. It is bounded on the north, west, and partly on the south by the Columbia river, which, as before stated, describes roughly a great semicircle in this part of the state, cutting deeply into the high plain or plateau formed by the lava sheets which cover eastern Oregon and Washington. The surface of the county as a whole falls gradually from north to south, and is deeply cut by steep-walled ravines, or coulees, as these are locally known. Of these Grand and Moses coulees are the most important, both traversing the northern half of the county diagonally from northeast to southwest. The former begins on the Columbia near the east line of the county and continues for about 55 miles toward Badger mountains. The walls of this chasm are, according to the report of Lieutenant Symons, about 350 feet high, and are nearly perpendicular, being broken down in only one place about half way of its length. At some places the coulee reaches a width of nearly 4 miles, and in others becomes quite narrow. The nearly level bottom is about 1,000 feet above the Columbia river. The soil in many places is rich, but crops can not be produced without irrigation.

Moses coulee is from 12 to 15 miles west of Grand coulee and lies nearly parallel with it. Between the two is high land with rich soil, producing good crops wherever cultivated. The difficulty of procuring water for stock and domestic purposes has, however, retarded the settlement of this area. West of Moses coulee and between it and Columbia river is another area of high land, on which are most of the farms of the county. This is well adapted for agriculture in every respect save that of water supply. On these high grounds crops are less liable to be injured by frosts than on the lower lands, and there is probably a greater amount of moisture in the soil, so that wheat, oats, rye, and barley, and even some fruit trees, thrive and produce abundantly. The early settlers tried the low lands first from the supposed better facilities for water, but soon discovered the greater natural advantages of the higher grounds, both in possessing more moisture and in freedom from alkali. In many cases, however, they are compelled to bring water for long distances for household use during the summer. All the higher lands are farmed without irrigation, but on the low lands, both along the Columbia river and in the coulees, owing to the intense heat of summer nothing can be raised unless watered.

The southern half of the county is lower and less fertile, having almost the character of a desert. Apparently the droughts are too severe for the cultivation of cereals, and the pasturage is comparatively poor. There are low lands along the Columbia above Priest Rapids to which water might possibly be brought from the Columbia, although requiring considerable expenditures. Wherever these lower lands can be brought under irrigation by water from some spring or small stream the yield of the various crops is enormous, and it has been found that all the grains and fruits of the temperate zone reach a high degree of excellence. As yet the county is sparsely settled, few farmers having been there for more than 4 or 5 years, and the water facilities have been so poor that irrigation has made little progress. There are few creeks in the county, and these, like the Columbia river, flow in deep gorges, so that their waters can be used only on the fringing bottom lands.

Franklin county is southeast of Douglas and south of Adams county, comprising that portion of the high plain of the Columbia north of and near the junction with the Snake river. It is in most respects similar in topography to the rest of the country within the great bend of the Columbia. As in the whole of this area, the cereals are raised without irrigation, this latter method of agriculture being used only in the case of a few orchards on low ground. A project has been set on foot for

irrigating some of the land along the Columbia by taking water from the Snake river, a short distance above its mouth, and bringing it by ditch to the vicinity of Pasco. It will be necessary to raise the water from the Snake river by machinery, and so far as can be ascertained the success of such a project is not yet assured.

GARFIELD COUNTY is in southeastern Washington, south of the Snake river, and between Asotin and Columbia counties. It consists principally of a high, deeply eroded plateau, around which the Snake flows almost in a semicircle, thus bounding it on the east and north. Toward the south the county extends in a narrow strip from 6 to 10 miles wide over the crest of the Blue mountains to the state line of Oregon. A number of small streams issue from this mountain area and flow outward to the Snake river. The principal of these are Alpowa, Deadman, Pataha, and Tokanon creeks, each of which flows in a deep gorge or cañon for the greater part of its course.

On the high and comparatively level lands, wheat, rye, oats, and barley are raised successfully 3 or 4 years out of 5. Occasionally the drought, as in 1889, proves too severe, and the farmers meet with losses and discouragements. Irrigation is carried on to a small extent on the narrow strips of land, from 100 to 300 feet wide, bordering the creeks just mentioned, and also on the small sandy bottoms or "bars" in the gorge of the Snake river. The success of peaches, plums, prunes, pears, apricots, grapes, and small fruits in these localities is wonderful, as the insect enemies of orchards and vineyards have not yet penetrated these regions. Water is diverted to the orchards and gardens in these places by means of small ditches from springs or from the stream itself. Along the Snake river a little water is raised to the sandy low lands by the use of pulsometers, thus irrigating a few valuable orchards.

There is little probability that water can ever be brought out upon the wheat lands on account of the fact that the streams are at such a great depth, from 100 to 1,500 feet below the general level. The soil of these lands usually retains moisture to a remarkable degree, and if there is a heavy fall of snow during the winter the farmers' success is assured. Water for domestic purposes is usually obtained from wells from 10 to 50 feet in depth, although in some localities the farmers have found it necessary to haul water for several miles. Irrigation is being practiced wherever water is accessible, and the present supply is nearly all utilized. The largest stream of the creeks mentioned, and probably the only one having a surplus of water, is the Tokanon, the others, particularly Deadman and Pataha, discharging in summer, it is said, only sufficient to supply water for stock and domestic purposes.

KITTITAS COUNTY is in the central part of Washington, east of the Cascade mountains, extending from the summits of that range in a general southeasterly direction to the Columbia river. It is bounded on the north by the Wenatchee river, and on the south contains the headwaters of the Yakima river, which flows southerly into Yakima county. Among the mountains at the headwaters of these streams are numerous beautiful lakes several miles in length. These tend to equalize the flow of water in the streams, and thus increase the summer discharge.

The principal agricultural area within this county is in the Kittitas valley, near the center of which is the town of Ellensburg. This valley is 10 miles or more in width and 20 miles long. It is bounded on the north and west by mountains containing deposits of valuable minerals, and covered with timber. Within the valley little, if anything, can be raised without irrigation, as the precipitation during the summer months is very small, and the winds which prevail tend to promote rapid evaporation.

Water for irrigation is taken from the Yakima river or from small tributaries of that stream. In the case of the river itself there is a supply of water sufficient for all demands now made upon it. The smaller streams, however, do not furnish an abundance during the summer, but there is such scarcity that only a portion of the crops cultivated can be thoroughly irrigated, and it often becomes necessary to cut some of them for hay. Some of the farmers propose to increase the summer flow of the creeks by the construction of reservoirs in the mountains to hold a portion, at least, of the flood waters which now run to waste before the beginning of the irrigating season. As a result of the deficiency of the

water supply controversies regarding water rights have already arisen, and expensive litigation has been entered upon by many of the farmers, who can ill afford this drain upon their resources.

The greater part of the eastern half of the county is composed of broken lands and sagebrush plains, on which crops can rarely be raised without the artificial application of water. There is no visible means of supply for the greater part of this area, and it is difficult to obtain water even for domestic purposes. Near the junction of the Wenatchee with the Columbia a small amount of land is irrigated, principally by means of the waters of springs. It is probable that a portion, at least, of the lower part of the level lands here can be irrigated by water taken from the Wenatchee or the Pechastin, but the expense of constructing a ditch of the length required is beyond the means of the present inhabitants. Near Ellensburg two wells have been sunk to considerable depths, in the hope of obtaining an artesian supply, but as yet without success. In the Kittitas valley the ordinary wells average about 30 feet in depth.

There are many small ditches in this county and a few of large size. Among the smaller ditches may be mentioned the Masterson ditch, taking water from Teanaway creek, which flows into the Yakima river from the north or left-hand side. The ditch runs on the west side of the creek and carries the water in a southwesterly direction for a distance of 5 miles. The width is 3 feet, and the cost was approximately $1,500. In 1889 about 300 acres, principally in timothy, were irrigated.

First Creek ditch takes water out of a stream tributary to Swauk creek, which flows into the Yakima east of Teanaway river. This ditch is about 12 miles long and 6 feet wide. It cost probably $6,000 in all. It is owned by 2 irrigators, who divide the water equally. In 1889 about 600 acres were irrigated, about 500 acres being in wheat and the remainder in oats and vegetables.

Gallaway ditch takes water from Wilson creek and carries it out in a southwesterly direction for about 8 miles. The average width is 5 feet. The ditch was constructed in 1877 by irrigators, who took advantage of an old channel of the stream which extends for a great part of this distance. In 1889 400 acres were irrigated.

Watt ditch takes water out of Manastash creek, which flows into the Yakima from the west side, nearly west of Ellensburg. The water is taken out upon the north side and carried a distance of 6 miles. The ditch is about 5 feet wide, and cost probably $2,000. It is owned by private parties, who divide the water among themselves. The owners of this ditch, as is the case with many other irrigators, have been compelled to enter upon suits at law for the protection of their claims to the water.

Bull ditch takes water from the Yakima river near Ellensburg and carries it out on the east side. The length of this ditch is 7 miles, the width about 7 feet, and the cost was $5,000. It is owned by farmers, who divide the water into tenths and distribute it according to the number of shares or tenths owned by each. In 1889 about 1,000 acres of meadow land and 500 acres of grain were irrigated. In the case of grain the water is turned into plow furrows from 60 to 100 feet apart, but the meadows are generally flooded, the flooding being repeated from 2 to 4 times each year.

The principal ditches of the county are those taking water from the Yakima river and carrying it out upon both sides in the vicinity of Ellensburg. The ditch on the east side of the river, owned by the Ellensburg Water Company, is 25 miles long, 12 feet wide, and cost for the 17 miles completed in 1890 $45,000. The owner of a share in this corporation is entitled to one-half miner's inch of water, this being considered sufficient to irrigate an acre. In 1889 about 2,000 acres were irrigated, the crops consisting of wheat, oats, barley, potatoes, and hay. The capacity of the ditch is reported to be 48 second-feet. The supply of water in the river is very large, but the ditch does not carry an amount sufficient for the demands made upon it. Above and north of this ditch is a large area of land which it is proposed to irrigate by the construction of a much larger canal taking water from a point higher up the stream.

The Westside irrigating canal is about 14 miles long and averages about 12 feet wide. It is estimated to cost when completed $30,000. At usual stages of the river there is no necessity of a dam for diverting the water. The corporation owning this ditch is composed of irrigators who use its water. Work was begun in June, 1889, and water was first used in 1890.

Klickitat county is in southern Washington, lying in a narrow strip along the Columbia river from the Cascade mountains eastward nearly to the mouth of the Snake river. A great part of the

county, especially at the eastern end, consists of high plains similar to those on the opposite side of the river, in Umatilla and Morrow counties, Oregon. These plains are deeply cut by cañons, in which, in the springtime at least, small streams are to be found. The western end of the county is higher, being hilly or even mountainous in character.

In nearly all parts of the county crops are raised without irrigation, but especially at the eastern end there are occasional failures owing to a deficiency of rainfall. If there is a heavy fall of snow during the winter and this melts gradually, saturating the ground, the farmers can depend upon an abundant harvest, but if, on the contrary, the snowfall is light or melts rapidly before the ground thaws, the chances of success are reduced. As an extreme instance, one farmer reports that in his vicinity good crops are raised 2 years out of 5, that during another 2 years only about half a crop is obtained, and that in 1 year out of 5 there is a total failure.

Irrigation is practiced on the low grounds along the Columbia river mainly for the purpose of raising fruit, and also in depressions known as "swales". The water is obtained in nearly all instances from springs, a small amount being pumped by windmills. In the case of the "swales" the ground is naturally moist, and the irrigation processes, if they may be so called, consist in regulating the supply of water by means of dams, at one time allowing it to flow freely from the springs or at others draining it off when in excess. The principal crop raised in these localities is for forage. These areas, compared with those irrigated for gardens and orchards, are large, and swell the total irrigated in the county.

There are very few ditches for irrigation, and of these the Cameron ditch may be given as an example. It takes water from White Salmon river, carrying it out upon the west side for a distance of about 4 miles. The width of the ditch averages 6 feet, and the cost was $3,000. It was begun in 1886, and used to a small extent in 1890. The water is diverted from the river at a point where there are 2 islands, part of the channel between them being obstructed by a log dam. Its course is mainly through land covered with a poor quality of pine timber, which must be cleared before the ground can be cultivated. The ditch has been built by private parties who have not yet been able to bring it to completion. The water supply is ample, and the land when cleared will doubtless yield large crops.

LINCOLN COUNTY is in eastern Washington, north of Adams county, and forms part of the great plains of the Columbia. It is bounded on the north by the Spokane and Columbia rivers, and on the other three sides by the rectangular lines of townships and ranges. The drainage systems of the county consist of small creeks, a few of which flow northerly into the Spokane or the Columbia. The greater number, however, run in a general southwesterly course, finally uniting to form Crab creek, a stream flowing in a westerly direction through a series of lakes into Douglas county, where the waters finally disappear by evaporation from the surface of Alkali lake. These streams have cut deeply into the surface of the county and flow in cañons or gorges from 100 to 600 feet deep, or even more.

On the high rolling prairie lands of which the greater part of the county is composed nearly all crops of the temperate zone are successfully raised. The soil is very rich, and in many years the yield is exceedingly large. The drought of 1889, so disastrous in other parts of the country, diminished the yield, but did not impoverish the farmers. There is usually a heavy fall of snow in winter, which, melting, saturates the ground to a great depth. Apparently the structure of the soil is such that as the dry season comes on some of this moisture returns toward the surface and reaches the roots of the plants. On the low lands along the streams, as, for example, in the narrow valley or gorge of the Columbia river and of Crab creek, crops usually require irrigation. The soil there is somewhat sandy, not retaining water for any great length of time. Springs issue from the walls of these gorges, usually at a depth of from 100 to 200 feet below the general level of the high prairie, and this water can be easily led out to irrigate the small patches of low ground.

From the character of the country and the fact that crops are successful without irrigation, it appears doubtful if any large system of water supply will ever be introduced. The greater part of the water flows too far below the surface of the ground to be brought out upon the land, and the country is so rolling and broken by cañons that canal construction would be very expensive. The

development of irrigation in a small way, however, will doubtless continue, as the benefits derived from this method of agriculture are such as in some places to warrant the expenditure of considerable sums for watering alfalfa, timothy, and other forage crops, as well as fruits and vegetables. At present a large part of the forage is made by cutting wheat and oats, since without irrigation alfalfa is not uniformly successful and frequently does not thrive through the droughts of summer. The water supply for domestic use is good. Wells usually reach water at a depth of from 10 to 30 feet, although in some places it is necessary to drill or bore to a depth of from 100 to 200 feet. So far as can be ascertained, however, none of this water rises and overflows.

Stevens county is in the northeastern corner of the state, bordering upon British Columbia on the north and Kootenai county, Idaho, on the east. From this latter county Clarke fork flows in a westerly direction into Stevens county, then continues northerly to a point 2 or 3 miles beyond the boundary of the United States, then it turns abruptly to the west again and empties into the Columbia, the junction of the two rivers being almost on the boundary line of the British possessions. The Columbia river, entering Washington, continues in a general southerly direction until it reaches the mouth of the Spokane river, which forms a portion of the southern boundary of Stevens county. It then continues westerly in its course around Douglas county.

The portion of Stevens county west of the Columbia river is included within the Colville Indian reservation. East of the river, however, are many farming areas, the greater part of which have been occupied for only a few years. This nearly triangular area, bounded on the west by the Columbia, on the east by Clarke fork, and on the south by the Spokane river, is known as the Colville region. It differs widely in many of its features from the country to the south, this difference being due largely to the absence of the lava sheets which underlie the greater part of the counties to the south, and give them their peculiar topography. The basaltic rocks do not extend north of the Spokane river, but in their place are rocks related to the granites, and instead of the steep cliffs bordering the streams, as in the case of the basaltic areas to the south, are sandy terraces rising gradually from the river bottoms.

A large amount of detailed information concerning this area is made available by the contoured maps and descriptions of the Colville country, prepared by the northern transcontinental survey, and published in 1883. As shown by the agricultural map, the Colville valley, with its rich alluvial soil, extends in a general northerly direction through about the center of this area, being continued on the north by Echo valley to the terrace lands of the Columbia, and on the south to the Spokane river by the sandy plateau and terrace lands of Chamokane creek. Throughout this region, especially on the bottom lands, agriculture is generally successful without the aid of irrigation, although many of the farmers have found it of benefit to divert water from the small streams for gardens and trees upon sandy soils. As a general statement it may be said that grasses, fruit and shade trees, as well as corn and vegetables, grow better if irrigated during the long drought of summer. On the bottom lands along the Colville river redtop and timothy hay are the principal products, wheat and oats being raised on the benches and depending for their moisture upon the rains.

