ADVANCE SHEETS, 4

ISSUED DECEMBER 15, 1918

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF FARM MANAGEMENT
W. J. SPILLMAN, CHIEF

ATLAS
OF
AMERICAN AGRICULTURE

PREPARED UNDER THE SUPERVISION OF O. E. BAKER, AGRICULTURIST

PART V

THE CROPS

SECTION A

COTTON

BY

O. C. STINE
ASSISTANT IN FARM ECONOMICS, OFFICE OF FARM MANAGEMENT
AND
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PRINCIPAL COMMERCIAL TYPES—
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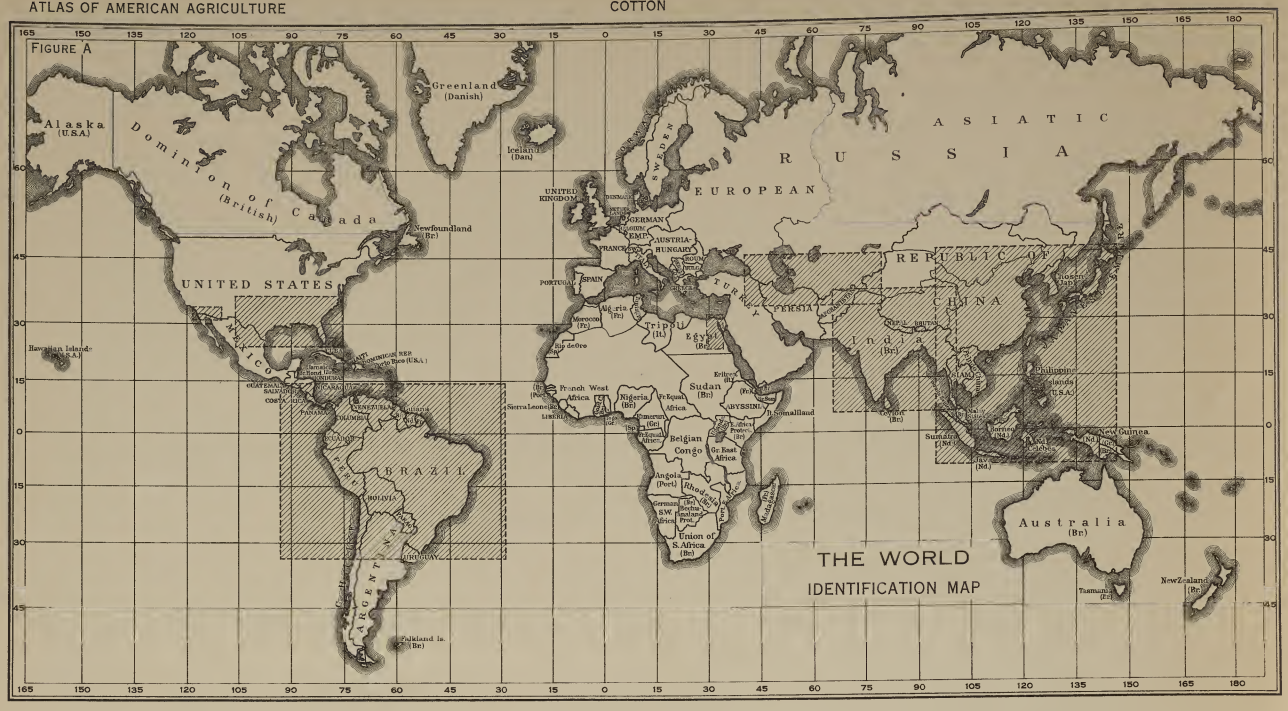

Figure A.—Identification map of the world. This map may be used to ascertain the names of all countries shown only in outline in figure 1. In the case of dependencies the name of the governing country is indicated by an abbreviation in parenthesis. In Europe the boundaries shown are those existing in 1913, after the Balkan Wars. The Japanese name Chosen is recognized for the peninsula formerly known as Korea. The Republic of China is considered as including not only China proper but also Manchuria, Mongolia, Chinese Turkestan, and Thibet. There is serious exaggeration in area in the northern and southern portions of the map, due to the Mercator projection. Thus a square mile at the latitude of Petrograd, Russia, 60° north, covers four times as much space on the map as a square mile at the Equator. The dots in figure 1 being of the same size throughout, the density of production in the regions nearer the Equator is therefore exaggerated as compared with regions to the north. The shading shows the areas included in the separate maps of cotton acreage by smaller civil divisions (figs. 5, 6, 8, 9, 10, 14, and 15).

Figure B.—Identification map of the United States. This map may be used to ascertain the names of the States and the location of the cities referred to in the maps, graphs, and text. The location of the Salt River Valley and Yuma districts in Arizona and the Imperial Valley in California is also shown on the map. The county boundaries shown on this map are those existing at the time the Thirteenth Census was taken, April 15, 1910.

Figure C.—Identification map of India. This map may be used to obtain the names of the Provinces and native States shown only in outline in figure 5. The location of the cities mentioned in the text is also shown in this map. The boundaries of the Provinces and minor civil divisions follow the ninth edition (1913) of Stieler's Atlas of Modern Geography, corrected according to official maps of the several Provinces published at later dates.

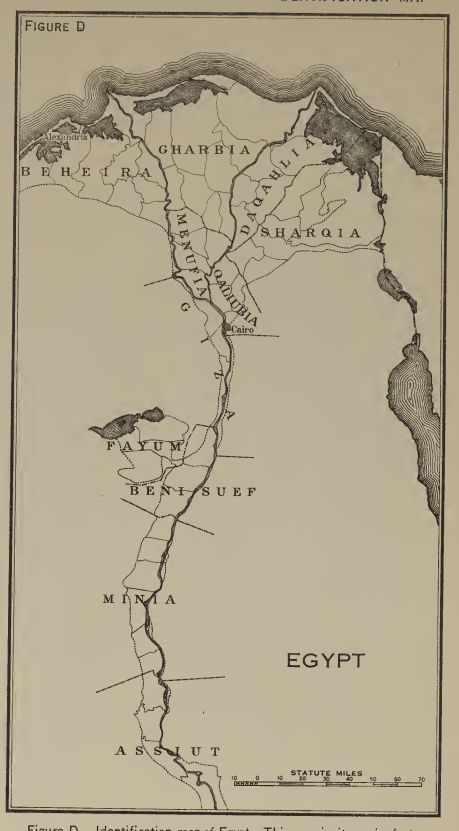

Figure D.—Identification map of Egypt. This map in its major features follows that published in the ninth edition (1913) of Stieler's Atlas of Modern Geography, but the boundaries of the minor civil divisions are taken from a "Map of Egypt by the Survey Department, Cairo, 1910." The thin dotted line bounds the areas of arable (irrigated) land.

Figure E.—Identification map of Russian Turkestan and Transcaucasia and of northern Persia. Adapted from maps in the ninth edition (1913) of Stieler's Atlas of Modern Geography.

Figure F.—Identification map of South America north of the thirty-fourth parallel of south latitude. Adapted from map in the ninth edition (1913) of Stieler's Atlas of Modern Geography.

Figure G.—Identification map of Southeastern Asia and the Philippine and East Indian Islands. Adapted from map in the 1912 edition of Rand McNally & Co. Library Atlas of the World.

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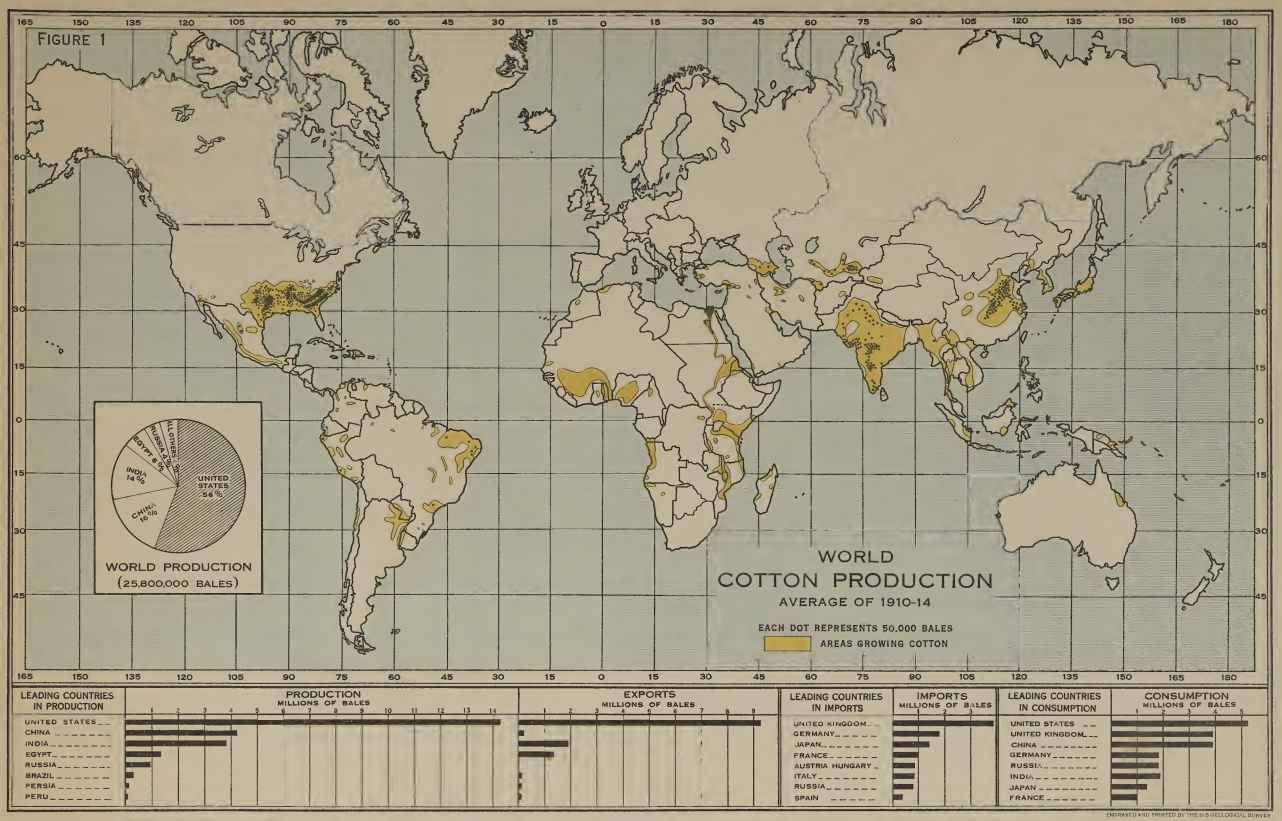


Figure 1.—World's cotton production. The United States produces about three-fifths of the world's cotton. India, China, Egypt, and Russia produce about nine-tenths of the remainder. Very little cotton is exported from China and none from Russia. Small quantities of cotton are grown in Eastern Brazil, in Peru, and in several other South American countries, in Mexico and the West Indies, in Greece, Asiatic Turkey, Persia, Chosen, Japan, Siam, the East Indies, and in many of the African colonies. Nearly all of the world's crop is grown south of the 37th parallel of north latitude. In Russian Turkestan, however, cotton is grown as far as 42° N., which is about the same latitude as Boston and Chicago. Most of the world's cotton is grown in the southern portion of the North Temperate Zone, but in both South America and Africa there are extensive areas climatically adapted to cotton production but as yet undeveloped, owing to labor and transportation difficulties. The production figure for China is merely an estimate and the distribution is based upon indefinite information. To identify the countries shown only in outline on this map consult the identification map (fig. A).

PRINCIPAL COMMERCIAL TYPES.

Cotton is the lint or fine fiber which grows on the seeds of plants belonging to the genus Gossypium. Wild species of Gossypium are found in tropical regions of both hemispheres, and there are hundreds of cultivated varieties, differing in plant characters, as well as in the length, strength, and fineness of fiber. Thirty-eight principal commercial types are recognized at Liverpool, the chief cotton market of the world. A broad grouping into five general classes according to uses and commercial values is as follows:

(1) Sea Island cotton (*Gossypium barbadense*) is a native of tropical America. It has yellow flowers with purple spots, bolls mostly 3-locked, black seeds, fuzzy only at the ends, and very long, silky fiber. "Fancy Sea Island," grown on the islands and mainland along the coast of South Carolina, has a fiber 2 inches in length, sometimes even longer, and is the most valuable of the world's cottons, surpassing all other types in length, strength, and fineness. Most of the Sea Island crop, with a staple of 1⅞ to 1¾ inches, is grown farther inland and is known commercially as "Floridas and Georgias." The production of Sea Island in the United States averages about 100,000 running bales, of which the fancy grades represent about one-tenth. The remainder of the Sea Island crop of the world, probably amounting to 10,000 bales, is grown mostly in the West Indies, principally St. Vincent, Barbados, and St. Kitts, and in Peru. (See staple No. 1, fig. 2.)

(2) Egyptian cotton is similar to Sea Island in the general appearance of the plants, and has a fine, silky, strong fiber. The staple is from 1⅜ to 1¾ inches in length and is second in value only to the Sea Island. Egypt furnishes the bulk of the annual crop, averaging during 1910-1916 the equivalent of about 1,400,000 of our bales, of which from 150,000 to 350,000 were exported annually to the United States. About 7,000 bales were grown in 1916 in the Salt River Valley of Arizona, where new varieties have been developed by selection and acclimatization of imported Egyptian stocks. (See staple No. 2, fig. 2.)

(3) Upland long-staple cotton (*Gossypium hirsutum*), grown chiefly in the United States, occupies a commercial position between the Egyptian and the upland short staples. The plants resemble those of the short-staple type, having unspotted white flowers, bolls 4- or 5-locked, and seeds usually well covered with white, brown, or green fuzz, in addition to the lint. The staple ranges in length from 1⅛ to 1½ inches and for some purposes competes with Egyptian. In the absence of separate statistics of these varieties the total production was estimated in 1915 at about 800,000 bales. (See staple No. 3, fig. 2.)