The Colville valley is bounded by mountainous areas, the surface of which is too broken for agriculture. To the east, along Clarke fork, in the vicinity of Calispell, and southeasterly from that point, are broad bottom lands usually overflowed each year by the spring freshets, so that, as in the case of other valleys along this stream, drainage is sometimes more necessary than irrigation. If the annual overflow does not occur, however, and the hay lands along the river and creek bottoms are not thoroughly wet, the crop is greatly reduced and is sometimes hardly worth cutting.

On the western edge of the Colville region, along the banks of the Columbia, is a succession of low terraces with rich though sandy soil. Here irrigation is generally necessary, although crops have been raised without it. Water is taken from the small creeks which flow into the Columbia and is used for gardens, orchards, and hay lands. It is possible that a canal may be taken out of the Columbia at some future time to cover a portion of these terraced lands, and that they may be brought under a high state of cultivation.

There are very few ditches of any importance in the county, the greater number being less than a mile in length and conducting water from the little creeks, which are found at intervals of from 8 to

10 miles throughout this mountainous area. One hindrance to the greater development of irrigation is that many of the settlers are still upon unsurveyed land, so that they do not know whether they are making improvements upon land that will eventually be their own or upon land the title to which will be obtained by some other person.

SPOKANE COUNTY is in eastern Washington, adjoining Kootenai county, Idaho. The principal city, Spokane, is the commercial center for eastern Washington and northern Idaho, and the greater part of the business pertaining to the mining and manufacturing interests, as well as to agriculture, is transacted here. The surface of the country is hilly or consists of high rolling prairie lands with a rich soil, producing wonderful crops of cereals. The county is drained by the tributaries of the Spokane river, the outlet of lake Coeur d'Alène. These streams have deeply eroded the surface, and flow at a depth of from 100 to 400 feet below the level of the rolling prairie lands. Irrigation in this county is exceptional, since the rainfall may be considered as abundant for all crops. The only cases in which it is practiced are those in which a water supply was obtained with more than ordinary facility and utilized by men accustomed to that method of farming. Besides the three instances given, there are other cases in which water has been used in a small way for gardens and fruit trees, but these can scarcely be considered as systematic irrigation.

The majority of farmers in this county do not look upon irrigation as feasible or necessary, but there are a few who recognize the fact that by means of an abundant water supply, even when the annual rainfall is large, the yield per acre can be greatly increased and a second or even a third cutting of forage plants obtained. There has never been a year yet in which the crop failures have been particularly serious, although in 1889 the yield was greatly reduced. During the winter there is usually a heavy snowfall, which, melting, saturates the ground in spring, so that all the cereals except perhaps corn reach maturity, the size of the crop being in a rough way proportional to the depth of snow. The dry season begins usually about the first of June, after which there is little rain until late in the fall. Alfalfa is reported as not being successfully raised, this plant probably requiring irrigation for its best development. There is an ample water supply for domestic purposes, and good wells are usually obtained, the depths being from 10 to 50 feet, or sometimes more. No flowing wells are reported.

WALLAWALLA COUNTY is in southeastern Washington, south of the Snake river and east of the Columbia, extending from these streams along the Oregon state line nearly to the summits of the Blue mountains. The Touchet river flows west and south nearly through the center of the county, entering the Wallawalla river, whose course is westerly along the southern boundary. These streams, as is the case with all in this portion of the country, flow in deep gorges hundreds of feet below the general level of the uplands.

The principal occupation of the people of this county is wheat raising, large crops being produced each year, and especially when the snowfall of the preceding winter is heavy. It is customary to summer fallow the land every third year, and thus, on an average, two-thirds of the farm land is in crop each season. Occasionally a small amount of corn is raised on this summer-fallowed land. Besides wheat, some barley, oats, and rye are produced, and occasionally potatoes and other vegetables, although in many parts of the county there is not sufficient moisture to make the yield of the latter profitable.

In the northern end of the county, between the Snake and Touchet rivers and in a general way parallel to them, is the high plateau known as Eureka flat. This is from 30 to 40 miles long and about 6 miles wide. The soil is rich, and enormous quantities of wheat are produced each year. The water supply for this area is, however, greatly deficient. The farmers are compelled to procure water for summer use either by saving in cisterns the water from melted snow, by purchasing it from the railroad company, or by hauling it from streams at distances of from 5 to 10 miles by means of wooden tanks mounted on stout wagons. It is reported that in 1889 the water filling a 500-gallon tank cost $4.00, and that the same quantity in 1890 cost $2.00. One farmer writes that in one year it cost him $50.00 for water for household use and to supply 4 horses. Water obtained from the railroad cost $12.50 for 2,500 gallons, with an additional expense of from $5.00 to $8.00 to bring it from the railroad station.

Efforts have been made to obtain water by drilling, but it has been found very difficult to penetrate the hard basaltic rock. Small pieces are easily dislodged by the drill and wedge it firmly, so that it becomes a matter of great difficulty and even in some cases impossible to withdraw the drilling tools. Wells have been put down to depths of from 300 to 400 feet without obtaining water, the drill having finally stuck fast. In some parts of the county less difficulty is experienced in obtaining water. One well is reported to be 130 feet deep and with 40 feet of water.

Irrigation is carried on along the Snake, Columbia, and Wallawalla rivers, and to a less extent along the Touchet river, wherever water can be brought out by small ditches, waterwheels, or force pumps. Gardens and fruit trees cultivated in this manner prove highly profitable, as the wheat growers on the higher lands raise very few vegetables or fruits, and thus there is little competition and a large demand for this class of produce.

WHITMAN COUNTY is on the eastern edge of Washington, south of Spokane county and north of the Snake river, and includes the greater part of the high rolling lands traversed by the Palouse river. This stream and its tributaries rise in the mountains of northern Idaho and flow westerly into Whitman county, where the river turns toward the south and, forming the southwestern border of the county, flows into the Snake. The surface of the country as a whole falls from the mountainous region on the east, sloping in a general way westerly out toward the great plains of the Columbia. It is broken, however, by innumerable hills, rising gently from heights of from 100 to several hundred feet above the valleys. The drainage channels have been deeply carved into this high rolling country, and the streams for the greater part of their course are in deep gorges.

The eastern half of the county has an abundant rainfall, and the yield of crops can rarely be surpassed by that of any other area. The western half, being out toward the plains of the Columbia, is somewhat drier, and seasons of deficient rainfall prove more serious. Losses, however, are generally prevented by thorough cultivation. The soil of the county is very rich, consisting largely of a deep black loam, and the yield of most of the cereals is extraordinarily great. No irrigation is required, as there is usually ample moisture to mature the wheat, oats, barley, and other crops. Fruit and shade trees thrive on the higher lands, and rarely is there serious loss through drought.

On the low ground along the Snake river are a few irrigated areas. Here the soil is sandy and the temperature is higher than on the upper lands, so that crops and fruit trees require the application of water during the summer. These strips of low land are locally known as "bars" or "flats". They are not continuous, but are separated from each other by rocky points which extend down to the river's edge. This is sometimes known as the fruit area of the county, from the fact that the greater part of the orchards are to be found here. On the higher grounds some apples and other fruits are produced, and their owners claim that the flavor is better than in the case of fruit from irrigated orchards, but on this point there is difference of opinion.

Water is usually obtained by sinking wells to a depth of from 10 to 50 feet, although in some cases it is necessary to go deeper. At Pullman there are reported to be 8 flowing wells of a depth of from 70 to 180 feet. The cost of these wells ranged from $3 to $4 per foot. The wells are from 3 to 6 inches in diameter, and are reported to deliver 800 gallons per minute. There are also 2 flowing wells at Moscow, in Latah county, Idaho, about 10 miles east of Pullman. These wells supply water mainly for domestic purposes, none being used for irrigation.

YAKIMA COUNTY is south of Kittitas and north of Klickitat, these 3 counties extending from the summits of the Cascade mountains eastward to the Columbia river. The Yakima river rises in the county to the north and flows in a general southeasterly course into Yakima county, where it receives numerous tributaries from the mountains on the west. The agricultural settlements are along these streams, the most prosperous being at places where water can be taken out to cover large areas of the fertile bench and valley lands. As a general rule nothing can be raised without irrigation, although there are a few favored spots, as, for example, near Cowiche, where wheat has been successful without the artificial application of water. In the eastern end of the county, out toward the plains of the Columbia, there are localities where farming without irrigation is attempted, but the yield is so small as barely to repay the efforts of the cultivator.

The Yakima river and its principal tributary, the Natches, rise among the high peaks of the Cascade range, and thus have a large perennial supply of water. Other streams of the county, as, for example, Wenas creek and Atahnam river, derive most of their water from spurs of the range, on which, the altitude being less, the snows melt earlier in the spring, giving a diminished summer flow. Along streams of this latter character the area under cultivation has already exceeded the amount which can be irrigated by present means, and as a result there is scarcity of water during the latter part of the crop season, especially among the irrigators on the lower portion of the streams. It is evident that water storage must be resorted to in order to save some of the surplus water of early spring, which usually comes in a flood of short duration, so short in fact that the irrigators have barely time to give their lands one thorough watering.

In many of the streams there are often two decided floods, the earlier resulting from the melting of the snows on the lower foothills, following a warm wind or rain. Later in the spring the snows on the higher mountains begin to melt, sometimes keeping up the height of the water, and at other times giving rise to a second well-marked flood. The creeks which do not receive this second supply shrink during June, so that by the first of July there is hardly enough water for gardens and stock. Some of the lower grounds along the creeks receive sufficient moisture by seepage from the streams or from the ditches on the benches to raise crops without the application of water to the surface, but the higher lands must be irrigated, except perhaps in the case of those at an elevation of from 1,500 to 2,000 feet or more above sea level.

The topography of this county is shown by maps made by the northern transcontinental survey in 1883. The area surveyed includes the Kittitas valley and the southern portion of Kittitas county, as well as the greater part of Yakima county. Besides the topography, which is shown by contoured lines, the forest areas have been outlined and the soils studied, the results in each case being shown by colored maps. This area is characterized by mountain ranges running in a general easterly and westerly direction, many of them being cut by the Yakima river. Between these ranges are fertile valleys, the soil of which yields large crops wherever water can be brought upon it.

The first of these valleys is the Kittitas valley, lying in the county of that name. After leaving this area the river passes through the Umtanum range and enters a valley region, the portion on the west or right bank of the river being known as the Wenas valley, from the creek of that name, and that on the east as the Selah valley. South of this latter valley is the narrow Yakima range, separating it from Moxee valley. On the opposite side of the stream and south of Wenas valley, from which it is separated by Natches river, is the Atahnam prairie, these 2 valleys, Atahnam and Moxee, being in all about 25 miles long and 5 miles wide. South of these the Yakima river cuts through Rattlesnake range into the broad Yakima prairie, 60 miles or more in length and from 10 to 15 miles in width. Here the river gradually turns toward the east and flows along the Simcoe range, which bounds the prairie region on the south. It is in this great prairie region that there appear to be remarkable opportunities for irrigation development, some of which are being utilized.

According to the report of the northern transcontinental survey, this whole region in former times consisted of 4 great lakes inclosed by mountain ranges now cut by the Yakima river. The soil of the valleys has been deposited from these lakes and is highly productive, containing usually but a small proportion of alkali. The geological structure is in some respects similar to that of the ancient lake basins in the states further to the east, where artesian wells have been found. East of the town of Yakima, in the Moxee valley, are 2 wells, 285 and 325 feet deep, respectively, having a combined flow of 1.35 second feet, the waters of which are of great value for household use, for stock, and for irrigation. An unsuccessful well has been drilled near Pasco, Franklin county, to a depth of 527 feet, mainly in basalt.

The greater portion of the center of the county west of the Yakima river is occupied by the Indian reservation, which thus includes a large part of Yakima prairie. Northeast of this prairie are rolling hills and plateaus, generally covered with nutritious bunch grass so valuable for stock raising. The soil is rich, and with an abundant rainfall good crops could be raised. In some localities large areas of government land have been taken up, and settlers have raised from 10 to 20 bushels of wheat to the

acre. The majority, however, have not been able to secure a crop, and many homesteads have been abandoned.

In the eastern part of the county, away from the river, it is exceedingly difficult to obtain water even for domestic purposes, and it is necessary to haul it long distances. A deep well has been drilled at the expense of the state in section 36, township 8 north, range 26 east. This reached a depth of about 500 feet, and cost $3,400. Water was struck at a depth of 225 feet, but did not rise to a higher level. The lava or basaltic rock through which the well was drilled is extremely hard and progress was very slow. At a few places along the Yakima river steam pumps with a capacity of from 500 to 1,000 gallons per minute have been located for the purpose of raising water for gardens, orchards, and stock. The expense of operating them is large, and it is still doubtful whether, as a rule, they are successful.

A large part of the irrigation in this county is carried on by means of ditches built by the farmers either individually or in partnership. These men, as a rule, have had little money to invest in the development of the water supply, but they have contributed freely of their labor. The short crops of the census year diminished their resources, so that generally they could not, unaided, undertake larger enterprises, such as the building of long canal systems. In 1889 and the following years outside capital was attracted by the apparent opportunities for profitable investment in works of this character, and corporations began to increase in number. Many of the irrigators, however, perhaps the majority, have a strongly expressed fear of powerful companies obtaining control of the running water of the county, and view with apprehension the extension of systems under corporate management.

As examples of some of the ditches of the county, there may be given the following: the Atahnam and Wide Hollow ditch takes water from the north side of Atahnam creek, carrying it out on to the prairie toward North Yakima. Its length is 10 miles, and its average width 5 feet. It was built in 1879. About 250 acres were irrigated in 1889, the crops being small grain, alfalfa, corn, potatoes, and with these orchards and gardens. It is reported that a large amount of water is required by the land under this ditch, and that, on the average, 1 second-foot is used for 50 acres. The supply of water in the creek is not sufficient for all the demands upon it. The Scott ditch takes water from the Natches river about 12 miles northwest of North Yakima, running out on the south side of the stream. It is about 3 miles long, nearly 3 feet wide, and 1 foot deep, and cost $1,500. It is owned by private parties, and irrigates 60 acres of alfalfa, clover, hops, potatoes, sorghum, and wheat. Union ditch takes water from the Natches river at a point 2 miles northwest of North Yakima, bringing it out upon the south side through the city. The total length of the ditch is 6 miles; the average width, 7 feet; the depth, 1.5 feet; and the cost was $2,000. The ditch was first used in 1874. It is now owned by an incorporated company of farmers. There is a large amount of water in the river, and the supply has been ample for all demands. The Fowler ditch takes water from the Yakima near the town of North Yakima, and runs out on the east side of the river into Moxee valley. The length is 8 miles; the average width, 7 feet; the depth, about 1 foot; and the cost was $3,000. No dam is used in the river, as the fall of the stream is sufficient to bring water into the ditch. About 1,500 acres are irrigated, the crops raised being small grain, alfalfa, hops, corn, and tobacco.

The ditches of the Yakima Irrigating and Improvement Company take water from the north side of the Yakima river and carry it out upon the bottom lands below the town of Kiona, extending from that point down to the lands at the junction with the Columbia river above the town of Pasco. The upper ditch known as the Kiona is 9 miles long and follows the general course of the Yakima river. In 1891 about 350 acres of corn, alfalfa, millet, rye, potatoes, beets, etc., were watered, the alfalfa being cut 5 times. The lower or Yakima ditch heads on the river near the lower end of the upper ditch and follows the course of the stream for a short distance. The total length of this system when completed will be upward of 60 miles. The ditches are from 9 to 10 feet in width and 3 feet in depth. They were first used in 1891, and are being extended each year, the water supply being ample.

Besides these ditches, and others of similar character which are already in operation, there are many large projects on foot for constructing canals to take the water of the Yakima river and its tributaries out at various points, and many of these will undoubtedly be successfully constructed, as there appears to be an ample supply of water in the river, and there are thousands of acres of fertile lands on the Yakima prairie.

[7-010]

CENSUS BULLETIN.

No. 199. WASHINGTON, D. C. July 14, 1892.

COLORED POPULATION IN 1890

CLASSIFIED AS PERSONS OF AFRICAN DESCENT, CHINESE, JAPANESE, AND CIVILIZED INDIANS.

BY STATES AND TERRITORIES.

DEPARTMENT OF THE INTERIOR,
CENSUS OFFICE,
WASHINGTON, D. C., June 29, 1892.

The total colored population, as returned under the census of 1890, is 7,638,360. Of this number 7,470,040 are persons of African descent, 107,475 are Chinese, 2,039 are Japanese, and 58,806 are civilized Indians.

The figures contained in this bulletin are the results of the first detailed count of population according to color, and are subject to correction.

The persons of African descent have been further classified in the present census according to the number of blacks, mulattoes, quadroons, and octoroons, this separation having been specifically called for by the act of March 1, 1889, under which the census of 1890 was taken. This special inquiry is of such a nature, however, that any results obtained through the ordinary channels of census enumeration must be at the best only approximate. Comparative figures obtained on the same basis in 1900, if required at that census, will add appreciably to the value of the present results.

The civilized Indians reported in the national census as a part of the constitutional population of the country comprehend only those found among the general population and not under tribal relations. All other Indians in the United States, that is, those still in tribal relations or living upon reservations, supported in part or entirely by the government, do not form a part of the constitutional population and are not considered in this bulletin. This class of Indians, however, has been made the subject of a special inquiry, not only as to their number, but as to their present condition generally. The primary results of this special census, so far as their numbers are concerned, have already been presented in Census Bulletin No. 25.

C. O. P.—10m

The following table gives for each state and territory, arranged geographically, the colored population in the aggregate, as well as a detailed classification according to the number of blacks, mulattoes, quadroons, octoroons, Chinese, Japanese, and civilized Indians:

STATES AND TERRITORIES.	Total colored.	PERSONS OF AFRICAN DESCENT.					Chinese.	Japanese.	Civilized Indians.
		Total.	Blacks.	Mulattoes.	Quadroons.	Octoroons.			
The United States	7,638,360	7,470,040	6,337,980	956,989	105,135	69,936	107,475	2,039	58,806
North Atlantic division	279,564	269,906	207,175	51,492	6,240	4,999	6,177	247	3,234
Maine	1,828	1,190	507	462	107	114	73	1	559
New Hampshire	690	614	248	188	70	118	58	2	16
Vermont	1,004	937	521	328	51	37	32	1	34
Massachusetts	23,570	22,144	14,108	6,815	728	493	984	18	424
Rhode Island	7,647	7,393	5,396	1,679	226	92	69	5	180
Connecticut	12,820	12,302	9,221	2,453	367	261	272	18	228
New York	73,901	70,092	54,852	12,469	1,622	1,149	2,935	148	726
New Jersey	48,352	47,638	40,436	6,123	701	378	608	22	84
Pennsylvania	109,757	107,596	81,886	20,980	2,368	2,362	1,146	32	983
South Atlantic division	3,265,771	3,262,690	2,823,905	374,765	38,946	25,074	669	55	2,357
Delaware	28,427	28,386	24,837	3,213	197	139	37	.....	4
Maryland	215,897	215,657	181,296	31,094	2,078	1,189	189	7	44
District of Columbia	75,697	75,572	55,736	17,989	1,126	721	91	9	25
Virginia	635,858	635,438	512,997	107,217	9,772	5,452	55	16	349
West Virginia	32,717	32,690	23,336	7,583	758	1,013	15	3	9
North Carolina	562,565	561,018	483,817	65,687	5,897	5,617	32	1	1,514
South Carolina	689,141	688,934	621,781	53,400	8,120	5,633	34	.....	173
Georgia	858,996	858,815	773,682	72,072	8,795	4,266	108	5	68
Florida	166,473	166,180	146,423	16,510	2,203	1,044	108	14	171
North Central division	450,352	431,112	297,331	107,701	15,092	10,988	2,351	117	16,772
Ohio	87,511	87,113	50,078	29,191	4,112	3,732	183	22	193
Indiana	45,668	45,215	31,557	10,970	1,526	1,162	92	18	343
Illinois	57,879	57,028	40,346	13,583	1,862	1,237	740	14	97
Michigan	21,005	15,223	7,036	5,589	1,376	1,222	120	38	5,624
Wisconsin	6,407	2,444	1,007	782	290	365	119	9	3,835
Minnesota	5,667	3,683	1,981	1,166	310	226	94	2	1,888
Iowa	10,810	10,685	7,503	2,318	585	279	64	1	60
Missouri	150,726	150,184	114,739	30,966	2,932	1,547	409	6	127
North Dakota	596	373	153	109	70	41	28	1	194
South Dakota	1,518	541	310	164	44	23	195	.....	782
Nebraska	12,022	8,913	6,091	2,155	405	262	214	2	2,893
Kansas	50,543	49,710	36,530	10,708	1,580	892	93	4	736
South Central division	3,485,317	3,479,251	2,993,092	416,411	43,068	26,680	1,434	61	4,571
Kentucky	268,173	268,071	216,085	46,152	3,577	2,257	28	3	71
Tennessee	430,881	430,678	356,215	65,222	5,485	3,756	51	6	146
Alabama	679,299	678,489	601,069	65,993	7,040	4,387	48	3	759
Mississippi	744,749	742,559	657,393	72,945	8,039	4,182	147	7	2,036
Louisiana	560,192	559,193	468,240	76,840	8,597	5,516	333	39	627
Texas	489,588	488,171	422,447	55,319	6,219	4,186	710	3	704
Oklahoma	3,008	2,973	2,156	688	77	52	25	.....	10
Arkansas	309,427	309,117	269,487	33,252	4,034	2,344	92	.....	218
Western division	157,356	27,081	16,477	6,620	1,789	2,195	96,844	1,559	31,872
Montana	4,888	1,490	1,086	257	93	54	2,532	6	860
Wyoming	1,430	922	671	195	37	19	465	.....	43
Colorado	7,730	6,215	4,056	1,778	229	152	1,398	10	107
New Mexico	10,874	1,956	970	419	236	331	361	3	8,554
Arizona	4,040	1,357	932	390	20	15	1,170	1	1,512
Utah	2,006	588	379	145	29	35	806	4	608
Nevada	6,677	242	140	77	12	13	2,833	3	3,599
Idaho	2,367	201	100	53	30	18	2,007	.....	159
Washington	8,877	1,602	1,044	371	101	86	3,260	360	3,655
Oregon	12,009	1,186	557	287	134	208	9,540	25	1,258
California	96,458	11,322	6,542	2,648	868	1,264	72,472	1,147	11,517

RECAPITULATION BY GEOGRAPHICAL DIVISIONS.

The United States	7,638,360	7,470,040	6,337,980	956,989	105,135	69,936	107,475	2,039	58,806
North Atlantic division	279,564	269,906	207,175	51,492	6,240	4,999	6,177	247	3,234
South Atlantic division	3,265,771	3,262,690	2,823,905	374,765	38,946	25,074	669	55	2,357
North Central division	450,352	431,112	297,331	107,701	15,092	10,988	2,351	117	16,772
South Central division	3,485,317	3,479,251	2,993,092	416,411	43,068	26,680	1,434	61	4,571
Western division	157,356	27,081	16,477	6,620	1,789	2,195	96,844	1,559	31,872

The following table gives the distribution, by number and per cent, according to geographical divisions, for persons of African descent, Chinese, Japanese, and civilized Indians, the whole number returned for the United States as a whole in each case being considered as 100 per cent:

GEOGRAPHICAL DIVISIONS.	PERSONS OF AFRICAN DESCENT.		CHINESE.		JAPANESE.		CIVILIZED INDIANS.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent
The United States	7,470,040	100.00	107,475	100.00	2,039	100.00	58,806	100.00
North Atlantic	269,906	3.61	6,177	5.75	247	12.11	3,234	5.50
South Atlantic	3,262,690	43.68	669	0.62	55	2.70	2,357	4.01
North Central	431,112	5.77	2,351	2.19	117	5.74	16,772	28.52
South Central	3,479,251	46.58	1,434	1.33	61	2.99	4,571	7.77
Western	27,081	0.36	96,844	90.11	1,559	76.46	31,872	54.20

Of the whole number of persons of African descent, 3,262,690, or 43.68 per cent, are in the South Atlantic division of states, and 3,479,251, or 46.58 per cent, in the South Central division of states and territories. Of the total Chinese in the United States, 96,844, or 90.11 per cent, are found in the states and territories comprising the Western division. This is also true for the Japanese, there being in these same states and territories 1,559, or 76.46 per cent, out of a total of 2,039 Japanese for the United States as a whole. Of the civilized Indians, 31,872, or 54.20 per cent, are also found in the Western division, and 16,772, or 28.52 per cent, in the North Central division, mainly in the states of Michigan, Wisconsin, Minnesota, and Nebraska.

The 2 tables following give for each state and territory the number of persons of African descent, Chinese, Japanese, and civilized Indians returned at each census since and including 1850. In the census of 1850 no separate return was made of Chinese, Japanese, and civilized Indians, and in the second table, on page 5, no results regarding these 3 classes are given for that census year.

STATES AND TERRITORIES.	PERSONS OF AFRICAN DESCENT.				
	1890	1880	1870	1860	1850
The United States	7,470,040	6,580,793	4,880,009	4,441,830	3,638,808
North Atlantic division	269,906	229,417	179,738	156,001	149,762
Maine	1,190	1,451	1,606	1,327	1,356
New Hampshire	614	685	580	494	520
Vermont	937	1,057	924	709	718
Massachusetts	22,144	18,697	13,947	9,602	9,064
Rhode Island	7,393	6,488	4,980	3,952	3,670
Connecticut	12,302	11,547	9,668	8,627	7,693
New York	70,092	65,104	52,081	49,005	49,069
New Jersey	47,638	38,853	30,658	25,336	24,046
Pennsylvania	107,596	85,535	65,294	56,949	53,626
South Atlantic division	3,262,690	2,941,202	2,216,705	2,058,198	1,860,871
Delaware	28,386	26,442	22,794	21,627	20,363
Maryland	215,657	210,230	175,391	171,131	165,091
District of Columbia	75,572	59,596	43,404	14,316	13,746
Virginia	635,438	631,616	512,841	a548,907	a526,861
West Virginia	32,690	25,886	17,980		
North Carolina	561,018	531,277	391,650	361,522	316,011
South Carolina	688,934	604,332	415,814	412,320	393,944
Georgia	858,815	725,133	545,142	465,698	384,613
Florida	166,180	126,690	91,689	62,677	40,242
North Central division	431,112	385,621	273,080	184,239	135,607
Ohio	87,113	79,900	63,213	36,673	25,279
Indiana	45,215	39,228	24,560	11,428	11,262
Illinois	57,028	46,368	28,762	7,628	5,436
Michigan	15,223	15,100	11,849	6,799	2,583
Wisconsin	2,444	2,702	2,113	1,171	635
Minnesota	3,683	1,564	759	259	39
Iowa	10,685	9,516	5,762	1,069	333
Missouri	150,184	145,350	118,071	118,503	90,040
North Dakota	373	b401	b94		
South Dakota	541				
Nebraska	8,913	2,385	789	82	
Kansas	49,710	43,107	17,108	627	
South Central division	3,479,251	3,012,701	2,204,106	2,038,913	1,491,327
Kentucky	268,071	271,451	222,210	236,167	220,992
Tennessee	430,678	403,151	322,331	283,019	245,881
Alabama	678,489	600,103	475,510	437,770	345,109
Mississippi	742,559	650,291	444,201	437,404	310,808
Louisiana	559,193	483,655	364,210	350,373	262,271
Texas	488,171	393,384	253,475	182,921	58,558
Oklahoma	2,978				
Arkansas	309,117	210,666	122,169	111,259	47,708
Western division	27,081	11,852	6,380	4,479	1,241
Montana	1,490	346	183		
Wyoming	922	298	183		
Colorado	6,215	2,435	456	46	
New Mexico	1,956	1,015	172	85	22
Arizona	1,357	155	26		
Utah	588	232	118	59	50
Nevada	242	488	357	45	
Idaho	201	53	60		
Washington	1,602	325	207	30	
Oregon	1,186	487	346	128	207
California	11,322	6,018	4,272	4,086	962

RECAPITULATION BY GEOGRAPHICAL DIVISIONS.

The United States	7,470,040	6,580,793	4,880,009	4,441,830	3,638,808
North Atlantic division	269,906	229,417	179,738	156,001	149,762
South Atlantic division	3,262,690	2,941,202	2,216,705	2,058,198	1,860,871
North Central division	431,112	385,621	273,080	184,239	135,607
South Central division	3,479,251	3,012,701	2,204,106	2,038,913	1,491,327
Western division	27,081	11,852	6,380	4,479	1,241

a West Virginia set off from Virginia December 31, 1862.

b Dakota territory.

STATES AND TERRITORIES.	CHINESE.				JAPANESE.				CIVILIZED INDIANS.			
	1890	1880	1870	1860	1890	1880	1870	1860	1890	1880	1870	1860
The United States	107,475	105,465	63,199	34,933	2,039	148	55	.....	58,806	66,407	25,731	44,021
North Atlantic division	6,177	1,628	137	.....	247	41	21	.....	3,234	2,477	1,565	239
Maine	73	8	1	.....	1	.....	.....	.....	559	625	499	5
New Hampshire	58	14	.....	.....	2	.....	.....	.....	16	63	23	.....
Vermont	32	.....	.....	.....	1	.....	.....	.....	34	11	14	20
Massachusetts	984	229	87	.....	18	8	10	.....	424	369	151	32
Rhode Island	69	27	.....	.....	5	.....	.....	.....	180	77	154	19
Connecticut	272	123	2	.....	18	6	.....	.....	228	255	235	16
New York	2,935	909	29	.....	148	17	.....	.....	726	819	439	140
New Jersey	608	170	5	.....	22	2	10	.....	84	74	16	.....
Pennsylvania	1,146	148	13	.....	32	8	1	.....	983	184	34	7
South Atlantic division	669	74	11	.....	55	5	.....	.....	2,357	1,804	1,656	1,398
Delaware	37	1	.....	.....	.....	.....	.....	.....	4	5	.....	.....
Maryland	189	5	2	.....	7	.....	.....	.....	44	15	4	.....
District of Columbia	91	13	3	.....	9	4	.....	.....	25	5	15	1
Virginia	55	6	4	.....	16	.....	.....	.....	349	85	229 }	a112
West Virginia	15	5	.....	.....	3	.....	.....	.....	9	29	1 }	
North Carolina	32	.....	.....	.....	1	1	.....	.....	1,514	1,230	1,241	1,158
South Carolina	34	9	1	.....	.....	.....	.....	.....	173	131	124	88
Georgia	108	17	1	.....	5	.....	.....	.....	68	124	40	38
Florida	108	18	.....	.....	14	.....	.....	.....	171	180	2	1
North Central division	2,351	813	9	.....	117	8	1	.....	16,772	16,246	9,518	12,508
Ohio	183	109	1	.....	22	3	.....	.....	193	130	100	30
Indiana	92	29	.....	.....	18	.....	.....	.....	343	246	240	290
Illinois	740	209	1	.....	14	3	.....	.....	97	140	32	32
Michigan	120	27	1	.....	38	1	1	.....	5,624	7,249	4,926	6,172
Wisconsin	119	16	.....	.....	9	.....	.....	.....	3,835	3,161	1,206	1,017
Minnesota	94	24	.....	.....	2	1	.....	.....	1,888	2,300	690	2,369
Iowa	64	33	3	.....	1	.....	.....	.....	60	466	48	65
Missouri	409	91	3	.....	6	.....	.....	.....	127	113	75	20
North Dakota	28 }	b238	.....	..... {	1	.....	.....	.....	194 }	b1,391	b1,200	b2,261
South Dakota	195 }			..... {	.....	.....	.....	.....	782 }			
Nebraska	214	18	.....	.....	2	.....	.....	.....	2,893	235	87	63
Kansas	93	19	.....	.....	4	.....	.....	.....	736	815	914	189
South Central division	1,434	848	211	.....	61	.....	.....	.....	4,571	4,507	2,122	879
Kentucky	28	10	1	.....	3	.....	.....	.....	71	50	108	33
Tennessee	51	25	.....	.....	6	.....	.....	.....	146	352	70	60
Alabama	48	4	.....	.....	3	.....	.....	.....	759	213	98	160
Mississippi	147	51	16	.....	7	.....	.....	.....	2,036	1,857	809	2
Louisiana	333	489	71	.....	39	.....	.....	.....	627	818	569	173
Texas	710	136	25	.....	3	.....	.....	.....	704	992	379	403
Oklahoma	25	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....
Arkansas	92	133	98	.....	.....	.....	.....	.....	218	195	89	48
Western division	96,844	102,102	62,831	34,933	1,559	94	33	.....	31,872	41,373	10,870	28,997
Montana	2,532	1,765	1,949	.....	6	.....	.....	.....	860	1,663	157	.....
Wyoming	465	914	143	.....	.....	.....	.....	.....	43	140	66	.....
Colorado	1,398	612	7	.....	10	.....	.....	.....	107	154	180	.....
New Mexico	361	57	.....	.....	3	.....	.....	.....	8,554	9,772	1,309	10,507
Arizona	1,170	1,630	20	.....	1	2	.....	.....	1,512	3,493	31	.....
Utah	806	501	445	.....	4	.....	.....	.....	608	807	179	89
Nevada	2,833	5,416	3,152	.....	3	3	.....	.....	3,599	2,803	23	.....
Idaho	2,007	3,379	4,274	.....	.....	.....	.....	.....	159	165	47	.....
Washington	3,260	3,186	234	.....	360	1	.....	.....	3,655	4,405	1,319	426
Oregon	9,540	9,510	3,330	.....	25	2	.....	.....	1,258	1,694	318	177
California	72,472	75,132	49,277	34,933	1,147	86	33	.....	11,517	16,277	7,241	17,798

RECAPITULATION BY GEOGRAPHICAL DIVISIONS.