(4) Upland short staple (*Gossypium hirsutum*) constitutes about 92 per cent of the cotton crop of the United States and nearly 60 per cent of the world's crop of 25,000,000 bales. "American Middling," the standard short-staple grade, is the basis of price quotations for all short-staple cottons. The staple varies in length from ⅝ to 1 inch, with some varieties exceeding an inch when grown under the most favorable conditions. Hundreds of varieties are cultivated in the American cotton belt, differing in habits of growth, size of bolls, earliness of opening, abundance, length, and uniformity of staple. New short-season varieties and improved cultural methods have been developed and are being adopted as the best means of avoiding injury from the boll weevil. American Upland varieties have been introduced into Russian Turkestan and Trans-Caucasia, and now constitute the major portion of the crop in those regions. They are also being grown in India, China, Chosen, Africa, Asia Minor, and Brazil. (See staple No. 4, fig. 2.)

(5) Asiatic cottons include *Gossypium herbaceum* and several related botanical species, *indicum*, *neglectum*, and *arboreum*. The staple is short, often only three-eighths to three-fourths of an inch, but strong and rather rough. Asiatic cotton is grown in India, China, Asia Minor, Persia, Indo-China, and Japan, but in several districts is giving place to the American Upland type. The total volume of the crop is large but unknown, most of it being applied to domestic or local uses. (See staple No. 5, fig. 2.)

Figure 3.—Upland cotton plant, leaves removed to show bolls.

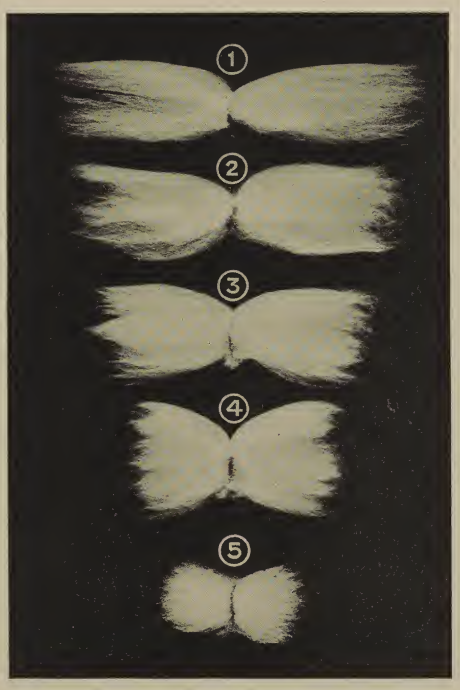


Figure 2.—Length of staple of five important types. Combed seed, natural size. Material prepared and photographed by G. S. Meloy.

TABLE I.—*A selected list of cottons, showing character and relative prices.*

Country.	Variety	Average length.	Relative price.	Counts up to.	Color.	Remarks.
		In.				
America.	Sea Island (S. C.)	2	230	300	Cream	Silky and regular.
	Sea Island (Ga. and Fla.)	1⅞	215	200	Cream	Silky and regular.
Egypt.	Sakellaridis	1⅝	173	150	Dark cream	Silky and soft.
	Nubari	1⅜	160	100	Light brown	Silky and weak.
America.	Long-staple Upland	1¼	160	60	White	Soft and strong.
	Upland, middling	1	100	40	White	Soft and strong.
India.	Tinnivelly	⅞	95	30	White	Best of Indians.
	Surat, Broach, etc.	⅞	91	30	Light brown	Harsh, strong.
	Sind	⅝	71	20	Dull white	Poor.
China.		¾	88	20	Dull white	Rather harsh.

Figure 4.—Ripe boll of American Upland cotton. Natural size.

FIGURE 5

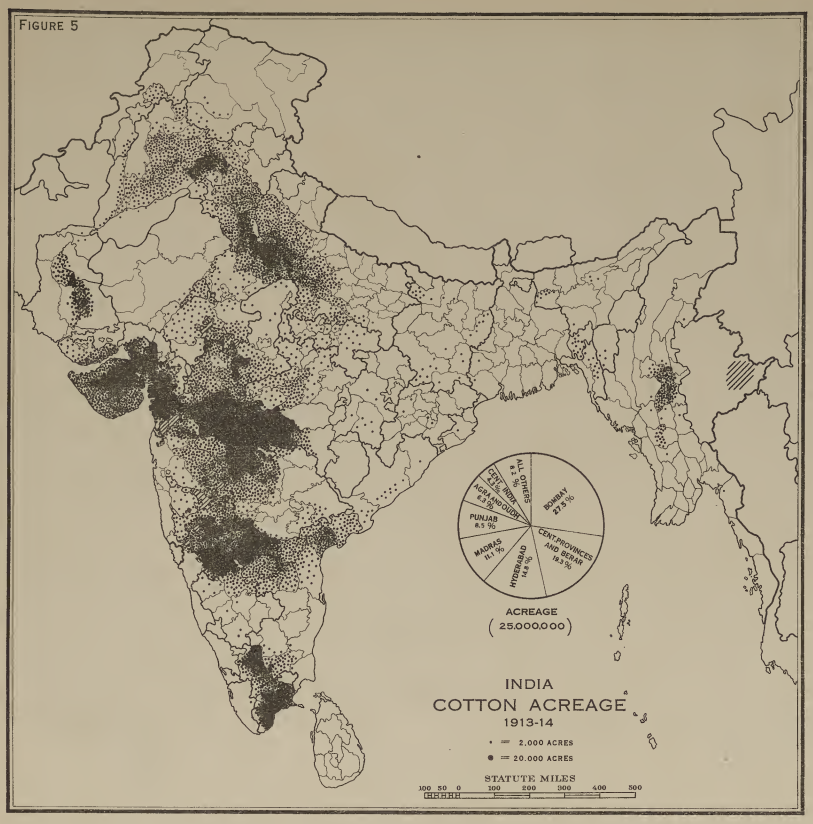


Figure 5.—Cotton is grown in nearly all parts of India, except on the Burma coast, in the swampy Ganges lowlands of eastern Bengal, and on the mountainous Malabar coast, regions where the rainfall is very heavy, and in the desert of western Rajputana (see fig. C). The regions of greatest production are in the Presidencies of Madras (to the south) and Bombay (to the west), and in Berar (center of map). In parts of Berar 40 per cent of the land area is in cotton, a higher proportion than is found in any section of the United States. The area devoted to cotton in India is about two-thirds that in the United States, but the low yield per acre results in an average annual production only one-third as great. About half the production is exported and nearly half the exports go to Japan.

FIGURE 6

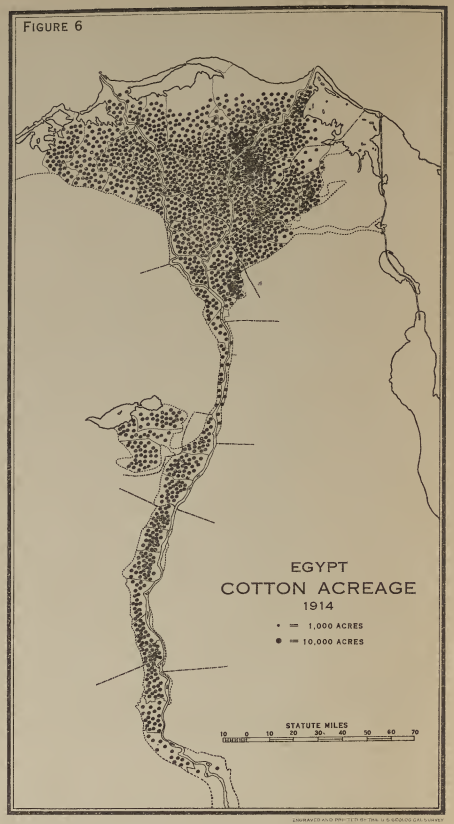


Figure 6.—The cultivable land in Egypt is limited to the Delta and a narrow strip along the Nile, 6,000,000 acres in all, of which nearly one-third is in cotton. The crop is irrigated. The acreage is one-twentieth that in the United States, but the value of the crop, owing to high yield per acre (450 pounds) and fine quality, is one-fifth that of the American crop. The scale of this map is much larger than that of the other countries.

GEOGRAPHY OF PRODUCTION.

Cotton is the most important source of material for clothing and household fabrics, and has many industrial uses. Long-staple cotton is used extensively in the manufacture of automobile tires and in airplane wings, and a considerable quantity of short staple and linters is used in the preparation of explosives and other industrial products. The seed is used for the manufacture of oil and the hulls and oil cake for stock feed. Both seed and hulls are also used for fertilizer. The value of the seed in the United States is one-sixth that of the lint.

Cotton is the greatest staple of international commerce, the exports of all producing countries having an average annual value of about one billion dollars. The world's crop of about 25,000,000 bales is almost all produced in the southern portion of the North Temperate Zone, where the plant becomes an annual which finds in the summer season the necessarily high temperatures. The lint, in bales of approximately 500 pounds, is transported mostly to more northerly regions of dense industrial populations, where it is manufactured; but in recent years, both in the United States and in the Orient, there has been a notable increase in the manufacture of cloth and yarn, particularly of the coarser grades, in the producing regions.

COTTON PRODUCTION AND CONSUMPTION.

[Average, 1910–1914. Bales of 500 pounds.]

Country.	Production.	Exports.	Net imports.	Consumption (production +imports −exports).	Number of spindles in cotton mills, 1914.
United States	14,259,200	9,218,739	263,032	5,303,493	32,107,000
China	[a] 4,181,300	232,900	42,069	3,990,379	1,000,000
India	3,775,200	1,925,808	54,935	1,904,327	6,500,000
Egypt	1,468,200	1,349,600	720	(b)	2,750,000
Russia	998,600	134	843,636	1,842,102	9,160,000
Brazil	346,000	97,389	.....	248,611	1,350,000
Persia	128,200	106,579	107	21,728	(b)
Peru	103,600	.....	.....	103,600	(b)
Japan	6,800	.....	1,451,044	1,457,844	2,750,000
United Kingdom	.....	.....	3,871,461	3,871,461	56,300,000
Germany	.....	.....	1,819,256	1,819,256	11,550,000
France	.....	.....	986,150	986,150	7,410,000
Austria-Hungary	.....	.....	863,227	863,227	4,970,000
Italy	.....	.....	856,070	856,070	4,020,000
Spain	.....	.....	376,400	376,400	2,210,000
Belgium	.....	.....	265,716	265,716	1,530,000
Other countries	500,400	.....	1,728,816	1,728,816	5,040,000
Total	25,767,500	.....	.....	25,767,500	146,397,000

[a] Three-year average, 1909–1911. Ministry of Agriculture of the Republic of China.
[b] Not reported.

FOREIGN COUNTRIES.

India (fig. 5).—Cotton is known to have been cultivated in India as early as 800 B. C. Most of the cotton in the Punjab and the Sind (see fig. C) is grown under irrigation, but nearly all the crop in central India, Bombay, Hyderabad, and Madras is "rain" cotton, planted during or at the close of the rainy season, which lasts from June to October, and picked during the late fall, winter, and early spring months, which are almost rainless (fig. 11).

Three important groups of soils occur in the cotton regions of India:

1. The "Regur" or "Cotton" soils, which are deep, limy, black, brown, or gray sticky clay soils, similar to the "black waxy" soils of the Southern States and the "black adobe" of California. They are widely distributed over the large trap rock area of central Bombay, northern Hyderabad, Berar, the western portion of the Central India Agency, and most of the peninsula of Kathiawar. These soils also occur in portions of southern Madras and cover much of the alluvial plain in Bombay, extending from south of Surat to Ahmedabad. Owing, in large measure, to more or less continuous cultivation for at least 2,000 years without fertilizer or manure, the yield per acre of cotton is less than 100 pounds of lint.

2. The "Red soils," which are derived from crystalline rocks, are mainly of a sandy clay texture. They cover most of the Madras Presidency, eastern Hyderabad, and Orissa, and, though varying greatly in composition, in general are less fertile than the Regur soils.

3. The alluvium of the Indo-Gangetic Plain and of the upper valleys of the Nerbudda and Tapti rivers. These soils consist mostly of reddish, brownish, or yellowish clay, often sandy, especially in the Indus Plain, rich in lime and potash.

FIGURE 7

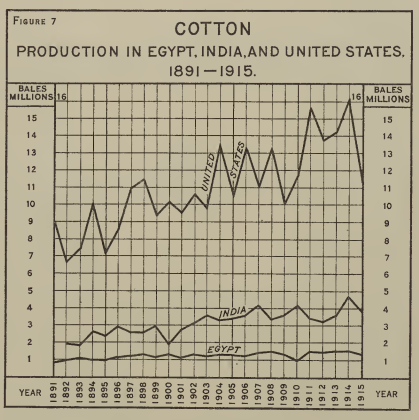


Figure 7.—The cotton crops of Egypt and India, as well as the United States, have nearly doubled during the past quarter century. During the past 10 years the world's production has increased on the average, nearly 5 per cent a year, yet the demand for cotton has increased so rapidly in recent years that the price has also advanced. The crop of 1914 was the largest ever produced, each of these countries having a record crop.

The more important cotton districts of India may be grouped into five regions:

1. Southern Madras: In this region, around Tinnevelly and Madura, the highest grade of Indian cotton is grown. The annual rainfall is about 30 inches, but as it is nearly all received during four months, irrigation is resorted to in some years for the native Tinnevelly cotton, which is grown on unmanured "Regur" soils, and in all years for the Cambodia, an American variety, which is grown only on manured red soils.

2. Northern Madras, southern Hyderabad, and southeastern Bombay: The production of cotton in this region is much greater than in southern Madras. The annual rainfall ranges from 15 to 35 inches. Both "Regur" and red soils occur. The cotton is sown in drills and is frequently grown mixed with other crops, principally grain sorghums, so that in seasons when drought destroys the cotton crop a cereal crop can be harvested. The cotton grown in this region is mostly "Westerns" and "Northerns." In southern Bombay, especially around Dharwar, some American Upland cotton is grown.

3. The most important cotton producing region of India extends across Central Bombay and Baroda, northern Hyderabad and Berar into the Central Provinces. The Kathiawar Peninsula may also be included in this region. The annual rainfall along the Bombay Coast is over 40 inches, in Berar and the Kathiawar Peninsula about 30 inches. The soils are nearly all of the "Regur" type. In Berar many varieties of cotton with staple varying in length from ⅞ to 1 inch are often mixed in the same field. This mixture is known as "Berar Jari." Early maturing kinds of cotton must be grown (Jari requires only six months to mature), as otherwise the roots of the plants are torn asunder by the cracking of the soil in November. In Bombay the soil cracks less severely, and the varieties grown require seven to eight months to mature. The cotton is grown in rotation, usually with grain sorghums. The cottons of Berar are mostly classed in the Liverpool market as Oomra and those of Bombay as Surat, which includes many varieties, Broach being the most important.