The United States	107,475	105,465	63,199	34,933	2,039	148	55	.....	58,806	66,407	25,731	44,021
North Atlantic division	6,177	1,628	137	.....	247	41	21	.....	3,234	2,477	1,565	239
South Atlantic division	669	74	11	.....	55	5	.....	.....	2,357	1,804	1,656	1,398
North Central division	2,351	813	9	.....	117	8	1	.....	16,772	16,246	9,518	12,508
South Central division	1,434	848	211	.....	61	.....	.....	.....	4,571	4,507	2,122	879
Western division	96,844	102,102	62,831	34,933	1,559	94	33	.....	31,872	41,373	10,870	28,997

a West Virginia set off from Virginia December 31, 1862.

b Dakota territory.

From the foregoing tables the following table for the United States as a whole is derived, giving separately for each class of the colored population under consideration the whole number returned at each census from 1850 to 1890, inclusive, together with the number and per cent of increase in each case during each decade:

CENSUS YEARS.	PERSONS OF AFRICAN DESCENT.			CHINESE.			JAPANESE.			CIVILIZED INDIANS.		
	Total.	Increase.		Total.	Increase.		Total.	Increase.		Total.	Increase.	
		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.
1890	7,470,040	889,247	13.51	107,475	2,010	1.91	2,039	1,891	1,277.70	58,806	a7,601	a11.45
1880	6,580,793	1,700,784	34.85	105,465	42,266	66.88	148	93	169.09	66,407	40,676	158.08
1870	4,880,009	438,179	9.86	63,199	28,266	80.91	55	55	.....	25,731	a18,290	a41.55
1860	4,441,830	803,022	22.07	34,933	34,933	.....	.....	.....	.....	44,021	44,021	.....
1850	3,638,808	765,160	26.63	.....	.....	.....	.....	.....	.....	.....	.....	.....

a Decrease.

Considering persons of African descent, it is seen that there has been an increase during the decade from 1880 to 1890 of 889,247, or 13.51 per cent, as against an increase during the decade from 1870 to 1880 of 1,700,784, or 34.85 per cent. The abnormal increase of the colored population of the South during the decade ending in 1880 led to the popular belief that the negroes were increasing at a much greater rate than the white population. The present census has shown, however, that the high rate of increase in the colored population, as shown by the census of 1880, was apparent only, and was due to the imperfect enumeration of 1870 in the southern states, as has been fully demonstrated in Census Bulletin No. 16, giving the official population of the United States in 1890.

There has been an increase in the number of Chinese in the United States during the decade from 1880 to 1890 of only 2,010, or 1.91 per cent, the number returned in 1880 being 105,465 and the number returned in 1890 being 107,475. The Chinese increased 66.88 per cent from 1870 to 1880 and 80.91 per cent from 1860 to 1870.

In 1880 the Japanese in the United States numbered only 148 while in 1890 they numbered 2,039. In 1870 there were only 55 Japanese returned under that census.

The civilized Indians have decreased during the past 10 years 7,601, or 11.45 per cent, the number returned in 1880 being 66,407 as against 58,806 returned in 1890.

ROBERT P. PORTER,
Superintendent of Census.

[7-010]

CENSUS BULLETIN.

No. 200. WASHINGTON, D. C. August 2, 1892.

MANUFACTURES.—PRODUCTION OF COKE.

POCAHONTAS FLAT TOP FIELD.

DEPARTMENT OF THE INTERIOR,
CENSUS OFFICE,
WASHINGTON, D. C., July 19, 1892.

Herewith is presented a report on the production of coke, prepared by Mr. JOSEPH D. WEEKS, special agent, under the direction of Mr. FRANK R. WILLIAMS, expert special agent in charge of the collection of statistics relating to all branches of manufactures.

The report is devoted especially to the production of coke in the Flat Top region of Virginia and West Virginia, known as the Pocahontas district, a territory in which the industry has recently been developed with an unusual degree of success, due to the fact that the coal peculiar to this district possesses high coking qualities.

The average number of persons reported as employed in the Flat Top coke works during the year 1889 was 533, and total amount of wages reported as paid was $149,727. The number of cars of coke shipped from the Flat Top district by the various railroads increased from 8,605 in 1887 to 20,883 in 1890. The notable feature in the table giving the distribution of these shipments is the great increase shown in shipments to points south of Bristol, Tennessee, which augmented from 1,275 cars in 1887 to 6,127 cars in 1889 and 9,143 cars in 1890, evidencing the increasing demand made by the furnaces at Chattanooga, Florence, Sheffield, and other points in Tennessee, Alabama, and the south for coke from this region.

The number of coking ovens built and in use in the Flat Top Company's districts has increased from 200 in 1883 to 1,833 in 1889, and 631 additional ovens were then under construction. The value of the coke at the ovens increased from $44,345 in 1883 to $542,219 in 1889.

It will be observed that the total capital reported as employed in coke manufacture in the Flat Top region in 1889 was only $744,576. This, however, does not represent the value of the leases nor value of the land held on lease, a royalty being paid by the operators on the coal mined. Assuming the value of the lease, so far as coke operations are concerned, to be $45 per acre, which value was estimated in the report of one operator, the sum of $783,810 for the 17,418 acres of leased lands should be added to the capital reported, making a total capital of $1,528,386.

(6938—8,000.)

The immense coal field owned and controlled by the Flat Top Coal Land Association comprises a total of about 175,000 acres actual coal land, not including the barren lands, of which 17,418 acres were under lease to 17 parties in 1890. A report made at the close of 1890 showed that up to that period 8,237,734 long tons of coal had been mined, and that only 899.7 acres of coal lands had been mined out of the territory controlled by this company, the average yield of which, to the close of 1890, has been 9,156 tons of coal per acre.

The combined length of the Flat Top and New River coal fields is about 60 miles, relatively equal to that of the Connellsville basin in Pennsylvania, but the breadth is more than five times as great.

Robert P. Porter

Superintendent of Census.

PRODUCTION OF COKE.

POCAHONTAS FLAT TOP FIELD.

BY JOS. D. WEEKS.

There is no more interesting and important coal field in the country than that known in its early history as the Pocahontas, named from the mining town where the first important developments were made, and then as the Flat Top, from the great Flat Top mountain in which the coal measures are found, but which is now known as the Pocahontas Flat Top field, but usually called the Flat Top. Apart from its importance as a producer of coal for the Atlantic seaboard markets, 1,783,583 short tons having been shipped in 1889, it is the chief dependence of the blast furnaces and foundries of Virginia, and to some extent of those of northern Alabama, for a supply of a high-grade coke for smelting and melting purposes. When the Elkhorn extension of the Norfolk and Western railroad is completed to the Ohio river, as it will be in 1892, the blast furnaces and foundries of southern Ohio, Indiana, Illinois, and Missouri will have a competitor for their trade, which heretofore has gone so largely to Connellsville, Pennsylvania, and to New River, Virginia.

In addition to its commercial importance, the tenure of the coal lands of this district and its business methods are a study in economics of interest and importance. All of the coal lands worked in this district in 1889 were owned or controlled by two parties, the Flat Top Coal Land Association and the so-called Crozer Land Company. The several parties mining coal or making coke lease their lands from one or the other of these companies at a royalty per ton with a minimum payment, and, at least in the case of the leases on the lands of the Flat Top Association, with an agreement that they will sell all of their coal through the Pocahontas Coal Company, which mines no coal but was organized solely as a sales agent. This company makes all sales, assumes all risks, and pays the coal operators for all coal mined and shipped in one month on the 15th of the next month, so that the operator who pays his men about the 20th of each month is sure to have in hand, from the product of the labor he is paying for, the means to compensate for that labor.

The selling of the coke is somewhat on the same principle, although the leases made to the coal operators, who are also coke makers (all the coke being made from the slack from the coal mines), do not contain a clause requiring all sales of coke to be made through the Hull Coal and Coke Company, the coke sales agent, as they do that all sales of coal shall be made through the Pocahontas Coal Company; but, under an agreement entered into between the operators and the Hull Company, the effect is the same. Even the furnaces which make their own coke sell through this company and pay a small commission.

The relation between the owners of the coal lands and a number of the blast furnaces of Virginia is such that these furnaces must draw their coke supplies from the Flat Top region, even if the conditions as to the location and transportation were not such as to virtually compel them to go to this field. Indeed, these furnaces have been located with a view to furnishing a market for this coke. The parties controlling the coal lands control the furnaces, and even if there be not a positive agreement that Flat Top coke shall be used, there is an equivalent understanding.

From what has been briefly said here, and from what will be noted in the course of this report, it will be seen that there is a breadth of organization and a deliberate interdependence of industries that make the coal and coke operations in this field both interesting and important apart from their commercial and statistical value.

In this report the Flat Top field will be regarded as a district for the production of coke, and its coal as material for coking, although to properly discuss its coke production it will also be necessary to pay some attention to its production of coal for other purposes.

GEOGRAPHICAL.

Geographically this field is located, so far as the measures have been worked, in the counties of Tazewell, in southwest Virginia, and Mercer and McDowell, in southeastern West Virginia.

This field can be divided, roughly, into—

1. The Pocahontas district, including the workings at or near the town of Pocahontas, Virginia.

2. The Bluestone district, including the workings on the Bluestone near Bramwell, in Mercer county, West Virginia, on the southeast slope of Flat Top mountain.

3. The Elkhorn district, including the workings in McDowell county, West Virginia, on the northeast slope of Flat Top mountain.

The workings in the Pocahontas district were until very recently entirely in Tazewell county, Virginia. Now some of the entries extend into Mercer county, West Virginia. There is but one operator in this district, the Southwest Virginia Improvement Company, which was the first in the Flat Top region. In giving the statistics of this field, those of the Pocahontas and Bluestone districts will be consolidated in many instances.

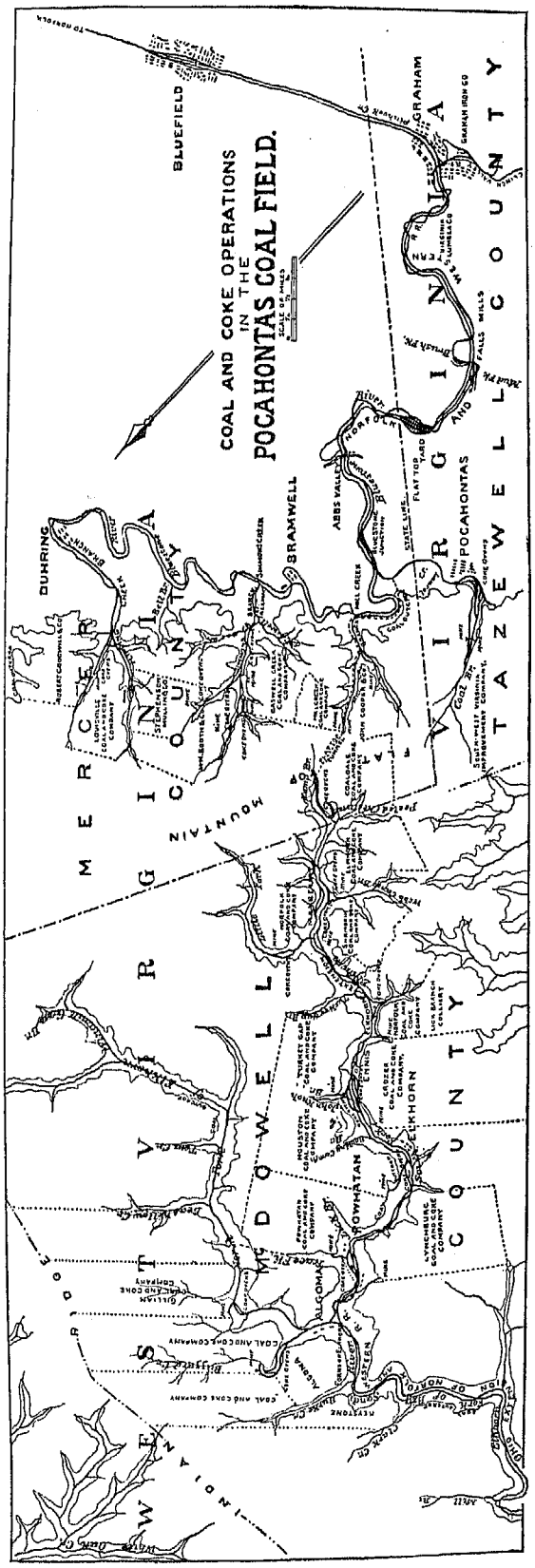
The Flat Top mountain, from which the district takes its name, is the most important and conspicuous feature of this region. Its surface features and those of the region are very marked, which is due to erosion. The carving is stupendous. Professor Stevenson compares the surface to that of the ocean petrified at the height of a terrible storm. Narrow ridges, rising to elevations of from 900 to 1,400 feet, separate equally narrow valleys in which flow rapid streams carrying a large body of water during most of the year. The slopes of these ridges are abrupt, sometimes as much as 35°, thus rendering the building of railroads exceedingly difficult. Level ground for building coke ovens is wanting at some places, and considerable grading required.

The Bluestone river, from which one of the districts in the Flat Top field is named, is formed at the easterly edge of Tazewell county, Virginia, by the union of Mud and Laurel forks, and flows across Mercer and Summers counties, West Virginia, to New River, which it reaches about 4 miles from Hinton, on the Chesapeake and Ohio railroad, near the New River coal field of that railroad.

The Flat Top mountain separates the Bluestone district from the Elkhorn. The Tug fork of the Sandy and the Elkhorn, on which are the coaling operations of the Elkhorn district, find their rise on the west slope of the mountain as the Bluestone does on the east. These streams flow by way of the Big Sandy into the Ohio at Catlettsburg. The Norfolk and Western is extending its road to the Ohio river, down the Elkhorn.

The present mining operations on the west side of the Flat Top are located along the Elkhorn, south of Indian ridge and north of Tug ridge. In the Pocahontas and Bluestone districts they are located east of Flat Top, between it and Red Oak mountain. The operations in the Pocahontas and Bluestone districts follow the Bluestone north from Pocahontas. On the Elkhorn they follow this stream westwardly from the tunnel through the Flat Top mountain.

The coal and coke operations in this field are shown in the following map:



OUTLETS.