4. Agra and Oudh: In this region about one-fourth of the cotton is irrigated. The leading variety is Bengal, one of the poorest of Indian cottons. American cotton was formerly grown in small quantities in this district but was found to be unprofitable, owing to lower yields and greater expense of cultivation. The cotton is sown broadcast in May in irrigated fields and in June in unirrigated fields after the first rain softens the very hard alluvial soil. On irrigated land the cotton is grown in rotation with wheat, corn (maize), barley and peas mixed, and on unirrigated land with millet and raha, a kind of pea.

5. Punjab and Sind: Most of the cotton in the Punjab and all of the cotton in the Sind region is grown under irrigation. The quality of the native cotton is poor, especially in the Sind, but the yields per acre are high. Considerable Dharwar American cotton is grown in the Punjab and both American and Egyptian cotton have been experimentally grown in the Sind.

Indian cotton is raised at great expenditure of hand labor on small private land holdings of 5 to 25 acres. The gins are modern, but almost entirely of the roller kind, and the bales much neater and better made than in America. About half the production is exported, and nearly half the exports go to Japan. Owing to its poor quality, little Indian cotton is exported to England, and although the price is determined largely by that of American Upland, it enters very little into competition with the American crop. India imports a small quantity of raw cotton, mostly American, and a great quantity of manufactured cotton goods, chiefly from England.

Egypt (fig. 6).—Cotton growing in Egypt dates from 1820, when the Khedive, Mohammed Aly, imported seed of Sea Island, Brazilian, and other varieties. Out of the

Figure 8.—Cotton is grown under irrigation in Russian Turkestan and Trans-Caucasia. The Province of Ferghana produces about half the total crop of 1,000,000 bales. In Turkestan cotton is grown farther north than elsewhere in the world. A little cotton is grown in northern Persia along the river bottoms.

Figure 9.—Cotton is grown in nearly all the countries of South America. Brazil produces about 400,000 bales, consisting principally of tree cotton and of varieties similar to American upland. Most of the crop is used by local mills, but some long staple is exported to England. Peru produces about 100,000 bales, two-thirds of which is "smooth Peruvian," a type grading slightly above American middling, and the remainder mostly "rough Peruvian," a coarse cotton usually mixed with wool in manufacture. Colombia, Venezuela, and Argentina, each produce 5,000 to 10,000 bales of cotton, practically all consumed locally. Uruguay, Paraguay, and Chile also grow a little cotton.

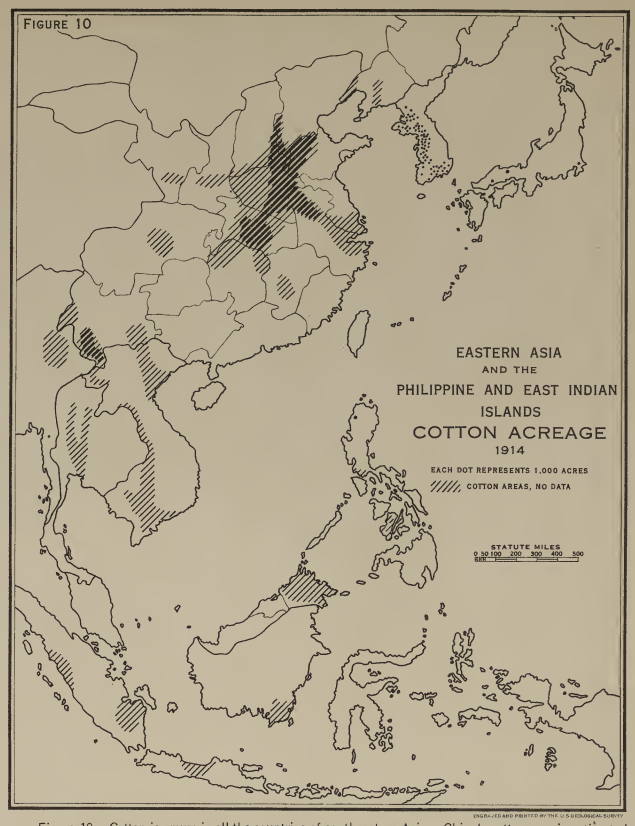


Figure 10.—Cotton is grown in all the countries of southeastern Asia. China's cotton crop is estimated at about 4,000,000 bales, of which about 1,800,000 bales constitute the commercial crop that reaches the mills or is exported. The cotton is grown in the valleys of both the Yangste and Hoangho Rivers, and is especially important along the Grand Canal connecting these rivers. Considerable cotton is grown in southwestern China, and a small amount in Manchuria. Chosen (Korea) produces about 70,000 bales of cotton, and under the stimulating influence of Japan the production is rapidly increasing. A little cotton is grown in Japan, Indo-China, Siam, Sumatra, Java, and the Philippine Islands.

intermixture of these with a native tree cotton the modern Egyptian varieties have developed, of which the highest grades, especially Jannovitch, and the new variety, Sakellaridis, are serious competitors of American Sea Island in the manufacture of certain kinds of goods, while the lower grades compete with American long-staple Upland. The importation of Egyptian cotton into the United States has increased greatly during the past few years, and now amounts to several hundred thousand bales annually.

The cotton crop of Egypt is grown on small holdings by the native fellaheen, or farmers. Ninety per cent of the landowners have 5 acres or less, and more than 50 per cent not over 1 acre. The cultivation is very intensive, practically all by hand labor. In upper Egypt cotton planting begins in February. Picking extends from late in August to October, and is performed largely by children and old people. In the Delta the planting comes in March or April and picking continues as late as December. In general, the land is irrigated before plowing, which is performed 3 or 4 times, each at right angles to the last, and irrigated again when the seed is sown a month later, a third time about 30 days after sowing, when the plants are thinned and hoed, then 30 days later another hoeing and irrigation is given, followed by irrigation every 2 or 3 weeks until the Nile "flood" arrives in midsummer. During the period of high water in the Nile the irrigation canals are drained on alternate weeks in order to avoid water-logging the soil. The crop is grown principally in rotation with berseem, a large clover, which, in conjunction with the silt-laden waters of the Nile, maintains the extraordinary fertility of the soil without resort to artificial or animal manures.

The cotton is carried to the ginneries in 400-pound sacks on camel back or by train or canal. The gins are all of the roller type, fed by hand. The cotton is baled at the ginneries and shipped to Alexandria, where it is opened up, examined, and rebaled by a steam press in bales of 700 to 800 pounds, covered with new canvas, carefully stitched up like a bale of dry goods, and arrives in England perfect in condition and appearance, a striking contrast to the ragged American bale.

Central, Western, and Eastern Africa (fig. 1).—South of Egypt there are vast areas in the Sudan available for cotton production when the transportation and labor problems have been solved. At present cotton is grown at several places in the Sudan, but the production is only about 10,000 bales. About 10,000 bales are grown also by the natives in the interior parkland section of Nigeria and Kamerun, where it is estimated that 25,000,000 acres are available for the production of cotton. Uganda, in East Central Africa, produces about 30,000 bales annually; British and German East Africa, each 10,000 bales; Nyasaland and Rhodesia, 7,000 bales; but owing to the spread of the sleeping sickness and to high cost of transportation it is doubtful if the total production of central and eastern Africa will exceed a few hundred thousand bales in the near future. Most of the cotton grown in the African colonies is of the American Upland variety.

Europe (fig. 1).—A little cotton is grown in southern Europe, principally in Greece, whose production averages 25,000 bales. Italy, Cyprus, and Bulgaria each produce a few thousand bales; and a few hundred bales are grown in Spain, Serbia, Sicily, Malta, and Crete.

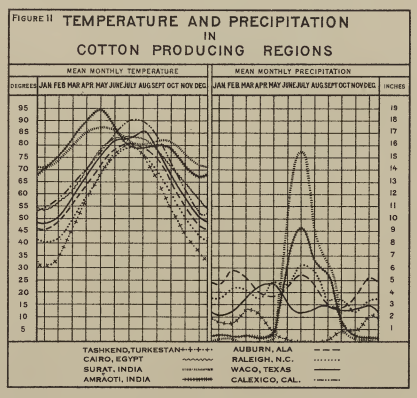


Figure 11.—The summer temperatures in the various cotton-producing regions are similar, the mean July temperature being between 80° and 90°; and the distribution of precipitation, though varying greatly in amount at other seasons of the year, is similar in showing an October rainfall of 3 inches or less. Heavy rains in the fall interfere with picking and also injure the quality of the lint.

Asia Minor and Persia (figs. 1 and 8).—Cotton is grown throughout Asia Minor, but is important only in districts near Adana and Smyrna. The production ranges from 100,000 to 200,000 bales. The cotton is similar to the Indian types except where American Upland has been introduced. Persia's cotton crop, about 130,000 bales, comes mostly from scattered small areas in the northern part of that country. The quality of the Persian cotton is inferior to American Upland, which has been introduced, but is not as yet grown on a commercial scale.

Russia (fig. 8).—The cotton crop of Russia is confined to Turkestan and Transcaucasia. The climate in these regions is of the arid continental type, characterized by hot summers and cool winters (see Tashkend, fig. 11). The annual rainfall in Turkestan, where most of the crop is grown, ranges from 5 to 15 inches. The soil is a very fertile loess and alluvium. Cultivation is limited to the river valleys which can be irrigated, about 2 per cent of the total area. In Ferghana and Transcaspia about 25 per cent of the irrigated land is in cotton; in Samarkand and Syr Daria about 3 per cent. Planting occurs in late March and April, picking from August to October. American varieties principally are grown, together with some native cotton, which has a shorter staple and is of poorer quality. The yield per acre ranges from 250 to 450 pounds of lint. The crop of about 1,000,000 bales goes mostly to European Russia, and supplies about one-half of the total consumption of the Empire.

China and Chosen (fig. 10).—The development both of cotton production and manufacture has been rapid in China during the past few years, cotton replacing the opium poppy in many regions. The lint is mostly of poor quality, coarse and short, averaging about five-eighths inch in length, but is improving. The native varieties of cotton grown in Manchuria and northern Chosen are hardier than the American Upland recently introduced into southern Chosen, requiring apparently a mean summer temperature of only 72°, or 2° to 5° less than the American varieties.

South America (fig. 9).—Brazil has a very extensive area of potential cotton production, estimated at 30,000,000 acres, but production on a large scale does not appear probable in the near future owing to lack of capital and the profitableness of other crops. The rainfall is ample along the coast, but severe droughts occur inland. The area available for cotton production in Peru, on the other hand, is very limited, being practically confined to the narrow, irrigated, coastal valleys. Argentina offers great possibilities when sufficient labor is available.

Mexico and the West Indies (figs. 1 and 15).—Cotton is grown to a slight extent in all of the warmer parts of Mexico, but the commercial production of 200,000 bales is limited chiefly to the "Laguna District" in the states of Coahuila and Durango, and to the Imperial Valley in Lower California. Irrigation is necessary in most sections. Some of the native Upland types are of excellent quality, two of these, called Durango and Acala from the places where they were found, having been acclimatized in the United States. Many of the West Indian islands produce more or less cotton. The total annual yield is between 10,000 and 15,000 bales, largely Sea Island.

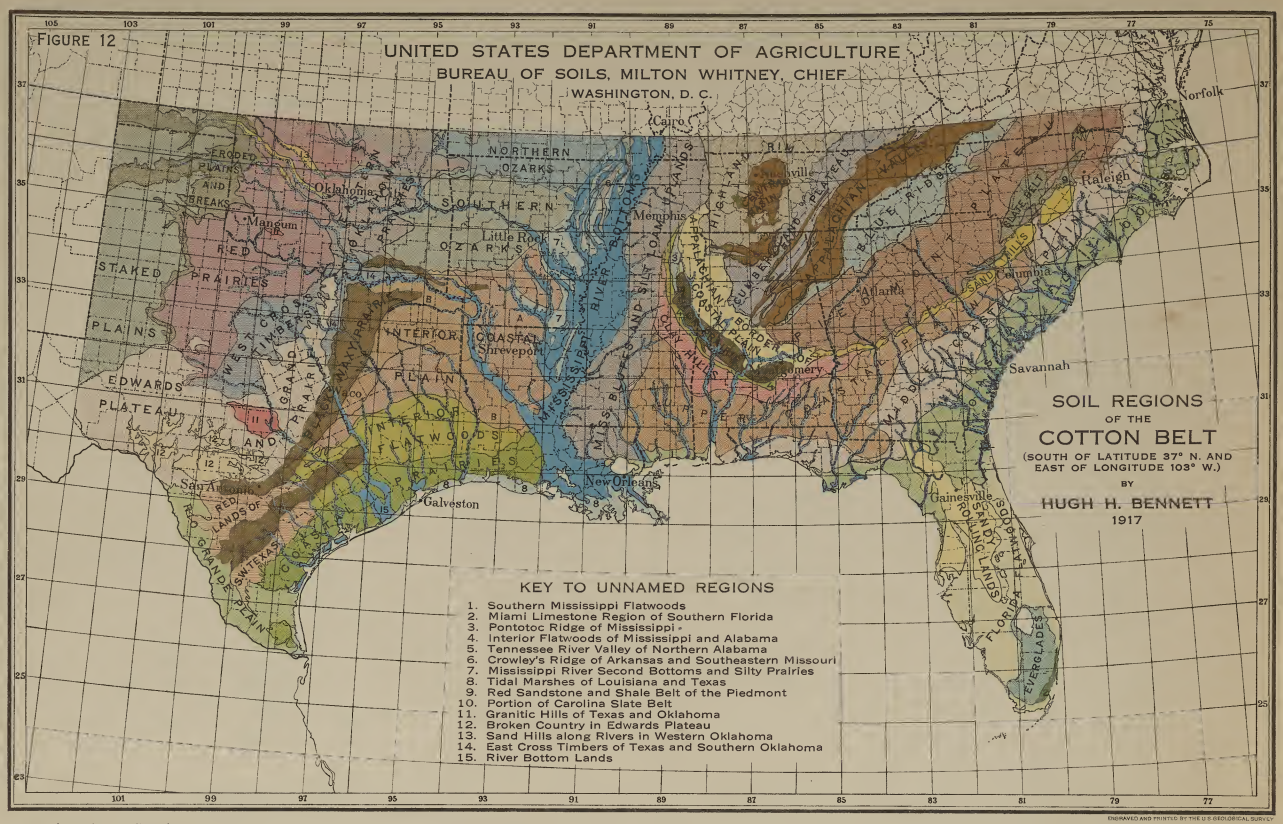


Figure 12. – Soil regions of the Cotton Belt. About two-thirds of the Cotton Belt consists of a broad coastal plain composed principally of sedimentary material, bordering and largely derived from two ancient and much eroded mountain masses, the Appalachian Highlands (including the Piedmont) in the East and the Ozark Highlands in the West. From these highland areas rivers radiate across the coastal plain, bordered, especially along their lower courses, by swampy flood plains often several miles in width; and in the broad depression between these two highlands the Mississippi River flows southward, dividing the Cotton Belt into an eastern and a western section approximately equal in area, in acreage of improved land, and in production of cotton. Beyond the boundary of the coastal plain the Cotton Belt includes northern and western marginal regions, comprising a portion of the Piedmont Plateau and of the valleys associated with the Cumberland Plateau and Blue Ridge Mountains in the East, together with the valleys of the Southern Ozarks (Ouachita and Boston Mountains) and a portion of the prairies and great plains of Texas and Oklahoma in the West.