The field is reached by the New River branch of the Norfolk and Western railroad, which leaves the main line at Radford, 43 miles southwest of Roanoke, the junction of the Norfolk and Western railroad with the Shenandoah Valley railroad, now a division of the Norfolk and Western. This latter road connects through the Shenandoah Valley via Hagerstown with Central Pennsylvania and the Pennsylvania railroad at Harrisburg. It is 74 miles from Radford to Pocahontas, the same distance from Radford to Bramwell, the center of operations in the Bluestone region, and 82 miles to Elkhorn.

The Ohio and Elkhorn extension will be carried down the Elkhorn and along the waters of the Big Sandy, crossing the Ohio at Catlettsburg by a steel bridge, and down the Ohio to Ironton. At Graham, 65 miles from Radford, the Clinch Valley railroad, which connects with the Louisville and Nashville at Big Stone Gap, branches off.

To the energy and push of the officials of the Norfolk and Western railroad is due the rapid development of this great coal field. The main line of this road runs from Bristol, Tennessee, at which point connection is made with the East Tennessee, Virginia and Georgia road, to Norfolk, Virginia, at the mouth of Chesapeake bay, one of the finest harbors in the country, at which point large and extensive coal docks have been erected. It will thus be seen that there are excellent transportation facilities for the distribution of the coal and coke of this region, not only to the furnaces and works of Virginia, but to all points through the south and southwest, and, when the Elkhorn extension shall be completed, to upper Ohio and the Mississippi river points and also to Lake Michigan ports.

OWNERS AND LEASES.

Until April, 1887, the territory of Flat Top mountain was owned by several companies. At this date these were all consolidated into what was for a time known as the Flat Top Land Trust, but now known as the Flat Top Coal Land Association, which owns most of the lands with the exception of those owned by the Crozer Land Company, on the Elkhorn. The Flat Top Coal Land Association owns 8,046 acres in Tazewell county, Virginia, including the Pocahontas lease of 3,808 acres; 38,450 acres in Mercer county, West Virginia, the Bluestone district; 60,629 acres in McDowell county,

West Virginia, the Elkhorn district, and 82,170 acres in Wyoming county, West Virginia, on which no leases have yet been made, as well as 100 acres in Boone county and 7,983 acres in Raleigh county, West Virginia. The Crozer Land Company owns about 18,000 acres in West Virginia. The lands of the two companies were at one time so interwoven on the Elkhorn that they squared the connecting tracts and organized the South Elkhorn Coal Company, the two corporations jointly forming this company. All of the stock of this company was finally acquired by the Flat Top Coal Land Association and the South Elkhorn Coal Company dissolved. The Flat Top Coal Land Association also owns the control of the Trans-Flat Top Land Association.

As stated elsewhere, the owners of the coal lands and mineral rights neither mine coal nor make coke, although individuals joined in the ownership of the lands may, as individuals, be connected with companies that do both. All land from which coal is mined is held and worked under leases. Even the Southwest Virginia Improvement Company, which was the first to mine coal in this region, and the only operator in the Pocahontas district, sold all its land to the trust when it was formed, and became a lessee under practically the same terms as the other companies.

At the close of 1889 there were 17 leases in this field, 1 in the Pocahontas district, 7 in the Bluestone, on 1 of which no coke was made, and 9 in the Elkhorn district, of which 2 were being developed, so that coke was made at but 14 places.

At the close of 1889 the total acreage of actual coal land in these 17 leases was 17,418, out of a total of some 175,000 acres held by the two companies, not including that classed as barren. Of these leases, 3,789 acres were in the Pocahontas district, 3,670 acres in the Bluestone, and 9,959 acres in the Elkhorn. The number of acres to a lease runs from 405 to 3,880. The Pocahontas lease is in Tazewell county, Virginia, and Mercer county, West Virginia. The Bluestone leases are all in Mercer county, West Virginia, and the Elkhorn leases all in McDowell county, West Virginia. In addition to requiring that coal shall be mined, all of these leases provide that coke ovens shall be erected.

A report made at the close of 1890 by the Flat Top Coal Land Association, up to which time 8,237,734 long tons of coal had been mined from their lands, showed that but 899.7 acres of coal lands had been mined out from the territory of the association.

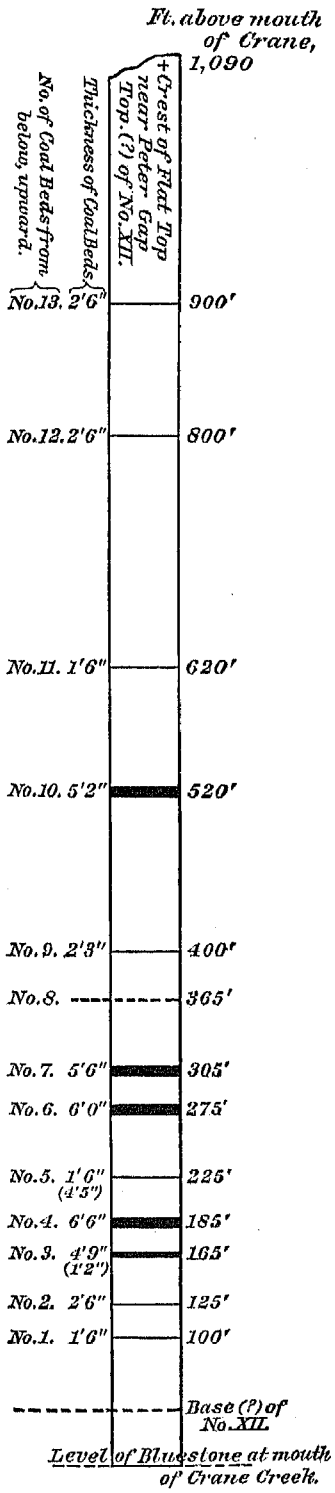
The royalties paid by the lessees are from 6 to 10 cents a ton (2,240 pounds) of coal sold as coal, and 15 cents a ton (2,240 pounds) of coke produced. The standard royalty of coal is 10 cents, the 6 and 8 cents royalty being paid in the northern part of the field, in the Bluestone district, where the vein is smaller than in the southern part, being 4.7 feet to 4.8 feet workable thickness instead of 7.5 feet to 8 feet. A minimum payment of $7,500 per year is required from each lease.

GEOLOGICAL.

Geologically, the coals of this field belong to the lowest member of the coal measures, No. XII of Rogers, the Pottsville conglomerate of Pennsylvania. It has been generally stated that they are the equivalent of the Quinnimont series of the Kanawha or New River region, and for this reason the series has been called the Pocahontas-Quinnimont. But Professor I. C. White expresses the opinion that the Pocahontas seam is well down toward the base of No. XII, and possibly lower than the Quinnimont or any of the New River coal beds. There are in this field at least three workable beds above water level. No. 3, the Pocahontas bed, is the one worked. This bed has a thickness of from 11 to 13 feet at Pocahontas, though the whole thickness is not mined, a portion of the top of the seam being left for the roof, and in some cases a portion of the bottom for the floor.

The thickness of the vein diminishes toward the northwest and northeast from Pocahontas. On the Virginia line it is about 11 feet, and diminishes 5 to 6 feet on Flipping creek, in the Bluestone region, and 4 to 5 feet further north. On the Elkhorn it is from 6 to 9 feet, and on the Tug fork of the Big Sandy from 6 to 10 feet. As will be seen from the tables on page 8, the actual average thickness of the seam worked at Pocahontas is 9 feet, on the Upper Bluestone, by the various companies, from 6.8 to 8 feet, to the north on the Bluestone 4.7 to 4.8 feet, and on the Elkhorn 7 to 7.5 feet. The average yield from the lands of the Flat Top Coal Land Association has been 9,156 tons an acre up to the close of 1890.

The following is a section profile showing the coal measures on Crane creek of Flat Top:



This wonderful coal seam is absolutely without a slate parting. It is split into distinct workable seams by a thin streak of bone coal quite rich in carbon. This has been called a slate parting, though improperly so. This bone coal increases in thickness northward, reaching 6 or 7 feet on Flipping creek, dividing coal bed No. 3 into two seams. The seam is also free from faults. Clay veins, spars, rolls, or horsebacks are never found in it. Everything handled by the miner is placed in the wagon, except a small streak of "bone coal" found near the top, which is condemned by the inspectors and thrown out. Certain portions of the coal at openings that have been discolored by water, termed "rusty coal", are also thrown out by the inspectors, though analysis shows it to be equal to coal not thus discolored.

EXTENT AND EXHAUSTION OF THE FIELD.

The Flat Top and New River fields belong to one and the same coal field. The seam of coal worked in the Flat Top region is known as the Pocahontas or No. 3 seam. Both it and the Quinnimont of the New River field are in the Pottsville conglomerate (No. XII). About the only differences are that the New River coals come from the northern portion of this great field and the veins are not so thick as the Flat Top beds, which lie in the southern part of the great deposit. Major Hotchkiss gives the dimensions of these combined fields as 60 miles in length and about 16 miles in breadth, making the combined length about the same as the Connellsville basin of Pennsylvania, but the breadth is more than five times as great. It is the largest field of distinctively coking coal in the United States.

The eastern border of this field is sharply defined by the Great Flat Top mountain and its extensions on the southwest side of the New river, and by Big Sewell mountain and its extensions on the northeast side of that river.

The demarcation of the western border of this field is difficult, because the formation holding the coals generally dips, at first moderately and then rapidly, to the northwest, and hence carries these coal beds under the drainage levels of the great trans-Appalachian plateau at different distances from their eastern outcrop, depending on the depths to which the streams have eroded their channels. A number of these western outcrops are found on the Tug river, on Elkhorn fork, on Indian and Pinnacle creeks, on Guyandot river, on Laurel fork of Clear fork, and on New river.

Of this great field some 220,000 acres are held by the two companies which control the coal lands of this district. These are practically all the lands within reach of transportation at the present time. Of this acreage the Flat Top Coal Land Association held 197,378 at the close of 1889, of which 107,125 acres were in the counties of Tazewell, Virginia, and Mercer and McDowell, West Virginia, and in which counties all of the coal mined in the Flat Top field up to the present time has been produced. Extensive surveys have been made by this association, which show approximately that, of the total area of land owned by it in these counties, 77.5 per cent is underlaid with coal, and that the coal area in Wyoming and Raleigh counties is even larger. It is asserted that only 20 per cent of the area of the coal lands in these counties owned by the Flat Top Land Association has been lost by erosion, and of the Crozer Company but 10 per cent. Assuming that the same holds true of the lands of the Crozer Land Company, there are about 175,000 acres of actual coal lands in these two holdings.

A most interesting and valuable statement has been made by the Flat Top Land Association showing the acreage and tonnage of coal mined on its lands from the beginning of operations to December 31, 1890. Although they include a year later than the date for which the census figures are gathered, the two tables are so valuable they are herewith inserted:

TABLE 1.—ACREAGE AND TONNAGE OF COAL MINED FROM THE BEGINNING OF OPERATIONS TO DECEMBER 31, 1890. (*a*)

NAMES OF COMPANIES.	Approximate thickness of vein. (Feet.)	Number of acres undermined.	Number of long tons mined, from reports.	Number of long tons per acre mined. (*b*)	Theoretical number of long tons per acre.	Per cent obtained per acre.	Remarks.
Total		899.7	8,237,734				
Southwest Virginia Improvement Company	9.0	481.0	4,242,110	8,819	14,520	61	Robbing.
John Cooper & Co., including East, West, and Coaldale mines	8.0	116.3	1,078,441	9,273	12,906	72	Robbing.
Caswell Creek Coal and Coke Company	7.7	87.1	877,593	10,076	12,423	81	Robbing.
Booth-Bowen Coal and Coke Company	6.8	69.5	693,279	9,975	10,971	91	Robbing.
Buckeye Coal and Coke Company	6.5	48.4	489,838	10,121	10,487	96	Robbing.
Goodwill Coal and Coke Company	4.7	32.1	228,957	7,133	7,583	94	Robbing begun.
Louisville Coal and Coke Company	4.8	19.1	141,361	7,401	7,744	96	Robbing begun.
Elkhorn Coal and Coke Company	7.5	17.2	178,364	10,370	12,100	86	
Shamokin Coal and Coke Company	7.5	17.2	180,030	10,467	12,100	87	
Norfolk Coal and Coke Company, No. 1	7.5	11.1	119,948	10,806	12,100	89	
Norfolk Coal and Coke Company, No. 2, Lick Branch colliery	7.0	0.7	7,813	11,161	11,293	99	

a Coke is reduced to coal on a basis of 1.6 to 1. *b* Average number of long tons per acre mined, 9,156.

TABLE 2.—ACREAGE AND TONNAGE OF COAL MINED DURING 1890. (*a*)

NAMES OF COMPANIES.	Approximate thickness of vein. (Feet.)	Number of acres undermined.	Number of long tons mined, from reports.	Number of long tons per acre mined. (*b*)	Theoretical number of long tons per acre.	Per cent obtained per acre.	Number of acres of rusty coal.
Total		196.7	1,905,618				
Southwest Virginia Improvement Company	9.0	50.6	668,685	13,215	14,520	91	12.0
John Cooper & Co., including East, West, and Coaldale mines	8.0	37.9	267,255	7,052	12,906	55	21.6
Caswell Creek Coal and Coke Company	7.7	24.9	210,485	8,453	12,423	68	8.5
Booth-Bowen Coal and Coke Company	6.8	17.8	159,210	8,944	10,971	82	9.3
Buckeye Coal and Coke Company	6.5	15.3	148,945	9,735	10,487	93	1.3
Goodwill Coal and Coke Company	4.7	11.1	77,510	6,983	7,583	92	Nominal.
Louisville Coal and Coke Company	4.8	10.9	78,423	7,195	7,744	93	Nominal.
Elkhorn Coal and Coke Company	7.5	10.3	98,051	9,520	12,100	79	
Shamokin Coal and Coke Company	7.5	9.0	96,791	10,755	12,100	89	
Norfolk Coal and Coke Company, No. 1	7.5	8.2	92,450	11,274	12,100	93	
Norfolk Coal and Coke Company, No. 2, Lick Branch colliery	7.0	0.7	7,813	11,161	11,293	99	

a Coke is reduced to coal on a basis of 1.6 to 1. *b* Average number of long tons per acre mined, 9,688.

From Table 1 it appears that the actual number of acres undermined from the beginning of operations to December 31, 1890, on the land of the Flat Top Coal Land Association is 899.7, from which 8,237,734 long tons of coal, or an average of 9,156 long tons per acre, have been obtained. For 1890 the product per acre was 9,688 tons, showing better mining. This association has in its employ an inspector of mines, whose duty it is to see that the association's requirements regulating methods of mining are followed. The result is that 80 per cent of the estimated contents of the seam has been produced. Entries are driven and chambers opened, and all the coal is required to be mined except that left in the pillars and supports.

It is estimated that the total acreage of coal undermined in this district up to December 31, 1890, was 1,000. There had been produced in all 7,366,801 long tons of coal and 1,158,653 long tons of coke. Reducing the coke to coal, on the basis of 1.6 tons of coal to a ton of coke, would give the coal equivalent of the coke as 1,853,845 long tons, making a total of 9,220,646 long tons. This would make the average yield per acre 9,221 long tons. On the same basis of yield, and on the

assumption that but 1,000 acres of the 175,000 acres of coal lands in these counties have been undermined, there are left more than a billion and a half long tons of coal, every pound of which is coking coal. When it is considered that there are probably only from 55,000 to 60,000 acres of coking coal left in the Connellsville region, the extent and relative value of the Flat Top portion of this great field can be properly appreciated.

CHARACTER OF THE COAL.

The Flat Top coal is semibituminous, somewhat dull in luster, rather hard in the vein, requiring powder to mine it, but, as will be seen from the following analyses, it is low in volatile matter and ash and high in fixed carbon. It is a superior grate and steam coal, giving an exceedingly bright, hot, clear fire. It makes an excellent coke. As to the value of this coal as a steam and grate fuel, it can be said that it burns with a short, fierce, bright flame, comparatively free from smoke, and generates an even temperature of high calorific power and intensity. It produces steam quickly and in large quantities. The following table shows 6 analyses of Pocahontas Flat Top coal:

ANALYSES OF POCAHONTAS FLAT TOP COAL.