UNITED STATES.

Cotton ranks second in value among the crops of the United States and occupies fifth place in acreage. It is the most important commercial crop of this country, and within the "Cotton Belt" has a value exceeding that of all other crops combined. The area of the Cotton Belt is about 300,000,000 acres, of which, in 1910, 65 per cent was in farms, 30 per cent was improved land, 22 per cent was in crops, and 11 per cent was in cotton.

SOILS OF THE COTTON BELT.

Cotton is grown on practically all well-drained types of soil in the Cotton Belt. In general the yield on the sandy uplands is smaller, and in wet seasons also the heavy clays and some bottom-land soils give low yields, though producing large vegetative growth. The most productive soils in a normal season are the dark-colored clay lands, particularly those rich in lime, such as the black prairies, and the red, brown, and black well-drained river bottom land and second bottoms. The sandy loams of the Coastal Plain having red and yellow friable clay subsoils, and the red subsoil Piedmont lands, when fertilized, also give high yields of cotton. In the eastern portion of the Cotton Belt the extensive use of fertilizers results in a relatively high yield on thin, sandy land and permits the growing of cotton on types of soil which would otherwise give yields too low to be profitable.

IMPORTANT SOIL REGIONS OF THE COASTAL PLAIN.

Atlantic Coast Flatwoods.—This region extends along the coast of the Carolinas and Georgia into Florida. Area, 21,200,000 acres. Elevation, 0 to 150 feet. Surface, flat to undulating; much poorly drained land and swamp. Soils, mainly dark and grayish sands and sandy loams, with yellow, gray, and mottled sand and clay subsoils; considerable silt loam in northeastern North Carolina. Vegetation, principally open forests of long-leaf pine, with gallberry and grassy undergrowth. Fertilizers are extensively used. Average yield per acre of lint cotton is about 200 pounds; average production, 290,000 bales.[1]

Florida and Southern Mississippi Flatwoods.—Area, 15,000,000 acres. Mainly dark and grayish to white, deep sandy soils. Vegetation, chiefly long-leaf pine, with saw palmetto undergrowth. Little cotton is grown in this region.

Middle Coastal Plain.—This region extends across the Carolinas and Georgia into western Florida. Area, 20,600,000 acres. Elevation, mostly between 100 and 400 feet. Surface, gently rolling. Soils, mainly grayish sandy loams with yellow, friable sandy clay subsoils. Vegetation, long-leaf pine and wire grass. Yield of cotton per acre, about 205 pounds; production, 1,140,000 bales, owing largely to the use of fertilizer.

Upper Coastal Plain.—This region extends from South Carolina across central Georgia and southern Alabama into central Mississippi, and includes a portion of northern Florida. Area, 28,700,000 acres. Elevation, 20 to 500 feet. Surface, rolling. Soils, mainly grayish and reddish sandy loams with yellow and red, friable, sandy clay subsoils. Vegetation, long-leaf and short-leaf pine, some oak and hickory. Yield of cotton per acre, about 190 pounds; production, 1,130,000 bales. Much fertilizer is used.

Clay Hills.—This region extends from western Georgia through Alabama and Mississippi almost to the Tennessee line. Area, 8,000,000 acres. The soils have stiff clay subsoils, and the surface is hilly, including some rough, stony land known as "white rock land" in east-central Mississippi and western Alabama. Average yield of cotton per acre is about 145 pounds; average production, 320,000 bales.

Sand Hills.—This region extends in a narrow, interrupted belt along the upper margin of the Coastal Plain from central North Carolina across South Carolina and Georgia into Alabama. Area, 3,400,000 acres. Soil, prevailingly deep, loose sand, grayish at the surface and yellowish beneath. Vegetation, long-leaf pine and forked leaf blackjack oak. Fertilizer is extensively used. Average yield of cotton per acre is about 180 pounds; average production, 175,000 bales.

Black Prairies.—This crescent shaped belt extends from eastern Alabama into northeastern Mississippi. Area, 4,000,000 acres. Elevation, 200 to 500 feet. Surface, gently rolling with some flat "post oak land." Soils, mainly dark gray and brown, limey clays. The included "post oak" soils are brown sandy loams and clays, with reddish subsoils and contain less lime. Yield of cotton per acre is less than 150 pounds, owing largely to continuous cropping and shallow plowing; production, 235,000 bales.

Mississippi Bluffs and Silt Loam Uplands.—This region borders the Mississippi bottom lands on the east, and extends from Louisiana into Kentucky. Area, 16,800,000 acres. Elevation, 100 to 600 feet. Surface, level to undulating, badly gullied in places. Soils, mainly brown silt loams of loessial origin, becoming thinner along the eastern border. A narrow strip of the same soil occupies Crowley's Ridge, extending from southeastern Missouri to Mariana, Arkansas. Vegetation, principally oak, sweet gum, and poplar. Yield of cotton per acre about 200 pounds; production, 580,000 bales.

Interior Flatwoods.—The largest area of the Interior Flatwoods extends from the Mississippi bottoms in Louisiana to the Guadalupe River in Texas. A long, narrow, crescent-shaped belt extending from central Alabama into northeastern Mississippi has similar soils and topography. Area, 13,000,000 acres, including about 600,000 acres in Alabama and Mississippi. Elevation, 100 to 500 feet. Surface, prevailingly flat; much poorly drained land. Soils, mainly gray sandy loams, silt loams, and clays with compact gray and yellow or mottled subsoils. Vegetation, long-leaf pine in Louisiana and eastern Texas; post oak in central Texas, Alabama, and Mississippi. Yield of cotton per acre, about 175 pounds; production, 366,000 bales.

FIGURE 13 PRINCIPAL SOIL REGIONS
PER CENT OF LAND AREA IMPROVED, IN CROPS AND IN COTTON
AND
ACRES PER FARM IMPROVED, IN CROPS AND IN COTTON

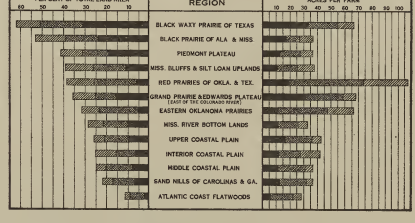


Figure 13.—The per cent of the land area improved, in crops, and in cotton, is greatest in the more fertile soil regions, especially the easily cultivated prairies. The farms, as classified by the Census, are largest in the western prairie regions and smallest in the East where the Negro cropper system is extensively developed. Each holding by a cropper or tenant is enumerated as a farm by the Census (see pages 11-13).

Interior Coastal Plain.—This region comprises a large area of prevailingly rolling country in northeast Texas, northwest Louisiana, and southwest Arkansas. Area, 28,800,000 acres. Elevation, 100 to 500 feet. Vegetation, in the east, long-leaf and short-leaf pine and some oak; in the west, oak with some prairie areas. Soils, mainly grayish, brownish or reddish sandy loams, sands and clays having in area A much soil with yellow, red, and mottled friable subsoils, and in area B relatively more soil with gray and red mottled stiff clay subsoils. Section A produces an average of about 165 pounds of cotton per acre, and section B, 163 pounds. The total production averages 995,000 bales.

"Black Waxy" Prairies.—There are two main bodies of these prairies, one extending from the Red River in northeast Texas to San Antonio, and the other from the Brazos River nearly to Laredo. Area of the first about 8,400,000 acres, of the second about 4,500,000 acres. Elevation, 100 to 600 feet. Surface, flat to undulating; drainage, good. Soils, black and dark gray calcareous clays. There is a small belt of similar soils in southeastern Oklahoma and southwestern Arkansas. Average yield of cotton per acre about 175 pounds; average production, 1,320,000 bales.

Less important soil regions of the Coastal Plain are the *Sandy Rolling Lands of Interior Florida*, which contain some red and brown loamy hammock lands, where Sea Island cotton is sparingly grown; the *Appalachian Border of the Coastal Plain* in northern Alabama and northeastern Mississippi, a region of rolling to hilly, grayish sandy loams with yellow and red subsoils, supporting mixed pine and oak forest; the *Pontotoc Ridge* in Mississippi, which has soils similar to those of the Upper Coastal Plain; and the *Gulf Coastal Prairies* of Louisiana and Texas, which is a flat, imperfectly drained region of black, brown, and gray clays and loams with black, yellow, and gray mottled clay subsoils, limey in the western portion. The eastern portion of the Coastal Prairies is largely devoted to rice and the western portion principally to grazing and to corn growing, with cotton ranking second in importance. The *Red Lands of Southwest Texas* produce some cotton in the northern portion. The soils are mainly reddish sandy loams, gravelly loams, and loams with red subsoils.

ALLUVIAL SOIL REGIONS.

Alluvial Bottoms of the Mississippi and other Rivers.—This region includes as the principal area the bottoms of the Mississippi River from Cairo, Illinois, to the Gulf. It also includes the bottoms of all other rivers within the Cotton Belt, many of which are too small to show on the map. Much of the land is subject to overflow, requiring protection by levees. Area, about 16,500,000 acres. Elevation, 0 to 300 feet. Surface, level. Soils of the Mississippi bottoms, mainly brown or mottled clays, silt loams, and fine sandy loams with gray, light brown, and mottled subsoils. Vegetation, largely cypress, red gum, and oak. Production of cotton about 940,000 bales. The most important cotton growing section in this region is that known as the Yazoo Delta, in which the average yield of cotton per acre is about 265 pounds, the highest in the Cotton Belt. In the bottoms of the streams east of the Mississippi River the principal soils are brownish loams, silt loams, and fine sandy loams, with yellowish and mottled subsoils; west of the Mississippi the principal soils are chocolate-red, brown, and black loams, silt loams, and clays, usually calcareous.

Mississippi River Second Bottoms and Silty Prairies.—These second bottoms are extensively developed in southeastern Missouri and northeastern Arkansas. They lie above overflow. The important soils are brown and gray silt loams, and fine sandy loams with light brown, gray, and mottled subsoils. The gray soils are poorly drained. The better drained soils are extensively used for cotton, giving good yields.

IMPORTANT SOIL REGIONS OF THE PIEDMONT, APPALACHIAN, AND OZARK PLATEAUS, MOUNTAINS, AND VALLEYS.

Piedmont Plateau.—This region extends from near New York City southwestward to Alabama, but is planted in cotton only from North Carolina southward. Area in the Cotton Belt, 26,700,000 acres. Elevation, 100 to 1,500 feet. Surface, rolling to hilly, often requiring terracing of cultivated slopes to prevent erosion. Soils, red clay loams and grayish sandy loams with red or yellow clay subsoils, derived principally from granite, schist, and diorite. Vegetation, largely oak, short-leaf pine, and hickory. Average yield per acre of cotton, about 180 pounds; average production, 1,860,000 bales. Fertilizer is extensively used.

In the *Carolina Slate Belt* portion of the Piedmont, the principal soils are gray silt and slate loams and red clay loam, with yellow and red clay subsoils. Fair to good yields of cotton are made, according to fertilization.

Less important cotton regions are the *Appalachian Limestone Valleys*, including the Tennessee River Valley of northern Alabama, and the *Central Basin* in Tennessee. These are regions of fertile, brown, reddish, and gray loams, silt loams, and clay loams with reddish and yellowish subsoils, largely derived from limestone and often cherty. A little cotton is grown in the southern portion of the *Highland Rim* region, which has gray silty and stony soils; and also in the valleys and smooth uplands of the *Southern Ozarks* of Arkansas and eastern Oklahoma, which is a hilly to mountainous region having brownish or reddish sandy loam soils, often stony, with red sandy clay subsoils.

IMPORTANT SOIL REGIONS OF THE WESTERN PRAIRIES AND PLAINS.

Eastern Oklahoma Prairies.—This region extends northward from the Red River in south-central Oklahoma, and includes most of the eastern half of the State. It is used principally for corn and hay and for grazing cattle. Area in Cotton Belt, about 11,000,000 acres. Elevation, 800 to 1,200 feet. Surface, gently rolling, and some rough areas. Soils, mainly brown, black, and reddish loams, clays and stony loams with clay subsoils, often of a clay-pan nature. Vegetation, prairie grasses with occasional areas of post and black-jack oak and red cedar. Yield per acre of cotton in 1909 was 182 pounds; average production, 350,000 bales.

Red Prairies.—This region extends across western Oklahoma into north-central Texas, and is largely devoted to grazing, but has recently experienced extensive development in cotton production. Area, 31,700,000 acres. Elevation, 1,000 to 2,000 feet. Surface, undulating to rolling, with many rough eroded areas known as "breaks" along the western margin. Soils, mainly red and brown fine sandy loams, silt and clay loams, with red and brown clay subsoils, often of a clay-pan nature. Included in this region are small "sand hill" areas (dunes). Yield per acre of cotton in 1909, 105 pounds; average production, 825,000 bales.