COMPONENT PARTS.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Water	0.932	0.684	0.492	0.786	1.011	1.112
Volatile matter	20.938	19.964	19.278	18.939	18.812	17.898
Fixed carbon	73.728	73.021	73.948	76.077	72.708	74.524
Sulphur	0.668	0.656	0.847	0.793	0.787	0.514
Ash	3.984	5.675	5.435	3.405	5.191	5.952

Of these analyses No. 1 is an average of 5 samples from the mines of the Southwest Virginia Improvement Company in the Pocahontas district, No. 2 is "run of mine" from the same district, No. 3 is from Mill creek in the Bluestone district, and No. 4 from Flipping creek in the same district, while No. 5 is an average of 15 analyses of the coal from the two districts. No. 6 is from the Elkhorn.

Taking No. 5 of the above, which is an average of 15 analyses, as the average analysis of the Flat Top coal, and the analysis of the coal of the Broad Ford mines of the H. C. Frick Coke Company as the typical analysis of Connellsville coal, the following is a comparison:

COMPONENT PARTS.	Flat Top coal.	Connellsville coal.
	Per cent.	*Per cent.*
Water	1.011	1.260
Volatile matter	18.812	30.107
Fixed carbon	72.708	59.616
Sulphur	0.787	0.784
Ash	5.191	8.233

The important differences in these coals are in the percentages of volatile matter, fixed carbon, and ash. The effect of these differences will be treated in connection with the discussion of coking these coals.

MINING WAGES AND COST OF COAL.

The operators not only have the magnificent seam of coal described to work upon, with its good roof and floor, but the mines are situated above the water level, requiring no drainage. The measures seem to be nearly horizontal, the rise of the coal bed being no more than is needful for drainage. This also reduces the cost of hauling to a minimum. Where mules are employed, the absence of heavy grades permits carriage of large loads, and the vein is so high that mine locomotives can be used when desired without many of the objections found in other sections. There is ample supply of timber to furnish all that is required for mining operations. The lessees are permitted to cut from the premises all timber necessary for building purposes or mine use. The effect of this will be noted in the statistics of materials used, given on page 21. Most of the companies set up sawmills and get out all lumber required for building, etc., thereby saving large expense.

Concerning ease of mining, it may be noted that 3,547 tons of coal were brought out to a tipple at one of the Southwest Virginia Improvement Company's mines in a single day. This amount was all gathered from the workings two miles away, and brought forward by mine locomotives. A gondola car, holding 20 tons, is loaded at this tipple every minute and a half.

The rates paid for mining in this district are 75 cents per wagon of 90 cubic feet (2 tons) for room coal, and $1.05 a car for entry coal. As more than the usual proportion of the coal taken out is entry coal, this increases the cost at the present time somewhat above the average, but in the near future, when the rooms are mined out, the cost will be reduced below the average. On the basis of 45 cubic feet to the ton of 2,240 pounds, the price of mining is 37.5 cents for room coal and 52.5 cents for entry coal. Breaking through rooms is paid $1.00 per yard and tonnage, turning rooms 50 cents per yard and tonnage. The company lays all roads and posts the rooms, the miner having nothing to do but mine and load into the car everything he brings down from the vein. Drivers are paid $1.68 per day; trappers, 58 cents; track layers, $1.75; men at the head of the tipple, $1.75; men standing props, $2.00; laborers, $1.20. Powder costs the men about 3.5 cents a ton of coal mined; tool sharpening, 50 cents a month. Good miners average 4 cars a day in the Pocahontas mines. On the narrower seam on the Bluestone, a miner with a boy or a common laborer will average about the same. It is estimated that the average wage of miners per month is $45; some, however, make as high as from $120 to $130 per month.

Prop setting and track laying cost the operators at some places, it is claimed, from 5 to 6 cents per ton of coal produced. It is asserted, however, that in some cases this work can be done for from 2.5 to 3 cents, and even as low as 1.25 cents. When so large a proportion of entry work is performed as in this field, the cost of timbering is above the average.

From the above figures some idea as to the cost of coal per ton may be gathered. It is claimed that the cost of dead work and hauling is 25 cents a ton. On the basis of room coal, then, the cost would be as follows per long ton:

	CENTS.
Mining	37.5
Dead work and hauling	25.0
Royalty	10.0
Total	72.5

This is probably very near the cost of "run of mine" coal. If the mine cars hold over two tons, the cost of mining will be relatively reduced.

PRODUCTION AND PRICES OF COAL.

The first shipments of coal from this field were made from Pocahontas in 1883. Including the shipments in that year to January 1, 1890, there have been sent to market from this field, via the Norfolk and Western railroad, 6,215,166 tons of 2,000 pounds each. This does not include the coal equivalent of the coke, which, on the basis of 1.6 tons of coal to 1 ton of coke, would be 1,377,661 tons additional. The following table shows the production of coal, not including that used for coke, from the Pocahontas Flat Top coal fields from 1883 to 1890, inclusive, in tons of 2,000 pounds:

	PRODUCTION.
1883	68,125
1884	196,280
1885	581,680
1886	857,959
1887	1,149,278
1888	1,549,663
1889	1,812,181
1890	2,035,644

The shipments at the present time are far behind the orders, owing to lack of transportation facilities. Additional cars are being built, which will obviate the reduction in production from this cause.

Shipments from Pocahontas Flat Top coal fields from 1887 to 1890, inclusive, divided as to size of coal, are as follows, given in short tons:

SIZES OF COAL.	1887	1888	1889	1890
Total	1,148,986	1,540,131	1,783,583	2,044,567
Run of mine	1,083,092	1,458,499	1,698,090	1,966,099
Lump	60,789	65,355	70,893	56,557
Nut			4,363	15,287
Slack	5,105	16,277	10,237	6,624

"Run of mine" must contain at least 40 per cent of lump, and is sold to the Pocahontas Coal Company at an average of 82 cents per ton free on board at the mines. This includes royalty. To produce "run of mine", especially at those works making coke, the coal is run over a screen with 1-inch meshes. When lump is desired, the screen bars are 3 inches apart. Lump is sold at $1.00 and slack at 65 cents per ton.

The Pocahontas Coal Company exercises the greatest care in securing a clean coal for market. It employs a general inspector for the entire field. This inspector places a subinspector at every tipple in the region, whose duty it is to stand on the car, watch every pound of coal dumped, and see that no slate or bone coal or rusty coal is loaded. While the coal from this region is of itself generally clean, this precaution, no doubt, sends the Flat Top coal into market remarkably free from dirt and impurities.

THE COAL AS A COKING COAL.

Inspection of the analysis of Flat Top coal does not warrant the belief that it is a good coking coal. While it has the advantage of being low in ash, and consequently should produce a coke high in carbon, it would be regarded as too low in volatile matter to agglutinate properly, having, as per the typical analysis given elsewhere, only 18.812 per cent, as compared with 30.107 per cent in the Connellsville coal. While it makes an excellent coke when burned as "run of mine", the coke is greatly improved by having the coal specially prepared for coking by crushing. When "run of mine" is charged, the lumps frequently come out of the oven simply charred, the volatile matter being driven off and the bond of the coal entirely broken. This charred coal is known locally as "roasted coal". Notwithstanding this lack of volatile matter, the coal makes a most excellent coke, not as bright as the Connellsville, possibly more friable, but having more fixed carbon, furnishing a first-class furnace fuel, capable of carrying in the furnace as heavy a burden as the Connellsville, and being much lower in ash.

The coking process is carried on, however, at the expense of a considerable portion of fixed carbon. To make a ton of coke requires at least 1.6 tons of coal, containing, on the basis of 72.708 per cent of fixed carbon, 116.33 units of carbon. In other words, as the coke contains only 91.50 units of fixed carbon, there has been a loss of 24.83 units of carbon in the coking process, or more than one-fifth of the fixed carbon contained in the coal necessary to make a ton of coke.

In coking Connellsville coal little or no fixed carbon is lost, or if it be burned its loss is made up by the carbon from the volatile matter, so that in this coke there will be found more carbon than the total fixed carbon in the coal. The practice with the Flat Top coal should certainly be better than it is at present, and the percentage of coke obtained greater. More satisfactory results no doubt will be secured through improvements in preparing the coal for coking and through other improvements to be made in the ovens and in coking methods.

OVENS.

The ovens used in this district during the census year were, without exception, the beehive. Some experiments, as stated elsewhere, have been made in coking in the Soldenhoff-Coppee oven, but, though admirable results were obtained, the oven has not been introduced into this district. The earlier ovens built were 11 feet and 11 feet 6 inches in diameter, and from 5.5 to 7 feet high; but all those recently constructed are 12 feet in diameter and 7 feet high. All ovens on the

Elkhorn are the larger size. Some ovens on the Welsh plan, that is, a long, narrow oven, have been introduced, and, it is said, good results were obtained.

The cost of a bank or block of ovens in this district varies somewhat with the nature of the ground and consequent amount of grading to be done. An estimate of the cost per oven of a block of 100 ovens is as follows:

Double block, including rail on top of ovens and lorry, each	$375
Double block, with rail only, each	350
Single bank, each, less	25

The cost of block ovens, including grading, wharf, lorries, tipple cars, etc., is placed at $450 each. The average value of the 1,833 ovens given in the table on page 19 is $359 each. The actual cost of a block of 100 ovens built in 1888, not including mine cars, was $43,600. This block required some heavy grading. The bricks used are chiefly Mount Savage and Black Lick, and were delivered in 1889 as low as $27 per 1,000.

The opinion is expressed that the ovens are too large for the coal used, based upon the view that the 11-foot-6-inch oven burns more actively and quicker than the 12-foot oven. The charge for the 12-foot oven is regarded as so heavy and deep that either the charge must be coked at the expense of the coal at the top, or the bottom of the charge will be found improperly burned, giving black ends. It is possible that in changing the shape and size of the oven, a method will be discovered of reducing the waste of fixed carbon in the process of coking referred to elsewhere.

The waste in coking, however, is owing chiefly to the extremely low volatile constituents. After drawing an oven, in order to restore the initial heat necessary to agglutinate a dry coal, a proportion of the fixed carbon of the coal is consumed. The amount thus consumed varies with the degree of watchfulness or care taken in drawing, which depends upon the character of the labor. The general employment of colored labor, which is usually careless and irregular, makes the waste greater than it should be. Ovens are unduly saturated with water. The time taken to draw the oven is unnecessarily prolonged, and it is allowed to get cold. This can be obviated with the present practice and ovens now in use by, first, universal crushing of the coal or slack to a regular degree of fineness; second, more rapid charging and drawing; third, more careful drafting of the oven or admission of the air after the small amount of volatile matter has been consumed, and in the future by, first, ovens built so as to utilize the waste gases for restoring the heat; second, mechanical drawing; third, watering outside of the oven.

Steps have already been taken in these directions, and a marked improvement noted in the product. In a new district, however, where the labor as well as the superintendence, with few exceptions, are learning and at the same time required to deal with a material different from that of any other district, difficulties must be expected. Experience will in time correct the waste now taking place.

CONSTRUCTION OF THE OVENS.

Though the beehive ovens in this district do not differ materially from those of other districts, their construction and arrangement are exhibited in the cuts on the following page as a matter of interest to those not posted concerning their details.

The ovens are of the ordinary beehive type and in two rows. Each oven has a space of 6 inches between it and the adjacent one transversely, and 3 inches space between it and the adjacent one longitudinally.

The ovens are 12 feet in diameter, 6 feet 6 inches high in the center, 1 brick thick, and have necks turning out, as shown by Figs. 2 and 3, so as to remove the door as far as possible from the excessive heat of the charge. The block is faced with rough rubble masonry. Piers are built up between the ovens, as shown on Figs. 2 and 3, which are 8 feet wide at the top, 7 feet wide at the bottom, and 18 inches thick; 3 rails are placed upon the piers for running the coal lorries upon. The material is dumped from the lorries through the funnel heads into the center of the ovens, as shown on Figs. 2 and 3. The coke is discharged by hand through the doorways, which are 3 feet high in the center by 2 feet 8 inches wide, and bricked up during the coking of the coal. A hose is provided, as shown to the right of Fig. 1, for watering the coke. A platform or wharf is erected on either side of the ovens, which is about 5 feet above the railway sidings.

BEEHIVE OVENS.

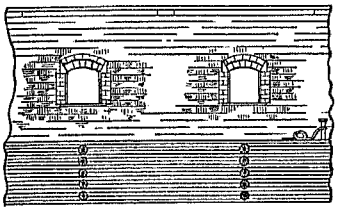


FIG. 1.—FRONT ELEVATION OF OVENS.

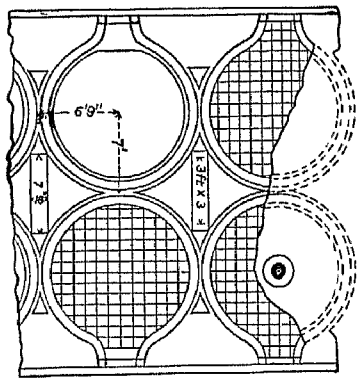


FIG. 2.—PART PLAN OF OVENS.

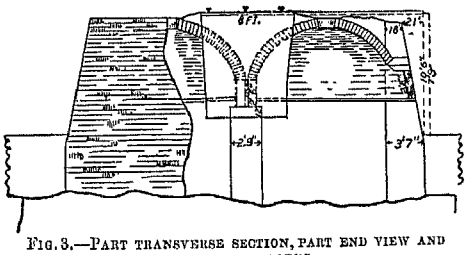


FIG. 3.—PART TRANSVERSE SECTION, PART END VIEW AND ELEVATION OF PIERS.

NUMBER OF OVENS.

The first coke ovens erected in this field were those built by the Southwest Virginia Improvement Company, at Pocahontas, in 1883. The first ovens built in the Bluestone region were in 1886, while the first ovens of the Elkhorn district were constructed in 1888.

The number of ovens built and building at the close of 1889, as well as those contemplated, is shown in the following table. Those reported as completed represent all the ovens that were or could be operated; those under construction are partially built, while those contemplated will be built, at least in part, in 1890.

LIST OF COKE OVENS IN POCAHONTAS, BLUESTONE, AND ELKHORN COAL DISTRICTS OF THE FLAT TOP FIELD IN VIRGINIA AND WEST VIRGINIA DECEMBER 31, 1889.

NAMES OF COMPANIES.	Ovens built.	Ovens building.	Ovens contemplated.
Total all fields	1,833	631	700
Pocahontas district:			
Southwest Virginia Improvement Company	400	250	
Bluestone district	578	150	170
John Cooper & Co	150		
Caswell Creek Coal and Coke Company	137		70
Coaldale Coal and Coke Company		150	
Booth-Bowen Coal and Coke Company	91		
Buckeye Coal and Coke Company	100		
Goodwill Coal and Coke Company	50		50
Louisville Coal and Coke Company	50		50
Elkhorn district	855	231	530
Elkhorn Coal and Coke Company	100		
Shamokin Coal and Coke Company	100		50
Norfolk Coal and Coke Company	100	50	50
Lick Branch Coal and Coke Company	120		80
Turkey Gap Coal and Coke Company	100		50
Crozer Coal and Coke Company	170	46	
Houston Coal and Coke Company	100		50
Powhatan Coal and Coke Company	65	35	50
Lynchburg Coal and Coke Company		100	
Algoma Coal and Coke Company			100
Gilliam Coal and Coke Company			100

It will thus be seen that when all of the ovens under construction and contemplated shall be built, the total number of ovens in the field will be 3,164, making this coking district one of the most important, in number of ovens, of any in the country. It will be surpassed in this respect only by the Connellsville (Pennsylvania) and Alabama districts. The indications are also that the growth of this district in the near future will place it, both in number of ovens and production, far in advance of any other coking district in the United States except the Connellsville.

The growth in the number of ovens in this district since 1883 is shown in the accompanying table, which states the number actually erected at the close of each year:

YEARS.	Total.	Pocahontas district.	Bluestone district.	Elkhorn district.
1883	200	200	----------	----------
1884	200	200	----------	----------
1885	200	200	----------	----------
1886	210	200	10	----------
1887	684	300	384	----------
1888	1,282	400	486	396
1889	1,833	400	578	855

COKING.

The charge of coal for a 12-foot oven is about 9,000 pounds for 72-hour coke, and 8,000 for 48-hour. In burning, the oven becomes exceedingly hot, and although at a "white heat", difficulty is still experienced in maintaining hot ovens, except at the expense of the fixed carbon in the coal. Great care is also required in quenching the ovens properly, in order to avoid "cold bottoms" and "black ends". When these conditions occur, the greatest care is necessary to bring the ovens up to the proper heat again.