Edwards Plateau and Grand Prairie.—This region extends from central Texas westward to the Rio Grande River, but only the eastern portion is extensively used for the production of cotton. Area of portion east of the Colorado River, 7,400,000 acres. Elevation of this eastern portion, 1,000 to 2,000 feet. Surface, rolling to hilly with some level lowlands. Soils, mainly calcareous silt and clay loams, black, brown, gray, and red in color. Vegetation, largely prairie and plains grasses with scattered post oak and cedar. Average yield per acre of cotton in eastern portion about 125 pounds; average production, 410,000 bales.

Less important regions are the *East and West Cross Timbers* in north-central Texas. The soils of both regions are mainly brown sandy loams, often stony, with reddish and yellowish subsoils. Vegetation, mostly post and black-jack oak. These regions are used largely for grazing cattle, but produce some cotton.

[1] Figures of the average yield per acre of lint cotton are for the four census years 1879, 1889, 1899, and 1909, unless otherwise noted. These are the only years for which statistics of acreage by counties are available. Figures of average production are for the five years 1911–1915.

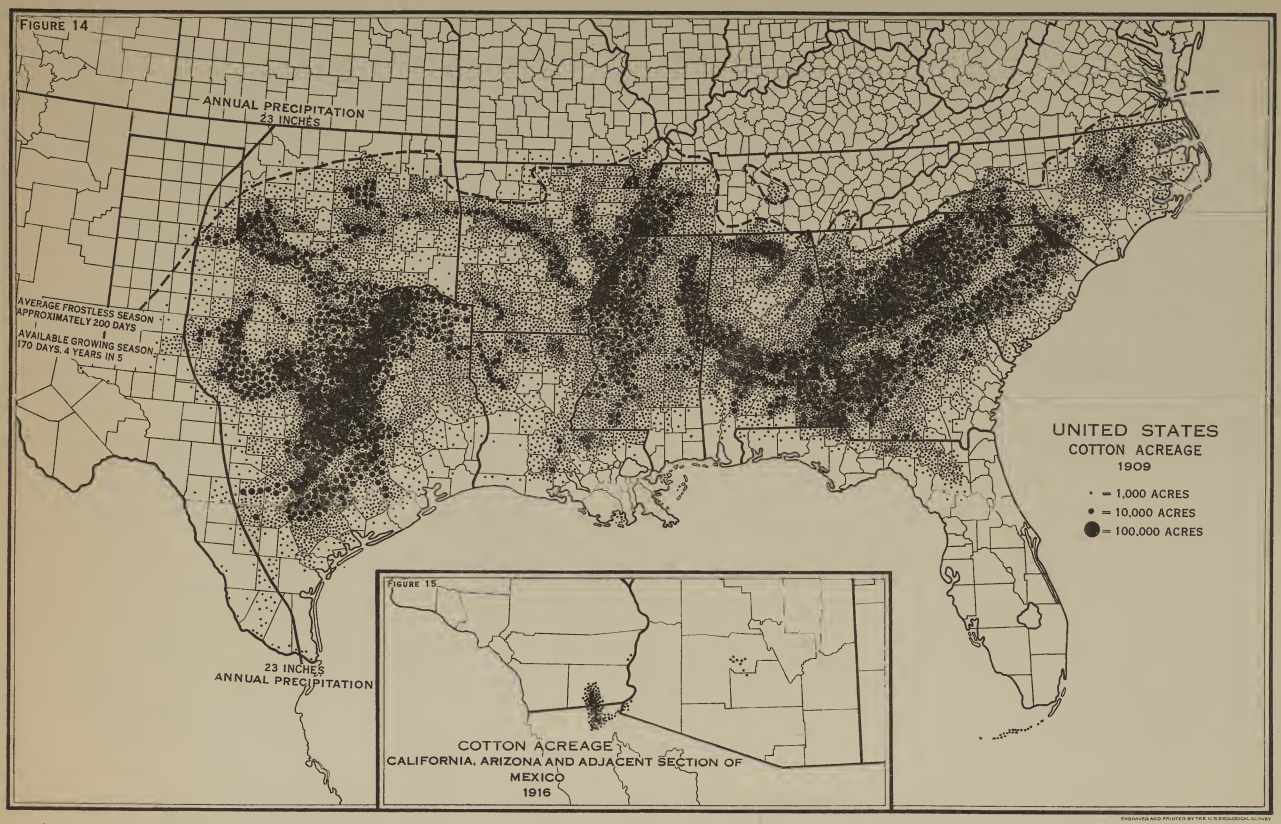


Figure 14.—The northern limit of commercial cotton production in the United States follows closely the average summer temperature line of 77°, or that of 70° for the growing season, and very little cotton is grown where the average season between killing frosts is less than 200 days. The western limit is approximately the line of 23 inches average annual precipitation. Very little cotton is grown along the Gulf coast east of Galveston and practically none in southern Florida, owing partly to the swampy or sandy soils and partly to the greater autumn rainfall (fig. 18), which interferes with picking and injures the quality of the lint. The denser areas on the map are regions of more fertile soils—the Piedmont Plateau and Upper Coastal Plain (which are separated by the less fertile belt of Sand Hills), the Black Prairie of Alabama and Mississippi, the Yazoo-Mississippi Delta, the Red River Valley, and, most important of all, the Black Waxy Prairies of Texas. In the first two regions the use of fertilizers has greatly increased the productivity of the soil.

Figure 15.—Cotton is a new crop in the Southwest. In 1909 there were only 324 acres in California and 19 in Arizona, but by 1916 the area had increased to 98,000 acres in the Imperial Valley, including both the California and Mexican portions, and 15,000 acres in Arizona, all grown under irrigation.

CLIMATE OF THE COTTON BELT.

Although the most noticeable differences in the density of cotton acreage and variations in yield per acre within the Cotton Belt are due principally to soil conditions, the outer boundaries of cotton production are determined almost entirely by climatic factors. The Cotton Belt has an average summer temperature of 77 degrees along the northern boundary (see fig. 28). This temperature appears to be the limit beyond which commercial production becomes unprofitable. (A very little cotton is grown for household use by the mountaineers in eastern Kentucky, where the summer temperature is only 74 degrees.) In the southern portion of the Cotton Belt the summer temperature is 80 to 85 degrees, and in the Imperial Valley of California it averages 95 degrees. Along the northern margin of the Cotton Belt the last killing frost in spring occurs, on the average, about April 10, and the first killing frost in fall about October 25, so that the frostless season is about 200 days. In the southern portion of the Cotton Belt the last killing frost in spring occurs about March 10, on the average, and the first killing frost in fall seldom before November 25, the frostless season being 260 days or more in length (figs. 25–27).

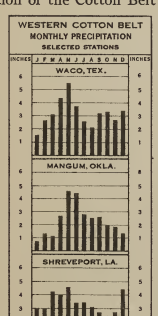
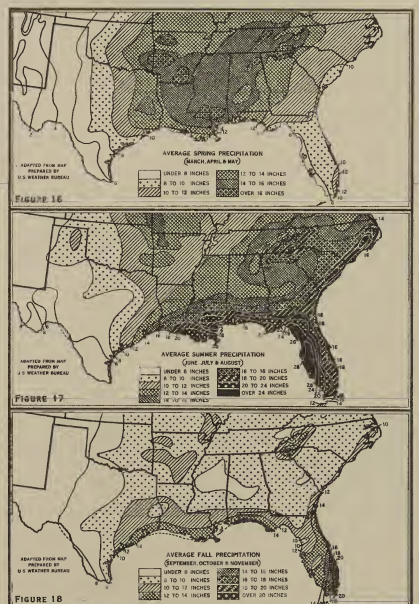


Figure 20.

The average annual precipitation in the Cotton Belt ranges from 23 inches in western Oklahoma and Texas to 55 inches in eastern North Carolina and 60 inches in southern Mississippi, but throughout much of the Belt is between 30 and 50 inches (fig. 19). The spring rainfall ranges from 6 inches in western Texas to 16 inches in Arkansas and southern Mississippi, being heavier in the Mississippi Valley States than in Texas or the South Atlantic States (fig. 16). The summer rainfall is somewhat greater than that of the other seasons, especially in the southern and eastern portion of the Belt, reaching a maximum of 20 inches in southern Mississippi and in eastern North and South Carolina; while in the Black Prairie of Texas the amount received averages only 8 inches (fig. 17). Autumn is the driest season of the year, practically all the important cotton regions receiving less than 10 inches of rain during the fall months (fig. 18). February and November are the wettest months in the Mississippi Valley States, in Alabama, and in northern Georgia. August is the wettest month in the Carolinas and May in Texas and Oklahoma. October and November are the driest months throughout practically the entire Cotton Belt.



Figures 16 to 18.—In spring the rainfall is heaviest in the Mississippi Valley, and in summer, along the Gulf and Atlantic coasts. In autumn, during picking time, the rainfall throughout the Cotton Belt averages less than 12 inches, and is mostly under 10 inches.

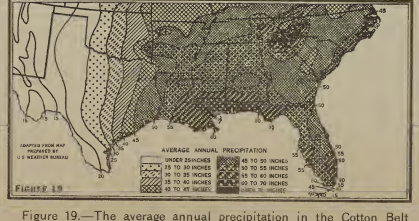


Figure 19.—The average annual precipitation in the Cotton Belt ranges from 20 to 60 inches, but is mostly from 30 to 50 inches. The heaviest annual rainfall occurs in southern Alabama and Mississippi.

Weather Conditions Favorable for Cotton.—The best conditions for cotton production are found where a mild spring with light but frequent showers merges into a moderately moist summer, warm both day and night, followed by a dry, cool, and prolonged autumn. Too cool weather in the spring retards growth, and too much rain may induce the seed to rot rather than germinate, or later cause the development of surface roots to the sacrifice of the deeper roots, with resultant wilting and shedding of leaves and bolls during drought in summer. May and June particularly are critical months when heavy rainfall, especially if accompanied by low temperatures, is very detrimental. Rainy weather in these months also interferes with cultivation. On the other hand, drought in the spring and early summer often kills the young shallow-rooted seedlings. A wet summer promotes vegetative growth, or "weed," at the expense of boll production, and favors the growth of weeds, while drought stunts the plants, causes early maturity, and reduces the yield, as does also a spell of cool weather. The most unfavorable conditions for the crop are a cool and wet May and June followed by a hot and dry July and August. The ideal rainfall is of the thundershower type with several days of bright, warm weather between rains. Plenty of sunshine is especially important in June and early July when the plants are in bloom. As the cotton matures and the bolls begin to open, in the latter part of August, rainy weather is undesirable, as it retards maturity, interferes with picking, and discolors or damages the exposed fiber. Moderate rain in early September, however, favors the production of a large "top crop" of late maturing bolls. The greater daily range in temperature in a dry fall is also favorable to the maturing crop as it checks vegetative growth and induces fruiting. Early frost in the fall kills the "top crop" on the upper branches of the plant, or causes the bolls to open prematurely, often seriously reducing the yield. In northern

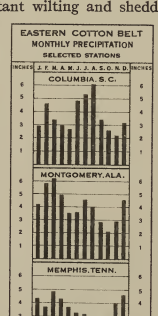


Figure 21.

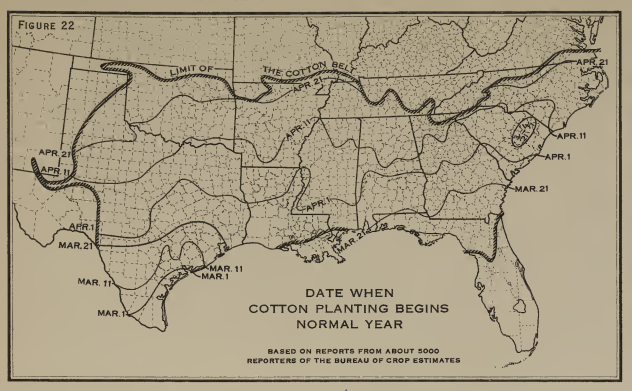


Figure 22.—The planting of cotton begins generally about 10 to 20 days after the last killing frost in spring. In the southern portion of the Cotton Belt this is about March 20, except in extreme southern Texas. Along the northern margin of the Cotton Belt planting does not normally begin before April 20.

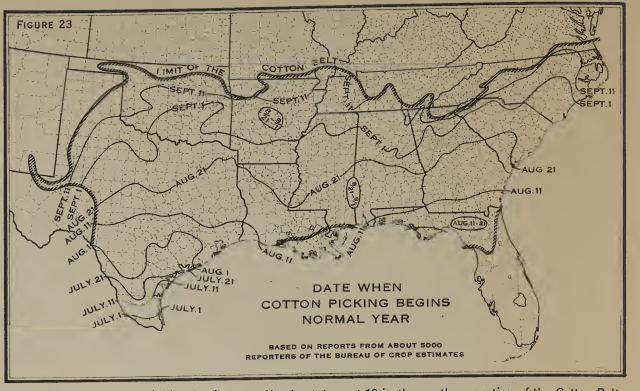


Figure 23.—Cotton picking begins usually about August 10 in the southern portion of the Cotton Belt, except in extreme southern Texas, and along the northern margin about September 10, which, in this region, is only six weeks before the first killing frost and 140 to 150 days after planting.