As has been suggested, this waste of fixed carbon in the process of coking indicates that the process as carried on is not the best, in view of the character of the coal. It is a well-known fact that, within certain limits, the higher the temperature in the oven during coking, other things being equal, the greater the yield of the coal in coke. As the heat in coking this coal is so high, the yield should certainly be greater than it is. The coke made, however, is a most excellent fuel, and while it may not be possible to conduct the process of coking with the loss of volatile matter only, there should be a large reduction in the amount of fixed carbon consumed. Not only this, but there should be a great improvement in the looks of the coke. It is not as handsome as the Connellsville, and lacks that bright luster which characterizes the Pennsylvania coke. It contains a large proportion of "black ends". This has been explained by the fact that the demand for coke was sufficient only to maintain the ovens in operation about half time, and the bottoms of the ovens were not kept hot enough.

There is no doubt but that a marked improvement in the coke can be secured by reducing the coal, previous to coking, to a uniform degree of fineness. By this course the exposure to the heat of a large surface of fine coal will cause it to evolve its volatile matter more quickly and coke more rapidly than when lumps of coal are present in the charge. Crushing is done at some of the coke works. The coke made from this crushed coal seems to be more regular and compact than that from uncrushed, but even better results could be obtained from disintegration. Another difficulty experienced at times in this region at some works is the want of water. This, however, is being remedied by sinking wells.

Very good results have been obtained with this coal in the Soldenhoff-Coppee oven. About 175,650 pounds of coal from the Bluestone district were sent to the Coppee ovens in the New River district. Of this amount, 46,850 pounds were "run of mine", the rest being slack. 5 tests were made, the charges being from 2.5 to 3 tons to the oven, the number of ovens charged from 4 to 9, and time of coking 24 to 48 hours. The average yield in the 5 experiments was 67.5 per cent. The coke burned 36 to 48 hours proved the best, being bright, regular, compact, and uniform throughout.

YIELD OF COAL IN COKE.

Great difference of opinion exists as to the yield of coal in coke, that is, as to the amount of coal required to make a ton of coke. This yield is generally placed at 62.5 per cent, so that it requires 1.6 tons of coal to make a ton of coke. This is the figure assumed in the tables of the Flat Top Coal Land Association and in all its estimates and publications, and yet at some works the yield is only from 54 to 60 per cent. One of the most intelligent operators in this region expresses the belief that the yield did not reach 53 per cent.

It would be a simple matter to make a test extending over a sufficient length of time to determine what this yield actually is, at least at the works where the test is made, and no doubt such tests have been made. If they have, the results are carefully withheld.

No doubt there is great difference in the practice. With a coal containing as little volatile matter as this, it would be easy, through careless practice, to greatly decrease the yield. In the returns first made by the operators, the amount of coal used for making a ton of coke indicated in some cases a yield as high as 70 per cent, which was evidently a mistake. Several works reported the yield at 65 per cent. The consumption of coal, as finally ascertained, was 517,613 tons, producing 321,686 tons of coke, an average yield of 62.15 per cent, and yet it is evident that these reports are estimates. The coal is not weighed, and the coke wastefully made. The only weight actually taken is that of the coke, and the only method of arriving at the quantity of coal used in the manufacture of coke is to estimate it. In view of these facts, the figures usually assumed, viz, 62.5 per cent, or 1.6 tons of coal to a ton of coke, may as well be taken as the yield as those given as the result of census investigation.

WAGES AND COST OF COKE.

The range and average of wages in this district are given in detail on pages 22 and 23. Here it need only be said that drivers get from $1.00 to $1.25 per day; chargers, $1.20 to $1.50; levelers, 8 cents an oven and $1.20 to $1.50 per day; loaders, $1.20 per day; laborers, $1.17 to $1.20 per day, and drawers 50 to 58 cents an oven and $1.25 per day. Charging costs from 4 to 5 cents an oven; leveling, 8 cents; drawing and loading, 50 to 58 cents; loading from wharf to cars, 10 to 12 cents a ton; cleaning out oven, 1 to 2 cents.

There is wide diversity of statement, not only between the operators and those owning lands, but among the operators themselves, as to the cost of coke. The figures given range all the way from $1.35 to $1.75 per ton. This great diversity arises in many instances from differences in opinion as to the price at which the coal should be charged to the ovens. In the Connellsville region (and reference is made to this region so frequently because it is always used in this district for comparison by the operators themselves) the operators mine coal for no other purpose than coke making. In estimates of cost of coke in Connellsville, therefore, coal is charged to the ovens at just what it costs to mine. In the Flat Top region, however, coke making is only an adjunct to the production of coal, coal mining and not coke making being the chief business. Some of the operators argue, therefore, that they should charge the coal to the ovens at the price they get for it as coal, including in this price their profit as coal producers. In the returns of the operators, the coal is reported as worth from 45 cents to 72 cents per ton. In the Pocahontas district the average is 64.7 cents per ton; in the Bluestone district, 62.8 cents per ton, and in the Elkhorn, 51.4 cents per ton, the general average being 58.5 cents per ton. It is immaterial what custom is adopted, provided that in making comparisons of cost with other districts the different items be calculated on the same basis. It would seem, however, that the fairer way would be to charge the coal to the ovens at cost, which, as given above, is 62.5 cents per ton of 2,240 pounds, or 55.8 cents per short ton.

On this basis, then, the cost of the coking will stand about as follows, a charge of 8,000 pounds to an oven and a yield of 62.5 per cent, say 2.5 tons (2,000 pounds) of coke, being assumed:

COST OF COKING IN THE FLAT TOP REGION.

ITEMS.	Per oven.	Per ton of coke. (2,000 lbs.)
	Cents.	*Cents.*
Total		35.7
Charging	5.0	2.0
Leveling	8.0	3.2
Drawing	50.0	20.0
General labor		2.5
Cleaning ovens		1.0
Supplies and repairs		7.0

If the charge is more than 8,000 pounds some of these items will be proportionately reduced. On a charge of 10,000 pounds the coke would cost 5 cents a ton less.

Assuming that the coal costs, not including royalty, 62.5 cents per ton of 2,240 pounds, or 55.8 cents per ton of 2,000 pounds, and that it requires 1.6 tons of coal to make a ton of coke, the cost of a ton of coke on the basis of the above figures would be as follows:

COST OF A TON OF COKE IN THE FLAT TOP REGION.

1.6 tons of coal, at 55.8 cents	$0.8928
Cost of coking	0.3570
General expense	0.0500
Royalty (15 cents on 2,240 pounds)	0.1340
Total	1.4338

If the yield is less than 62.5 per cent, this cost will be increased, and, on the other hand, as some coal is sold as lump, at an advanced rate, the slack of which is coked, this slack should be held to be worth less than "run of mine", and so decrease the cost. So, also, if mining is less than 37.5 cents a ton, and if the charge to the oven be more than 8,000 pounds, the cost will be decreased. It would be fair to assume $1.40 to $1.45 as the cost of coke at well-managed works. This does not include commission for selling. A statement made from the returns received would show a higher cost than this, as will be seen from the following condensation of items of cost as returned:

Value of coal used	$302,742
Royalty on 321,686 short tons of coke produced, at 13.4 cents per ton	43,106
Cost of all other materials	8,913
Total cost of materials	354,761
Total wages paid	149,727
Total amount paid for miscellaneous expenses	14,084
Aggregate cost at ovens of 321,686 short tons of coke	518,572

From the foregoing statement the cost of coke at the works appears to be $1.612 per short ton. This exceeds the estimated cost based on economical management, which is not always obtained in the district under consideration. For reasons stated elsewhere, it seems probable that the value of coal used is too high. Owing to the fact that the mining of coal and manufacture of coke are so closely allied, it is also probable that the wages charged the coke department may exceed the true expenditure for this branch of operation.

ANALYSES OF THE FLAT TOP COKE.

In the following table are given three analyses of Flat Top coke: the first is made by the Pulaski furnace, the second is that of Messrs. Stephenson, Mullin & Co. in the Bluestone region, the third is Mr. McCreath's average of three samples:

ANALYSES OF COKE FROM THE FLAT TOP REGION, WEST VIRGINIA.

COMPONENT PARTS.	No. 1.	No. 2.	No. 3.
	Per cent.	*Per cent.*	*Per cent.*
Moisture	0.700	0.664	0.347
Volatile matter	1.270	1.059	0.757
Fixed carbon	91.430	92.816	92.550
Ash	6.090	4.913	5.749
Sulphur	0.509	0.548	0.597

That the Flat Top coke is a most excellent fuel can not be questioned. It is low in ash, high in carbon, cellular, and, as compared with most of the cokes of the country, bright and hard, strong and dense. It is, however, somewhat fragile and dull in luster. The wastage in drawing and transporting is large, but in the furnace it bears a heavy burden. At a Virginia furnace, using a washed ore carrying 12 per cent of water in mechanical combination, the burden at the time of the visit to the field was as follows:

	POUNDS.
Ore	8,600
Lime	2,800
Total	11,400
Coke	4,300

This is 2.65 to 1, which is a very good record when the water in the ore is considered.

Probably as good evidence of the character of this coke as can be given will be found in the statement of its work in the Ivanhoe (Virginia) blast furnace. This is a small furnace, with the following dimensions: height of stack, 60 feet; diameter of boshes, 12 feet 6 inches; diameter of hearth, 7 feet 2 inches; stock line, 9 feet 6 inches; number of tuyeres, 6; size of tuyeres, 5 inches; number of Whitwell fire-brick stoves, 2; size of stoves, 60 by 16 feet; number of blowing engines, 1; steam cylinder, 48 by 36 inches; blowing cylinder, 48 by 84 inches; displacement of engines, 308 cubic feet per revolution; capacity of furnace, 4,200 cubic feet.

During the time mentioned in the following runs the furnace was burdened for mill iron, but occasionally ran off on foundry. The ore mixture for the furnace was 0.75 Ivanhoe ore, a limonite from near the furnace, and 0.25 mountain ore (Potsdam formation, No. I, of Rogers), of which the following is a fair analysis:

COMPONENT PARTS.	Ivanhoe limonite ore.	Mountain Potsdam ore.
	Per cent.	*Per cent.*
Metallic iron	46.650	44.110
Silica	15.750	15.300
Manganese	0.309	1.200
Phosphorus	0.067	0.916

The limestone had the following composition:

	PER CENT.
$CaCO_3$	76.05
$MgCO_3$	22.13
SiO_2	1.26
Fe_2O_3 and Al_2O_3	0.65
	100.09

The average analysis of the Pocahontas coke is as follows:

	PER CENT.
Water and volatile matter	1.07
Fixed carbon	91.77
Ash	6.60
Sulphur	0.56
	100.00

The first run of the furnace of which there is record was from July 13 to July 27, 1890, inclusive. The run per day was as follows:

	TONS.		TONS.
July 13	65	July 22	67
July 14	60	July 23	70
July 15	*a*68	July 24	60
July 16	68	July 25	64
July 17	68	July 26	75
July 18	65	July 27	64
July 19	72		
July 20	60	Total	991
July 21	65		

a Stopped 2 hours.

This gives a daily average of 66.07 tons. The condition of the furnace was as follows: average blast temperature, 1,277 degrees fahrenheit; average revolutions, 32, which gives 9,824 cubic feet of piston displacement per minute; blast pressure, 6.9 pounds per square inch; steam pressure, 78 pounds per square inch.

During this period the average consumption of coke per ton of pig iron was 1.075 short tons, or 2,150 pounds of coke to 2,260 pounds of iron (*a*). The ore mixture yielded 46.5 per cent of iron. The average percentage of limestone used was 32.

The second run of which a record is given was from August 31 to September 6, inclusive. This run was as follows:

RECORD OF IVANHOE (VIRGINIA) FURNACE FOR 7 DAYS IN AUGUST AND SEPTEMBER, 1890.

	TONS.		TONS.
August 31	70	September 5	67
September 1	68	September 6	64
September 2	74		
September 3	65	Total	476
September 4	68		

This was an average of 68 tons per day. The conditions of the furnace during this run were as follows: average blast temperature, 1,155 degrees fahrenheit; average revolutions of engine, 31, equivalent to 9,517 cubic feet of piston displacement per minute; blast pressure, 6.3 pounds per square inch; steam pressure, 76 pounds per square inch.

During this period the consumption of fuel was 1.01 short tons, or 2,020 pounds to each 2,260 pounds of iron produced. The ore mixture yielded 49 per cent of iron. The furnace was burdened for mill iron, but made 25 per cent of the lower grades of foundry iron.

The percentages of silicon, manganese, phosphorus, and sulphur in the Ivanhoe pig iron are as follows:

COMPONENT PARTS.	No. 1.	No. 2.	No. 3.	Gray forge.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Silicon	2.026	1.113	1.026	0.980
Manganese	0.884	0.872	0.871	0.910
Phosphorus	0.622	0.620	0.564	0.564
Sulphur				0.040

a An allowance of 20 pounds is made for sandage on each long ton of iron; all products of pig iron are therefore given in tons of 2,260 pounds.

STATISTICS OF THE PRODUCTION OF COKE IN THE FLAT TOP FIELD OF VIRGINIA AND WEST VIRGINIA.

As will be seen from the table published below, the total production of coke in the Flat Top field in Virginia and West Virginia in 1889 was 321,686 short tons, valued at $542,219, or $1.686 per short ton. In the production of this coke 517,613 short tons of coal were consumed, valued at $302,742, or 58.5 cents per ton. It required 1.61 tons of coal to make 1 ton of coke, or 1 ton of coal yielded 0.6215 ton of coke. There were 1,833 coke ovens built at the close of 1889 and 631 additional were in process of construction.

The statistics of the production of coke in the Flat Top field in Virginia and West Virginia in 1889, by districts, are as follows:

STATISTICS OF THE PRODUCTION OF COKE IN THE FLAT TOP FIELD OF VIRGINIA AND WEST VIRGINIA IN 1889.

DISTRICTS.	OVENS.		Coal used. (Short tons.)	Total value of coal.	Value of coal per short ton. (Cents.)	Yield of coal in coke. (Per cent.)	Coal to a ton of coke. (Short tons.)	Value of coal to a ton of coke.	Coke produced. (Short tons.)	Total value of coke.	Value of coke per ton.
	Built.	Building.									
Total	1,833	631	517,613	$302,742	58.5	62.15	1.61	$0.942	321,686	$542,219	$1.686
Pocahontas	400	250	130,080	84,158	64.7	62.50	1.60	1.035	81,300	136,584	1.680
Bluestone	578	150	169,460	106,458	62.8	61.04	1.64	1.030	103,438	177,600	1.717
Elkhorn	855	231	218,073	112,126	51.4	62.80	1.59	0.817	136,948	228,035	1.665

Of the production by districts, almost all of that in the Pocahontas field is produced in Virginia. A small amount comes from Mercer county, West Virginia. All the production of the Bluestone and Elkhorn districts, however, is in West Virginia.

The different values of coal per ton given in the several districts will be noted. The occasion of this is discussed under the heading of "Cost of coke". It is only necessary to state here that at certain works it was considered that the coal should be charged to the ovens at the price that could be obtained for it if sold in the open market. Other operators believed that the proper course was to charge it at cost. While the value given to the coal varies in the different districts, being 64.7 cents per ton in the Pocahontas, 62.8 cents in the Bluestone, and 51.4 cents in the Elkhorn, making an average of 58.5 cents a ton, it is apparent that even this is higher than what, under the circumstances, should be a reasonable price. In the discussion of the cost of coke the value of the coal is assumed to be 55.8 cents per short ton, which, in view of all the conditions, is believed to be a fairer price than that given in the individual reports.

The figures shown as to the yield of coal in coke also vary in different districts, being 62.50 per cent in the Pocahontas district, 61.04 per cent in the Bluestone, and 62.80 per cent in the Elkhorn, making an average of 62.15 per cent. This is also fully treated elsewhere, the figures assumed in the general discussion being a yield of 62.5 per cent, or that it requires 1.6 tons of coal to make a ton of coke. The other figures in this table require no discussion.