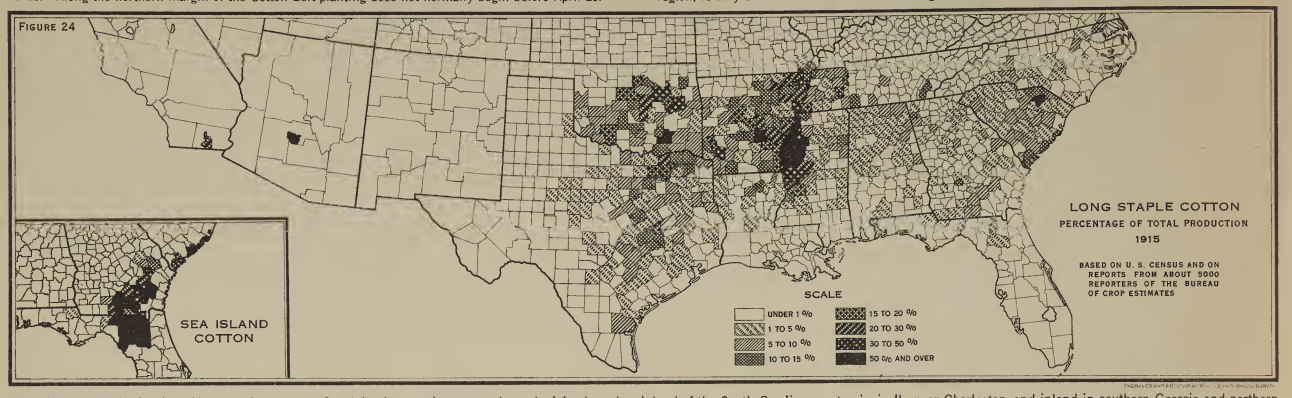


Figure 24.—Distribution of long-staple cottons. Sea Island cotton is grown only on the islands and mainland of the South Carolina coast, principally near Charleston, and inland in southern Georgia and northern Florida. About half of the cotton grown in these districts is Sea Island. Upland long-staple cotton is grown mostly in the Yazoo-Mississippi Delta and adjoining counties of Arkansas, where it constitutes about half of the entire crop. There is a small center of production in Darlington County, S. C., and a small proportion of the crop in several other counties of South Carolina, and also of northern Georgia and Alabama, Tennessee, and Texas is classed as long staple. About 20 per cent of the cotton grown in the Imperial Valley of California is Durango and other long-staple varieties. Egyptian cotton is grown principally in the Salt River Valley of Arizona, the crop of about 7,000 bales in 1916 constituting probably 95 per cent of the cotton production of the valley. About 38,000 acres were planted in the valley in 1917, mostly of the improved Pima type, introduced by the U. S. Department of Agriculture. The production of long-staple cotton in the United States in 1915 was estimated at about 7 per cent of the total cotton crop (see fig. 83).

Texas and Oklahoma, where the winds dry out the cotton in the unopened frost-bitten bolls, this "top crop" is "snapped" from the stalks, and, after being run through a machine which removes the burrs, is ginned and sold as "bollies." In other sections rains may cause the frost-bitten bolls to rot.

Dates of Planting and Picking (figs. 22 and 23).—Cotton planting generally begins in the southern portion of the Cotton Belt about March 20, and progresses northward with the advance of temperature at the rate of 10 to 20 miles a day, so that in the central portion planting begins during the first week in April, and in the northern portion about April 20. The planting usually requires two to three weeks to complete, hence is over in the southern districts about April 15 and in the northern districts a month later. When the cotton is a few inches high the rows need to be thinned, which process is known as "chopping out," and is the most laborious task in the cultivation of cotton except that of picking. Chopping out begins in the southern districts of the Cotton Belt usually about the 1st of May, in extreme southern Texas as early as April, and continues for about a month. In the northern districts it begins about June 1 and ends from June 20 to July 5, being usually two weeks later in Arkansas and western Tennessee, especially on the river bottom lands, than at corresponding latitudes in the Carolinas. Cotton picking begins about August 10 in the southern portion of the belt, usually the last week in August in the central portion, and in the northern portion about September 10. The cotton is picked by hand, a slow and laborious process, and three or four pickings are commonly given each field, the first picking of the early maturing bolls and the last picking of the late maturing bolls being much smaller than the midseason pickings. It is usually the first of December before picking is completed in the southern districts and from December 20 to January 1 in the northern districts. Where the acreage is large and the labor insufficient, the picking may drag along into midwinter, though the cotton is by this time likely to be considerably injured by the weather.

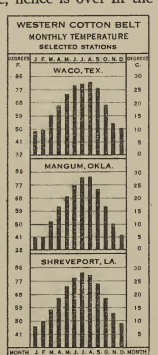
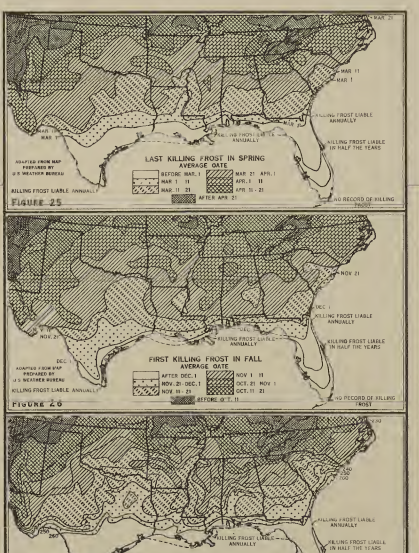


Figure 29.



Figures 25 to 27.—The average length of the season between killing frosts varies from 200 days along the northern margin to 260 days or more in the southern portion of the Cotton Belt.

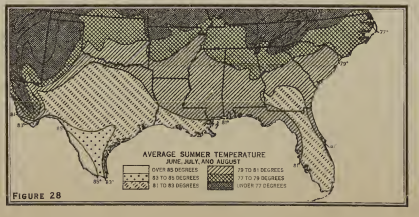


Figure 28.—The average summer (June, July, and August) temperature along the northern margin of the Cotton Belt is about 77 degrees.

DISTRIBUTION OF LONG-STAPLE TYPES.

In addition to the Upland short-staple cottons which are grown throughout the Cotton Belt and also in the Imperial Valley of California, there are three types of long-staple cotton whose production is mostly localized (fig. 24).

Sea Island cotton, grown on the islands and mainland of the South Carolina coast and inland in southern Georgia and northern Florida, requires greater atmospheric humidity than does Upland cotton. In the region where both are grown a wet season favors the Sea Island and a dry season the Upland varieties, the Sea Island in such seasons having a harsher and shorter staple. Along the Carolina coast an ocean exposure is said to produce a finer and glossier staple because of the moisture-laden winds, and in the interior low-lying lands, especially those near swamps, produce the better staple.

Upland long-staple cotton is grown principally in the Yazoo-Mississippi delta, and in the adjoining counties of Arkansas. Its extensive production in this region is undoubtedly due in part to the very fertile soils and abundant rainfall (see fig. 19). The small center of production in Darlington and Marlboro Counties, S. C., is in large measure due to the initiative of one man, but here also the rainfall is heavy and the consumption of fertilizer per acre is greater than in other sections of the Cotton Belt (see fig. 48). The successful production of long-staple cotton demands fertile soils and careful culture. Although long-staple cottons usually require a longer season to mature than short staples, the development of improved, early-maturing varieties by the Department of Agriculture has made it possible to continue the production of long-staple cottons in the presence of the boll weevil.

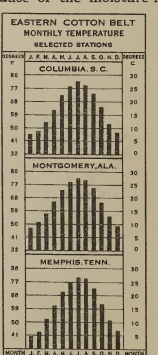


Figure 30.

Egyptian cotton is grown in the Salt River Valley of Arizona, in the Yuma district, and in the Palo Verde Valley on the California side of the Colorado River. The climate in these valleys is arid and hot, like that of Egypt, and the cotton is likewise grown entirely under irrigation. The best farmers secure yields per acre even exceeding those in Egypt. Under the stimulus of increasing special demands and unusually high prices the production is expanding rapidly.

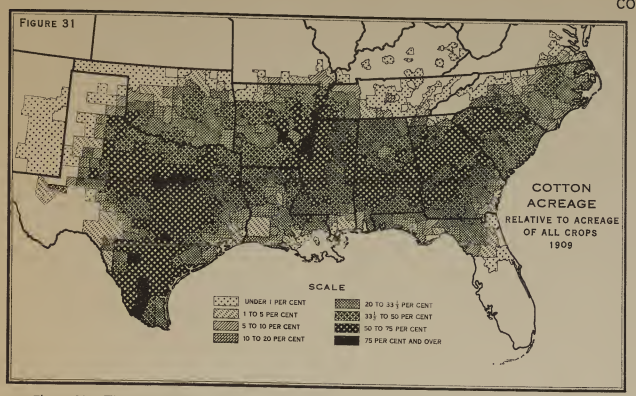


Figure 31.—Through the center of the Cotton Belt cotton occupies one-half or more of the cropped land. In the Yazoo-Mississippi Delta, a section of the Arkansas River Valley, and in several counties of southern and central Texas it occupies three-fourths of the cropped land.

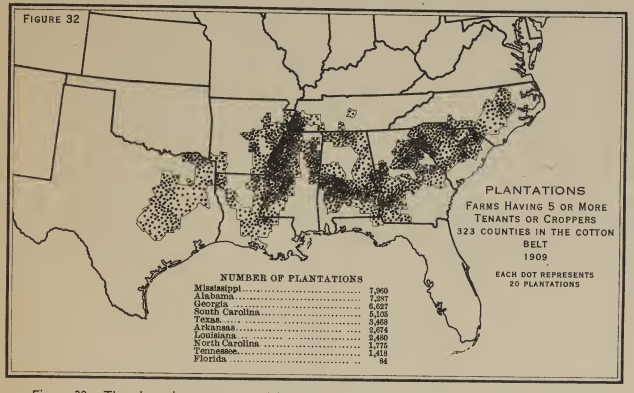


Figure 32.—The plantations represented here are those tabulated by the Bureau of the Census for 323 counties of the Cotton Belt. The counties are outlined. The tabulation of statistics was confined to those counties in which the plantation system of management is extensively employed. Plantations are more numerous in the eastern portion of the Cotton Belt, where the slavery system was well developed before the Civil War, and are most numerous where the soils are best adapted to cotton production.

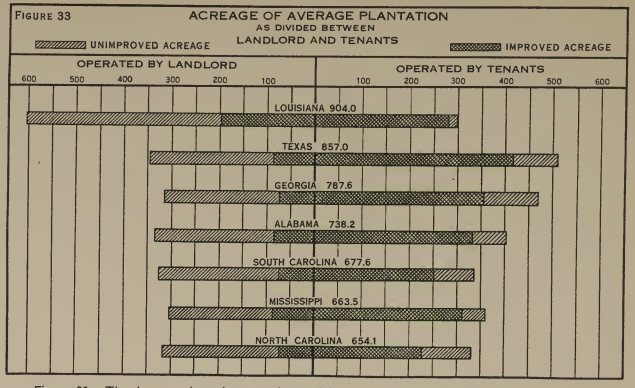


Figure 33.—The largest plantations are in Louisiana and Texas. More than half of the average plantation in Louisiana is operated by the landlord. In all the States most of the unimproved land is operated by the landlord, and most of the improved land by the tenants.

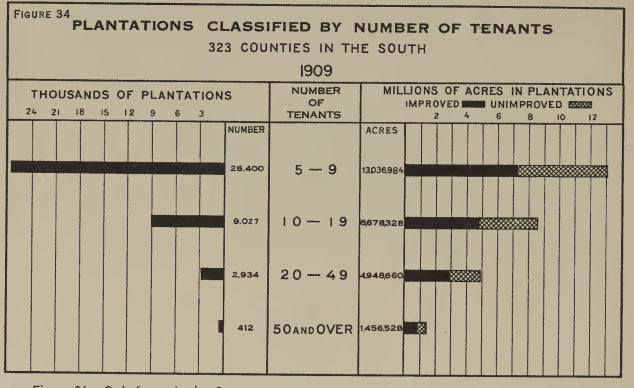


Figure 34.—Only farms having 5 or more tenants are enumerated as plantations. Two-thirds of the plantations have from 5 to 9 tenants, while a few have 50 or more. The total area of the plantations having from 5 to 9 tenants is about one-half of the total area of the plantations enumerated. In each of the four groups more than half of the land held by the tenants is improved. Approximately one-third of the improved land of the counties represented on the plantation map (fig. 32) is in plantations and this includes the most productive cotton lands of the South.

ECONOMICS AND METHODS OF PRODUCTION.

Cotton is the great crop of the South. It occupies the best land and is the chief source of the farmer's income. Through the center of the Cotton Belt cotton occupies one-half or more of the cropped land (fig. 31) and is the most important crop produced for market. Although cotton requires labor throughout practically the entire season, the distribution of that labor is such that other crops may be cultivated to some extent without reducing the acreage of cotton, and consequently a great diversity of crops for home consumption is produced in the Cotton Belt. Corn is the most important of these crops, and in many regions the acreage in corn is equal to the acreage in cotton (fig. 44). Oats, wheat, rye, cow peas, sweet potatoes, Irish potatoes, sorghum, garden vegetables, and fruits are produced in considerable quantities in some parts of the South. Although there is this diversity of crops, in many cases not enough food is grown by farmers for home use or to feed the livestock, which on the small farms usually consists of a work animal, a cow, some swine, and poultry. Though there is land available for the production of food and forage crops and though diversification in commercial crops is being constantly urged upon the South, the acreage devoted to all of these crops, excepting corn, is relatively small; and consequently the South imports from the North every year large quantities of foodstuffs and grain for feed, which is distributed not only to the city population but also to the cotton growers on the farms.

Natural and economic forces have made the South peculiarly dependent upon cotton. Cotton may be grown only under certain climatic conditions, already discussed, which restrict its production in the United States to the Southern States, whereas grain and forage crops, which are grown to some extent in these States, are grown in other parts of the United States under climatic conditions as favorable or even more favorable for their production. Since cotton will grow on practically all well-drained soils, is drought resistant, and yields well on light sandy soils to which fertilizers have been applied, it is better suited to many of the soils of the South than are the other staple crops. Furthermore, the South has a denser agricultural population and cheaper labor than other parts of the United States, both of which circumstances favor the production of cotton, as it requires a large amount of hand labor and yields high returns per acre. Since cotton can be produced cheaply only in the South, whereas other staple crops can be produced as cheaply or more cheaply elsewhere, it is more profitable with normal prices to produce cotton in most parts of the South than to produce other crops and live stock for market, except in so far as their production with the cotton crop results in better and more efficient use of the labor and capital on the farm.

METHODS OF MANAGING THE COTTON FARM.

The character of the labor supply and the large amount of hand labor used in the production of cotton have developed systems of managing the farm peculiar to the South.

THE PLANTATION.

From the time when cotton became a commercial crop in the South until the Civil War, it was commonly grown under the plantation system. Strictly speaking, the term "plantation" was applied to a large farm operated under one management with slave labor frequently directed by an overseer. The planter exercised supervision over the growing of crops through the overseer and handled most of the business transactions himself. After the slaves were freed the "cropper" system was established, and the "plantation" may now be defined as a large tract of farm land operated under one management by wage hands and croppers. Under the cropper system there is much less supervision by the owner or manager than was necessary with slave labor and less than is necessary to operate the plantation with wage hands. The planter does not always have an overseer, although on the farms most commonly recognized as plantations one is usually employed. The term "plantation" is often used colloquially, however, to designate any large farm employing a considerable amount of labor. The Bureau of the Census defines a tenant plantation as "a continuous tract of land of considerable area under the general supervision or control of a single individual or firm, all or a part of such tract being divided into at least five smaller tracts, which are leased to tenants"; but this definition does not accord with common usage.