In the following table the totals of the production for the entire Flat Top region, as located in Virginia and West Virginia, are given, from the beginning of operations in 1883 to the close of 1889:

STATISTICS OF THE MANUFACTURE OF COKE IN THE FLAT TOP DISTRICT OF VIRGINIA AND WEST VIRGINIA FROM 1883 TO 1889, INCLUSIVE. (*a*)

ITEMS.	1883	1884	1885	1886	1887	1888	1889
Number of establishments	1	1	1	2	5	13	a17
Ovens built	200	200	200	210	684	1,282	1,833
Ovens building				238	842	200	631
Coal used, short tons	39,000	99,000	81,899	100,518	240,814	312,014	517,613
Coke produced, short tons	22,718	57,107	50,194	60,436	150,708	201,317	321,686
Total value of coke at ovens	$44,345	$111,300	$85,993	$155,771	$271,276	$358,938	$542,219
Value of coke at ovens per ton	$1.951	$1.948	$1.713	$2.577	$1.800	$1.782	$1.686
Yield of coal in coke, per cent	58	58	61	60	62.5	64.5	62.15

a At three of these works no coke was made in 1889; ovens were building only.

CAPITAL.

The following statement gives the capital employed in the production of coke in the Flat Top region of Virginia and West Virginia, so far as returns have been received. For reasons stated below, it is not believed that these data are complete. Against each item is stated the number of operators making report for the respective items, the total number of operators being 14, conducting 17 works.

CAPITAL INVESTED IN COKE WORKS (BOTH OWNED AND BORROWED).

Value of plant:		
Land, 17,418 acres (reported by 17 establishments).		
Buildings (6 reports)	$7,830	
Ovens (17 reports)	657,521	
Machinery, tools, and implements (13 reports)	19,985	
Railway plant and water supply (12 reports)	22,127	
Total		$707,463
Live capital:		
Raw materials and supplies on hand (3 reports)	$675	
Stock in process and finished products on hand (4 reports)	3,043	
Cash on hand, bills receivable, unsettled ledger accounts, and sundries not included in any of the foregoing items (8 reports)	33,395	
Total		37,113
Grand total		744,576

From the above statement it will be observed that the total capital reported as employed in the manufacture of coke in 1889 in the Flat Top region was $744,576. Several causes have combined to make this capital unusually small. These causes grow out of tenure of land and the peculiar methods of manufacture and disposal of the product.

In the first place, it will be noted that no price is given as value of the land. No price, except in two instances, was given in the individual reports. All of the land from which comes the coal used in coking is held on lease, a certain royalty per ton being paid on all coal mined. All of the coal used in coking is slack. The question arises, what is the value of this land? The slack being in effect a by-product of mining coal, should any value for this land from which the coal for coking comes be given in the coke schedule? The operators, by their failure to report any such value, evidently considered that the value of the land should be included with the report on the coal mines, and not on the coke operations, and this view has been accepted in this report. One operator, however, regards the value of his lease, so far as the coke operations are concerned, as equal to $45 an acre. If this be assumed as correct, the value of the 17,418 acres of land for coking purposes would be $783,810, which should be added to the total of capital. In the two cases referred to, in which the value of the land per acre was reported, the value is given for coal-mining purposes, and not for coking. In one case the value is put at $360 and in another case at $250 per acre. In 1890, as is shown in Table 2, page 8, 196.7 acres of coal land belonging to the Flat Top Coal Land Association were mined. The amount of royalties received was $179,758, an average of $914 per acre of coal mined. Of the total royalties received by this company, $140,901 was from coal and $38,857 from coke.

These facts concerning the value of the land are merely stated, without attempt to ascertain or even to suggest what would be the value, for coking purposes, of the land held in leases by the different parties making coke.

It will be noted that the total value of the ovens in this district is given as $657,521. This is an average of $359 per oven.

The value of the buildings, machinery, railway plant, and water supply seems quite small in view of the magnitude of the operations, but it must be constantly borne in mind in considering these figures that coking is only an adjunct to the production of coal for sale in the general market. The larger portion of the value of the buildings, machinery, tools, implements, railway plant, and water supply is charged to coal. The same condition of affairs will be apparent in discussions regarding live capital, wages, etc.

The total amount of what is termed in the census inquiry "live capital" was $37,113 at the close of 1889. Of this sum, $675 represent raw material and supplies on hand, $3,043 stock in process of being worked up and finished product, and $33,395 cash on hand, etc.

It must be remembered that the raw material for manufacturing into coke is the slack coal from the coal mines. This is charged into the ovens as soon as it reaches them, except occasionally a small amount stored in bins, and any supplies of this kind would be held at the coal mines and there reported, and not at the coke works. It can be said, however, that very little raw material is kept on hand. The coal is used as soon as it reaches the surface. A similar statement may be made regarding stock in process of manufacture and finished products on hand. The only stock in process of manufacture would be the coal in the ovens. Coke is very rarely stored at the ovens, but it is shipped away as soon as produced; hence the amount of finished product on hand would be very small.

As to cash on hand, bills receivable, etc., the methods of selling, referred to elsewhere, should be borne in mind. All the coal sold in one month is paid for on the 15th of the next; hence there are very few unsettled accounts, and, as a rule, not much cash on hand. These accounts are not regarded as due until date of settlement. However, it is probable that this item should be considerably increased.

MATERIALS AND SUPPLIES USED.

The chief material used in the production of coke is coal. All the coal used is slack from the coal-mining operations in this field, and this amounted in 1889 to 517,613 short tons, valued at $302,742. The material used in addition to this has but small value. It is chiefly wood for preliminary heating of the ovens and barricading the doors of cars when shipments are made in stock or box cars. This wood is all cut on the lease of the operators, the lease providing for the right to use wood for such purposes. The chief item of expense in connection with procuring this wood is the labor, which is included under the wages report. Several of the coal operators have sawmills, where boards and other lumber are prepared. In most cases the expense of this work is charged to the coal-mining operations.

In addition to wood, fire brick, and red brick for repairs, tools for leveling and charging are employed to some extent, and certain materials are employed in repairing the lorries used in charging coke, and other machinery about the works. The amount used, however, is very small, as will be seen from the following table, giving the kind of materials utilized and the quantities and cost of same at the works:

MATERIALS AND SUPPLIES USED AT THE COKE WORKS IN THE FLAT TOP DISTRICT OF VIRGINIA AND WEST VIRGINIA IN 1889.

KINDS.	*Quantities.*	Cost at the works using them, including freight charges.
Total cost of all materials		$8,913
Coal other than that coked, tons	500	400
Firebrick for repairs, thousands	61	1,742
Red brick, thousands	49	597
Wood, cords	500	250
All other materials and supplies		5,924

From this it appears that the total cost of materials used as reported was but $8,913, which, added to the value of the coal, would make the total value of materials $311,655.

LABOR AND WAGES AT COKE WORKS.

In the tables on pages 22 and 23 will be found the total number of employés at coke works in the Flat Top field, together with the total wages paid same, and also classification of weekly rates of wages paid and average number of hands employed at each rate, not including those employed on piecework.

LABOR AND WAGES AT COKE WORKS IN 1889.

CLASSES.	Average number employed during the year.	Total amount paid in wages during the year.
Total	533	$149,727
Operatives, engineers, and other skilled workmen, overseers, and foremen or superintendents, not general superintendents or managers:		
Males above 16 years	74	31,325
Officers or firm members:		
Males	7	4,562
Clerks or salesmen:		
Males above 16 years	4	1,520
Watchmen, laborers, teamsters, and other unskilled workmen:		
Males above 16 years	278	62,053
Children	6	630
Piecework, not included in the foregoing statement:		
Males above 16 years	164	49,637

WEEKLY RATES OF WAGES PAID AND AVERAGE NUMBER OF HANDS EMPLOYED AT EACH RATE (NOT INCLUDING THOSE EMPLOYED ON PIECEWORK).

RATES PER WEEK.	Males above 16 years.	Children.
Under $5		5
$5 and over, but under $6		
$6 and over, but under $7	2	
$7 and over, but under $8	306	1
$8 and over, but under $9	31	
$9 and over, but under $10	1	
$10 and over, but under $12	1	
$12 and over, but under $15	9	
$15 and over, but under $20	12	
$20 and over, but under $25		
$25 and over	1	

In the following table is shown a technical classification of employés, together with rates of wages:

TABLE SHOWING AVERAGE EARNINGS OF PERSONS EMPLOYED AT COKE WORKS IN THE FLAT TOP FIELD OF VIRGINIA AND WEST VIRGINIA IN 1889.

SUPERINTENDENTS OR FOREMEN.		CLERKS.		HAULERS.				CHARGERS.			
				Men.		Boys.		Men.		Boys.	
No.	Rate per month.	No.	Rate per month.	No.	Rate per day.	No.	Rate per day.	No.	Rate per day.	No.	Rate per day.
1	$150.00	2	$50.00	2	$1.25	3	$0.75	1	$1.50	2	$0.80
1	80.00	1	45.00	2	1.20	1	0.50	4	1.40		
4	75.00	1	37.50	1	1.00			2	1.35		
1	73.00							1	1.30		
1	70.00							2	1.25		
1	67.50							11	1.20		
3	60.00										
1	50.00										
1	37.50										
Total.	Average.	Total.	Average.	Total.	Average.	Total.	Average.	Total.	Average.	Total.	Average.
14	$72.00	4	$45.63	5	$1.18	4	$0.69	21	$1.28	2	$0.80

TABLE SHOWING AVERAGE EARNINGS OF PERSONS EMPLOYED AT COKE WORKS IN THE FLAT TOP FIELD OF VIRGINIA AND WEST VIRGINIA IN 1889—Continued.

DRAWERS.				FORKERS.				LEVELERS.				LABORERS.			
Day work.		Piecework.		Day work.		Piecework.		Day work.		Piecework.		Men.		Boys.	
No.	Rate per day.	No.	Rate per oven.	No.	Rate per day.	No.	Rate per oven.	No.	Rate per day.	No.	Rate per oven.	No.	Rate per day.	No.	Rate per day.
9	$1.25	77	$0.58	101	$1.20	4	$0.08	1	$1.50	1	$0.08	137	$1.20	3	$0.50
		30	0.53	8	1.13							26	1.17		
		82	0.50												
Total.	Average.	Total.	Average.	Total.	Average.	Total.	Average.	Total.	Average.	Total.	Average.	Total.	Average.	Total.	Average.
9	$1.25	189	$0.54	109	$1.19	4	$0.08	1	$1.50	1	$0.08	163	$1.20	3	$0.50

The foregoing table includes all of the employés and all but 4 of the officers and firm members reported. In considering the wages of superintendents, foremen, and clerks reported in the coke industry, it must be remembered that such employés often occupy dual positions and are employed in the production of coal as well as the manufacture of coke, and that in such cases their wages should be divided in the proper proportion to the respective industries. The superintendent reported as receiving $150 per month was a partner at the works. The usual rate of pay for a superintendent who is exclusively employed at coke works is from $70 to $75 per month. The variation in rates per oven paid drawers is due to the varying sizes of the ovens, which have been described.

PERIODS OF PAYMENT.

Payments, without exception, are monthly, usually about the 20th of the month. Coal and coke delivered during the month are paid for on the 15th of the succeeding month, the workmen being paid immediately after the receipt of such payments.

METHODS OF PAYMENT.

Nearly all of the works in the Flat Top region have stores connected with them, from which the operatives are supplied, though, so far as has been learned, they are not compelled to buy at these stores unless they so desire.

While no doubt in opening these stores profit was in the minds of the operators, it is also true that in many, indeed in most, cases such establishments were a necessity. The district in which these operations are conducted is very sparsely settled and mountainous, and the opportunities for communication from the mines and coke works with the few centers of population that exist in the district are very limited, so that it has been found necessary in the past, in order to keep the men at the mines, to open stores for the purpose of supplying their wants.

HOURS OF LABOR.

Without an exception the hours of labor in the region are 10 the year round. This applies to day laborers. In some cases miners work less hours. As they are paid by the ton they can frequently shorten their hours of labor by getting out what is regarded as a day's work in less than 10 hours.

REGULARITY OF EMPLOYMENT.

Employment in the Flat Top field was so irregular in 1889 it is impossible to show in tabular form the number of days employed. Several of the coke works were not finished until near the close of the year, and at most of the others the employment was very irregular. This irregularity was occasioned chiefly by the impossibility of securing cars to ship the coke. It is probable that the demand on this district for its coke would have been sufficient to have kept the ovens in

operation the entire time had the railroad company possessed the facilities to move the freig offered. This, however, has since been remedied, and with the completion of the Ohio branch of t Norfolk and Western road to the Ohio river in 1892 the demand for coke from this field will very greatly increased, requiring the building of additional ovens.

It is fair to assume that the production of coke in the Flat Top field in 1889 was equal only about one-half the capacity, and where the works were built at the beginning of the y employment was given to the operatives about three-quarters of the time.

EXPENSES.

The miscellaneous items of expense in connection with the production of coke are given the following statement:

ITEMS OF EXPENSE IN THE MANUFACTURE OF COKE IN THE FLAT TOP DISTRICT OF VIRGINIA AND WEST VIRGINIA IN 1889.

Amount paid for rent, power, and heat (2 reports)	$430
Amount paid for taxes (7 reports)	1,692
Amount paid for insurance (2 reports)	817
Amount paid for repairs, ordinary, of buildings and machinery (5 reports)	1,756
Amount paid for interest on cash used in the business (2 reports)	1,049
Amount paid for all sundries not reported in any of the foregoing items (4 reports)	8,340
Total	14,084

Regarding the other items embraced in the foregoing statement, which it is noticed exceedingly small, it is necessary to repeat the statement made so often in this report, nam that coking is but an adjunct to the mining of coal, and most of the expense for rent, ta insurance, etc., is charged to coal.

POWER USED IN MANUFACTURE.

It is reported that 7 boilers and 5 engines, with 175 total horse power, were employed the manufacture of coke in the Flat Top field in 1889.

WASHING AND CRUSHING.

No washing is done in the Flat Top district, the coal being too pure to require separat However, it has been found advisable to use crushers in order to prepare the coal for coking. Tl crushers are reported: the Jeffery, with a capacity of 55 tons a day; the Nelsonville, with a capa of 200 tons a day, and one, name not given, with a capacity of 20 tons a day.

DISTRIBUTION OF COKE.

In the following table will be found a statement as to the number of cars of coke ship from the Flat Top district, and distribution thereof, for the years 1887 to 1890, inclusive:

NUMBER OF CARS OF COKE SHIPPED FROM THE FLAT TOP DISTRICT, AND DISTRIBUTION THEREOF, FROM 1887 TO 1890, INCLUSIVE.

DESTINATIONS, BY GROUPS.	1887	1888	1889	1890
	Cars.	*Cars.*	*Cars.*	*Cars.*
Total	8,605	11,095	15,983	20,883
To points on Norfolk and Western railroad	4,324	6,715	9,001	9,092
To points on Shenandoah Valley railroad	1,650	379	494	2,426
To points on other railways of Virginia	13	14	13	19
To points north of Hagerstown and Shenandoah Junction	----------	----------	196	13
To points south of Bristol	1,275	2,717	6,127	9,143
To points in North and South Carolina	13	11	12	133
To Chicago, Illinois	525	71	----------	----------
To East St. Louis, Illinois	653	527	65	56
To East Carondelet, Illinois	----------	660	54	----------
To Louisville, Kentucky	65	----------	21	1
To Joliet, Illinois	84	----------	----------	----------
To Terre Haute, Indiana	3	----------	----------	----------
To Centralia, Illinois	----------	1	----------	----------
Representing total tonnage of	151,171	202,808	310,504	433,527

The notable feature about this distribution is the great increase in shipments to points south of Bristol, Tennessee. These shipments increased from 1,275 cars in 1887 to 6,127 cars in 1889, 380 per cent. This indicates that the furnaces of Chattanooga, Florence, Sheffield, and other points in Tennessee and Alabama are using Virginia coke in advanced percentage. The increase in the use of Flat Top coke at points south of Bristol has been much greater than that on the Norfolk and Western railroad in Virginia. Virginia has only about doubled its use, while points south of Bristol use nearly five times more. In 1887 points south of Bristol used only about one-seventh of the total production of coke in the Flat Top region, and Norfolk and Western points one-half. In 1889 the former took about 39 per cent and the latter about 56 per cent, these destinations receiving about 95 per cent of all the coke made in this district.