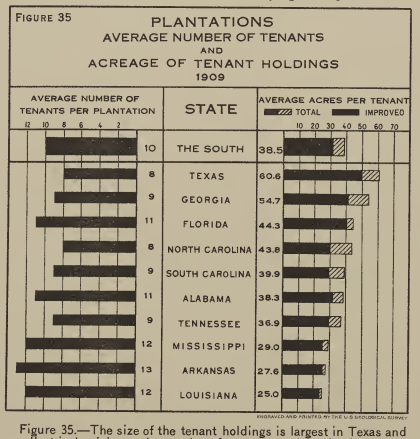


Figure 35.—The size of the tenant holdings is largest in Texas and smallest in Louisiana; the number of tenants per plantation is greatest in Arkansas and smallest in Texas and North Carolina.

Plantations as defined by the Census are most numerous in the older cotton-growing States (fig. 32). Texas was a part of the United States for only a few years before the Civil War, so that slavery and the plantation system did not have time to develop there to the extent that it did in the States east of Texas, and therefore the plantations of to-day are found only in the eastern part of the State. Oklahoma has no plantations, as it has been settled in recent years, too late for the system to become established.

Plantations are the largest in Texas and Louisiana, as shown by figure 33. The large plantations have a high percentage of unimproved land, most of which is under the control of the owner. The croppers on the plantation rent mostly the improved land, leaving the unimproved in the care of the owner, who utilizes it for supplying fuel and to some extent for the grazing of the livestock belonging to the plantation. The average number of croppers or "tenants" per plantation is largest in those States in which the holdings are smallest, while the number is smallest in those States in which the holdings are largest (fig. 35). In Texas the cropper operates a large acreage of improved land by using two and four horse implements in preparing the land and cultivating the crops and by employing extra labor for picking cotton.

Wage Hands.—The owners of the plantations commonly operate a part of their land with the assistance of wage hands, the remainder being let to croppers or tenants. Wage hands are usually paid a stipulated cash wage per month and furnished a house, wood, and rations. On the Upper Coastal Plain in South Carolina the wage hands are also frequently furnished 2 or 3 acres of land rent free, which they plant on their own account, using the operators' work stock. This land is given them to plant in order to hold them on the farm through the season. The wage hands are used principally in growing the feed crops and keeping up the farm, while most of the cotton is grown by the croppers.

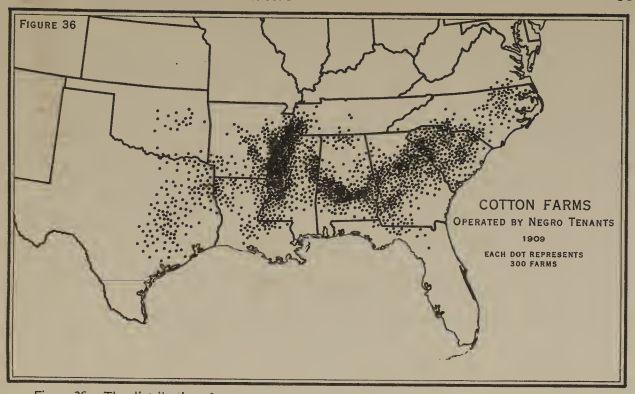


Figure 36.—The distribution of negro tenants or croppers is similar to that of plantations (see fig. 32). On the old plantations many of the negroes have remained as croppers. There are a few negro tenants in Texas and Oklahoma outside the plantation areas.

Figure 38.—Cotton farms operated by negro owners are thinly scattered over the South. They are relatively most numerous on the Atlantic Coastal Plain and on the Interior Coastal Plain in Arkansas, Louisiana, and Texas. They are least numerous where the plantation system prevails.

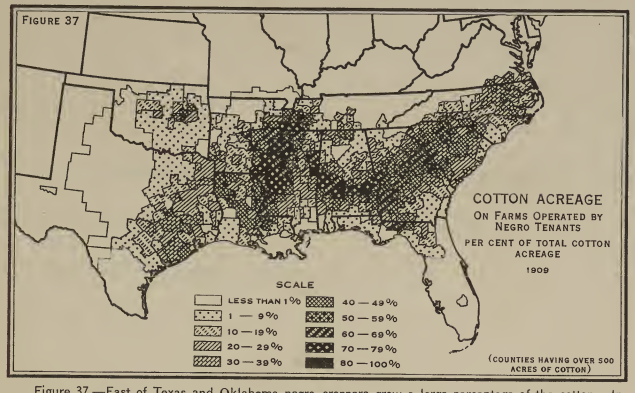


Figure 37.—East of Texas and Oklahoma negro croppers grow a large percentage of the cotton. In the Yazoo-Mississippi Delta and in the Black Prairie region of Alabama and Mississippi they plant over 70 per cent of the total acreage.

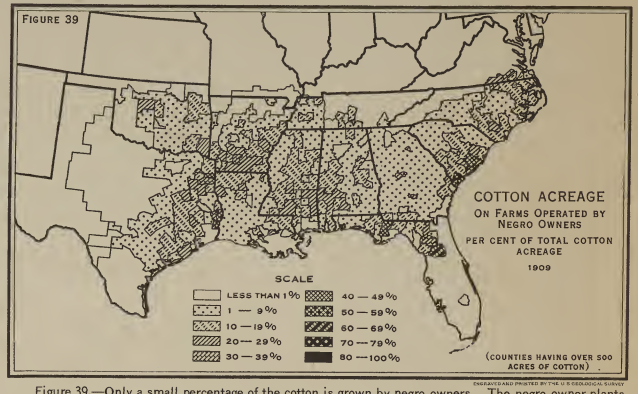


Figure 39.—Only a small percentage of the cotton is grown by negro owners. The negro owner plants about the same number of acres on the average as the negro tenant or cropper, but there are comparatively few negro owners.

Croppers.—In the Census reports croppers are classed as tenants, but legally they are laborers paid by a share of the crop instead of cash. In the South they are regarded as a higher class than wage hands and in some sections are called "half-hands" or "half-renters." Under the cropper system the common custom is for the landlord to furnish the land, work stock, implements, feed, seed, and half the fertilizer, while the cropper furnishes all the labor and half the fertilizer, and pays for half the ginning; and all the crops are divided equally. The owner frequently advances money or rations or both to the cropper, repayment being made out of the cropper's half at the end of the year. Often there are variations from the details of this arrangement, but it is the one most commonly used. The cropper is usually closely supervised by the owner of the land or by an overseer employed by him.

Where the cultivator of the land on a plantation furnishes the work stock and implements while the owner furnishes part or all the fertilizer, if any is used, he receives one-half or two-thirds of the crop. This system is used where the planter can give little supervision or where the cropper is desirous of greater independence than is customary under the ordinary cropper system. The amount of supervision over such share renters or croppers on plantations varies greatly.

TENANT FARMS.

It is practically impossible to draw a sharp line between tenants and croppers. In general it may be said that the tenant is more nearly an independent farm operator. Where individual farms are rented on shares or for cash, little or no supervision is given the tenant. Most of the rented farms outside of the plantation regions may be designated tenant farms. There are also some tenant farms scattered through the plantation region.

Share Tenants.—In renting on shares the landlord furnishes a part of the fertilizer, if any is used—commonly one-fourth for the cotton and one-third for corn and other crops—and receives as rent one-fourth of the cotton and one-third of the other crops. The greater amount of labor required by cotton is the reason for granting the tenant a larger share of the cotton than of the corn. In some instances where the fertility of the land is above the average, the landlord receives one-third of the cotton, in which case he furnishes one-third of the fertilizer. Each party pays for his share of the ginning.

Cash Tenants.—Some tenants pay cash rent for a part or all the land which they operate. Frequently, however, instead of actual cash, the tenant pays a stipulated amount of lint cotton, usually two 500-pound bales for enough land for a one-mule farm. In this way the landlord, instead of the tenant, takes the risk on the price of the cotton that he receives for rent. Such a tenant is also called a "standing renter."

FARMS CLASSIFIED BY TENURE AND COLOR OF OPERATOR.

The United States Census enumeration of farms does not distinguish between croppers and tenants, hence a plantation operated with the aid of several croppers is returned as so many farms. According to the census enumeration of 1910 more than two-thirds of the farms of the Cotton Belt were operated by white men and more than three-fifths of the cotton was produced by them. This large proportion of white cultivators is due to the fact that there are relatively few negro cultivators in Oklahoma and Texas, and the large percentage of cotton produced by white farmers is owing both to the number of white operators and to the fact that the cotton produced by negro laborers as wage hands is accredited to the white operators. That the negro operators specialize more in cotton than do the white operators is evidenced by the fact that, whereas the negroes operate 28.7 per cent of the farms, they produce 37.8 per cent of the cotton crop.

TABLE II.—STATISTICS OF COTTON CULTURE IN SELECTED COUNTIES OF EIGHT SOIL REGIONS OF THE COTTON BELT, 1909.

	Atlantic Coast Flatwoods.	Upper Coastal Plain.	Sand Hills.	Piedmont Plateau.	Black Prairie of Alabama and Mississippi.	Yazoo-Mississippi delta.	Black Prairie of Texas.	Interior Coastal Plain of Tex. and La.
Number of counties selected	7	16	9	20	7	10	10	9
Per cent of land area in farms	47.4	65.7	62.2	84.3	68.9	52.6	86.1	62.0
Per cent of land area improved	13.5	33.3	23.6	44.9	46.5	37.1	62.2	31.8
Per cent of land area in cotton	3.5	13.3	9.0	20.4	23.9	21.5	31.6	10.2
Per cent of land area in corn	4.3	9.6	6.8	10.0	8.2	6.5	14.5	8.5
Per cent of total farm land in "Plantations"	6.8	28.6	24.6	28.7	64.2	85.2	14.5	13.9
Per cent of total improved land in "Plantations"	2.5	16.4	9.3	15.3	45.1	56.6	10.6	7.8
Per cent of farms operated by:								
Negro tenants	23.3	44.8	31.5	40.8	78.7	86.1	9.5	24.3
Negro owners	26.5	9.8	8.5	3.7	7.2	5.0	2.5	12.2
White tenants	13.7	16.7	24.0	28.9	5.2	3.1	35.7	25.9
White owners	36.2	28.2	35.4	26.4	8.6	3.3	31.9	37.4
Acres per farm:								
Negro tenants	26.4	44.9	38.6	47.7	33.2	21.6	54.2	44.8
Negro owners	49.6	82.5	86.7	79.1	75.7	59.3	67.8	94.3
White tenants	90.8	65.7	65.3	54.8	95.7	55.3	83.2	56.2
White owners	195.4	159.5	156.5	107.3	196.0	223.4	124.9	133.6
Acres of improved land per farm:								
Negro tenants	19.2	35.7	28.1	31.7	29.0	21.0	49.0	35.4
Negro owners	20.8	41.0	33.9	40.0	41.6	33.8	47.8	50.0
White tenants	29.6	40.2	30.9	31.9	56.6	34.0	66.9	35.4
White owners	43.1	57.8	44.9	45.4	90.7	79.2	77.1	56.6
Farms reporting cotton per cent of all farms:								
Negro tenants	83.6	89.5	90.0	91.8	91.6	76.6	87.3	82.9
Negro owners	70.1	92.4	92.7	94.2	95.3	92.5	88.3	93.4
White tenants	71.0	83.0	83.5	89.1	77.3	70.0	88.3	71.3
White owners	76.1	86.7	86.7	81.0	75.4	64.2	81.0	81.3
Acres of cotton per farm reporting:								
Negro tenants	9.6	20.5	17.1	20.2	20.6	17.2	36.7	20.3
Negro owners	8.7	18.3	15.0	19.6	21.4	19.6	30.6	19.8
White tenants	11.0	19.3	14.8	16.9	24.7	21.4	41.2	16.7
White owners	11.9	19.8	14.7	16.8	27.7	54.3	41.1	16.9

Negro "Tenants" (figs. 36 and 37).—Of all the farms in the South 21.6 per cent are operated by negro "tenants" who are mostly croppers on plantations. They are most numerous in the more fertile cotton regions, where plantations are most numerous. There are not many negro tenants in Texas and Oklahoma because, as has been previously stated, the plantation system had not developed extensively in these States before the Civil War. Although conditions are favorable in Texas for intense specialization in cotton production, few negroes have migrated to this State since the Civil War.

Negro Owners (figs. 38 and 39).—Negro owners operate 6.7 per cent of the farms of the South and are distributed over the same area as negro "tenants," but are relatively most numerous along the Atlantic Coastal Plain and on a belt extending southwest from Memphis, Tennessee, across Arkansas and Louisiana and into Texas, a recently developed cotton producing region. In the older cotton producing centers, where the cotton farms are operated under the plantation system, few of the negroes have been successful in passing from the status of cropper or tenant to that of owner, while in regions where land is cheap and undeveloped but capable of profitable cotton production many have become owners of land.

White Tenants (figs. 40 and 41).—A few of the white tenants are croppers on plantations, but they are mostly renters of small farms. They are most numerous along the northern and western borders of the Cotton Belt. In slavery times white owners and tenants of small farms were to be found in North Carolina, in the upper Piedmont region of South Carolina and Georgia, in northern Alabama, and Mississippi, in Tennessee, and Arkansas, where there was less competition with slave labor; while in the center of the Cotton Belt the white population was sparser, consisting mostly of the owners and overseers of the large plantations. After the Civil War the white tenants and owners of the small farms did not enter upon the old plantations to any very great extent. In Oklahoma and in parts of Texas, as previously noted, the negro was not introduced by slaveholders and the white man is dominant in all forms of tenure.

White Owners (figs. 42 and 43).—Cotton farms operated by white owners are more evenly distributed over the South than are those operated by tenants, but are most numerous in the same regions where white tenants are

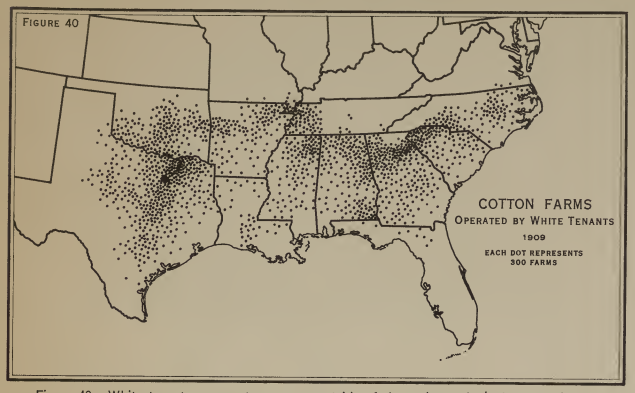


Figure 40.—White tenants are most numerous outside of the regions where the plantation system prevails. In southeastern Alabama, the upper Piedmont, northern Alabama, Tennessee, northern Arkansas, and in Oklahoma and central Texas a large percentage of the farms are operated by white tenants.

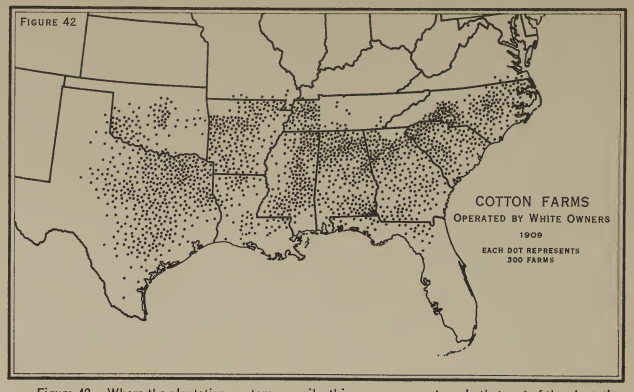


Figure 42.—Where the plantation system prevails this map represents only that part of the plantation operated by the owner himself with or without the assistance of wage hands. Elsewhere it represents the entire farm operated by the owner. Compare with the plantation map (fig. 33).

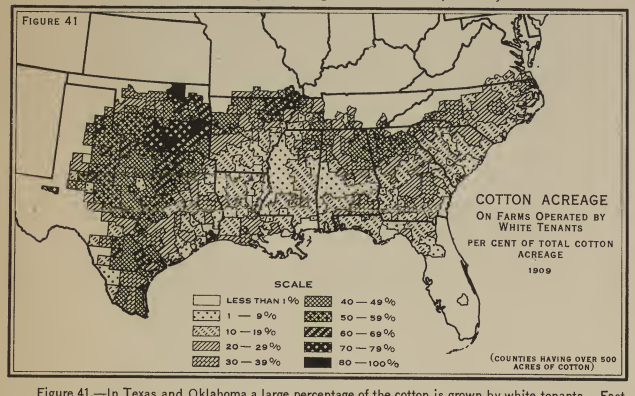


Figure 41.—In Texas and Oklahoma a large percentage of the cotton is grown by white tenants. East of these States white tenants plant much of the cotton along the northern border but very little through the center of the Cotton Belt.

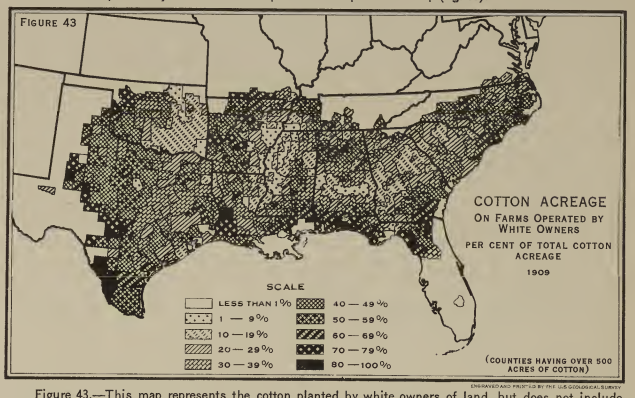


Figure 43.—This map represents the cotton planted by white owners of land, but does not include cotton planted by croppers. The percentage of the total cotton planted by white owners is greatest on the borders of the Cotton Belt.

most numerous. The plantations are usually owned by whites and operated in part by the owners and in part by the croppers, working under the supervision of the owners or their managers (figs. 32 and 36). In the map showing the per cent which the cotton acreage on farms owned by whites constitutes of the total cotton acreage, only the acreage on that portion of the plantation which is operated by the white owner is included.

DESCRIPTION OF COTTON FARMS IN DIFFERENT REGIONS AS CLASSIFIED BY COLOR AND TENURE OF OPERATOR.

Throughout the South the white owner operates a large farm with much unimproved land, while the negro cropper or tenant has a small farm consisting almost entirely of improved land (Table II). In the regions designated as the Upper Coastal Plain, the Sand Hills, the Piedmont, and the Interior Coastal Plain of Texas and Louisiana the negro tenant grows a greater acreage of cotton than the man who owns his farm, but nowhere does he grow as much corn. The owner having much uncultivated land for grazing may keep some stock in addition to his work animals, and must grow feed not only for his own use but to furnish feed for the work animals used by the croppers.

In the regions for which statistics are given in Table II the largest farms operated by negro croppers are in the Piedmont region. The average farm operated by the negro tenant or cropper in this region consists of 48 acres, of which 32 are improved. Nearly all of these farms grow on an average 20 acres of cotton and four-fifths of them 8 acres of corn. Contrast with this the farms operated by the white owners in the same region. The white owners have 107 acres, with 45 acres improved, and 81 per cent of them grow on the average 17 acres of cotton, while 91 per cent grow 12 acres of corn per farm. In the Yazoo-Mississippi Delta, where the negro croppers are most numerous, the average farm operated by them consists of 22 acres, of which 21 are improved. Of these farms, three-fourths grow on an average 17 acres of cotton and three-fifths grow 5 acres of corn. There are relatively few farms operated by the white owners, but they are large, consisting of 223 acres, of which 79 acres are improved. Two-thirds of these farms grow on the average 54 acres of cotton and three-fourths grow 19 acres of corn per farm.

The farms of the Alabama-Mississippi Black Prairie are operated for the most part on the plantation system with negro croppers, as in the Yazoo Delta. The farms are a little larger than those of the Yazoo Delta, and generally have more unimproved land. The cropper cultivates about as much land as in the Delta, while the white owner cultivates less than half as much as he does in the Delta. More than half of the farms of the Texas Black Waxy Prairie are operated by white tenants, and owing to the nature of the land and the methods used a large acreage per farm is in cotton. The average white tenant farm consists of 83 acres, with 67 acres improved, and 88 per cent of these farms grow cotton, averaging 41 acres of this crop per farm, while 77 per cent grow corn, averaging 20 acres per farm. About one-third of the farms of this region are operated by their white owners, who have on the average a larger farm than the tenants, consisting of 125 acres, of which 77 acres are improved, but who grow only about the same amount of cotton as the tenants. The negro cultivators of this region operate less than one-eighth of the farms, which is a much smaller proportion than is found in any of the other seven regions. Another striking characteristic of this region is that there are on an average more than three work animals per farm, while in none of the other seven important cotton regions is there an average of two work animals.

TABLE II.—STATISTICS OF COTTON CULTURE IN SELECTED COUNTIES OF EIGHT SOIL REGIONS OF THE COTTON BELT, 1909—Concluded.

	Atlantic Coast Flatwoods.	Upper Coastal Plain.	Sand Hills.	Piedmont Plateau.	Black Prairie of Alabama and Mississippi.	Yazoo-Mississippi delta.	Black Prairie of Texas.	Interior Coastal Plain of Tex. and La.
Per cent of cotton, corn, oats, and wheat acreage in cotton:								
Negro tenants	54.4	62.5	67.3	71.5	77.3	80.6	76.0	64.8
Negro owners	44.4	55.9	57.6	61.7	71.4	72.6	67.7	56.5
White tenants	43.8	54.5	54.0	61.8	64.0	65.9	65.9	53.5
White owners	36.7	47.3	43.7	46.0	54.5	62.3	59.1	47.0
Yield of cotton per acre (pounds):								
Negro tenants	206	187	171	178	111	217	144	134
Negro owners	198	188	167	186	123	200	139	126
White tenants	260	203	207	203	141	235	146	139
White owners	263	247	222	232	156	216	150	143
Average yield of cotton per acre, 4 census years, 1899–1909 (pounds)	200	190	180	184	142	264	176	164
Farms reporting corn per cent of all farms:								
Negro tenants	88.0	87.3	81.3	82.6	79.3	62.2	71.3	79.5
Negro owners	95.9	95.7	94.1	91.3	85.3	88.0	84.1	95.1
White tenants	82.7	82.7	85.3	83.5	74.7	67.1	78.6	76.1
White owners	95.7	93.5	93.6	91.0	79.9	77.0	78.7	89.5
Acres of corn per farm reporting:								
Negro tenants	7.3	11.9	8.7	7.9	6.8	5.1	13.6	11.4
Negro owners	7.5	12.4	9.9	9.8	9.1	7.7	13.9	14.6
White tenants	11.1	14.6	11.0	8.9	12.4	11.4	20.5	13.4
White owners	14.4	16.9	14.6	11.7	17.6	26.8	22.4	16.6
Per cent of cotton, corn, oats, and wheat acreage in corn:								
Negro tenants	43.4	35.4	30.9	25.0	22.2	19.4	23.0	34.9
Negro owners	52.2	39.3	38.6	29.8	27.0	27.1	29.4	42.5
White tenants	51.5	40.8	41.2	30.5	31.0	33.5	29.2	45.8
White owners	55.7	43.4	46.9	36.1	36.5	36.8	31.3	50.8
Yield of corn per acre:								
Negro tenants	12	10	10	9	11	20	17	13
Negro owners	12	10	9	10	11	18	16	11
White tenants	15	12	11	11	12	19	16	14
White owners	15	14	12	14	12	19	17	15
Work animals per farm (average of all tenures)	1.1	1.4	1.4	1.3	1.4	1.3	3.4	1.8
Acres per work animal:								
Cotton, corn, oats, wheat; total	16.3	22.9	18.9	19.8	18.5	14.5	15.7	15.0
Cotton	6.9	12.6	10.1	12.1	13.5	11.1	10.1	8.1
Corn	8.5	9.1	7.6	5.9	4.6	3.4	4.6	6.7
Oats	0.9	1.2	1.1	1.1	0.4	0.3	0.8	0.2

In the other regions for which statistics are given in the accompanying table, less than one-third of the total land area is improved and less than one-seventh is in cotton. A larger proportion of the farms in these regions are operated by their owners, and more of them grow corn than in the regions previously discussed.

METHODS OF GROWING COTTON.

The time and method of preparing the land, of planting, cultivating, and picking the cotton, and the cost of preparing it for market varies much in different parts of the South.

UPLAND COTTON.

A description of the methods used in producing Upland cotton in an older center in the East and a newer center in the West will give an idea of the common practices. Anderson County, S. C., which has over 60 per cent of its cropped area in cotton, and Ellis County, Texas, which has over 70 per cent planted in cotton, are the centers selected for this purpose.

Anderson County, South Carolina.—In Anderson County some land is usually devoted to the production of cotton year after year. In preparing to plant cotton the old stalks are first broken or cut. A one-horse plow is then run along the side of the old row and the dirt thrown toward the middle by running one or two furrows on each side of the row. This leaves the old cotton stubs standing on a "balk" or small ridge, which is broken out with a one-horse shovel plow, leaving a furrow in which the fertilizer is distributed with a one-horse fertilizer distributor. The land is bedded back on the fertilizer with a plow by taking from two to four trips per row. This leaves another "balk" between the two old rows, which may be left until the cotton is cultivated. The top of the bed is leveled off with a harrow or a board and the cotton planted on top of the bed, the new row being in the same place as the old one. The advantage of placing the new row in the place of the old row is that the plants are thus in the best position to profit by the residual effect of the previous applications of fertilizer.

In planting, a bushel of seed per acre or thereabouts is drilled in the row with a planter. Sometimes the fertilizer is put down with a combination planter and fertilizer distributor at the time the cotton is planted. The rows are usually 3 to 4 feet apart, but on the most fertile fields they

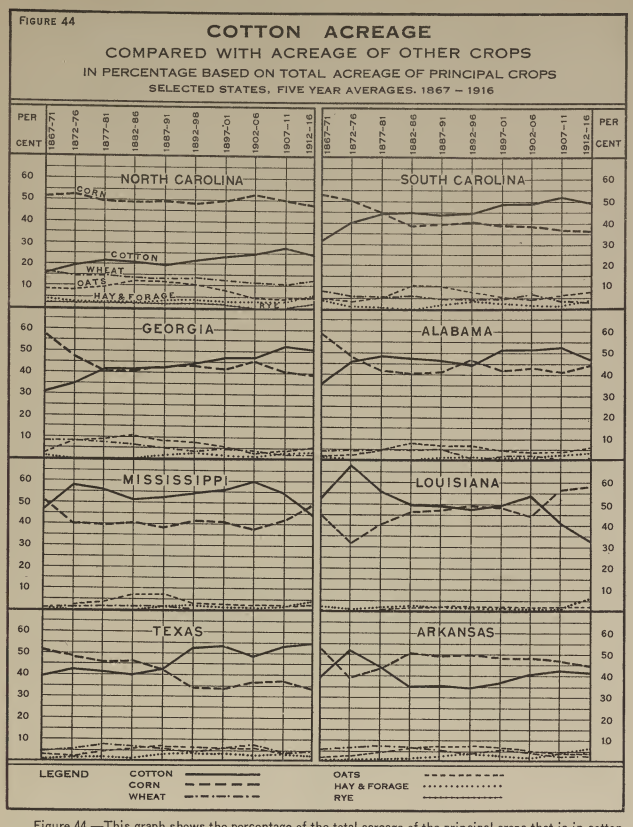


Figure 44.—This graph shows the percentage of the total acreage of the principal crops that is in cotton and in each of the other important crops. Cotton and corn are the two most important crops of the South, cotton usually having a greater acreage than corn, except in North Carolina and Arkansas. From 1867 to 1911 the percentage in cotton increased, except in Louisiana, Mississippi, and Arkansas. In the period 1912–1916 there was a relative decline in cotton acreage in all States except Texas (see Table III).

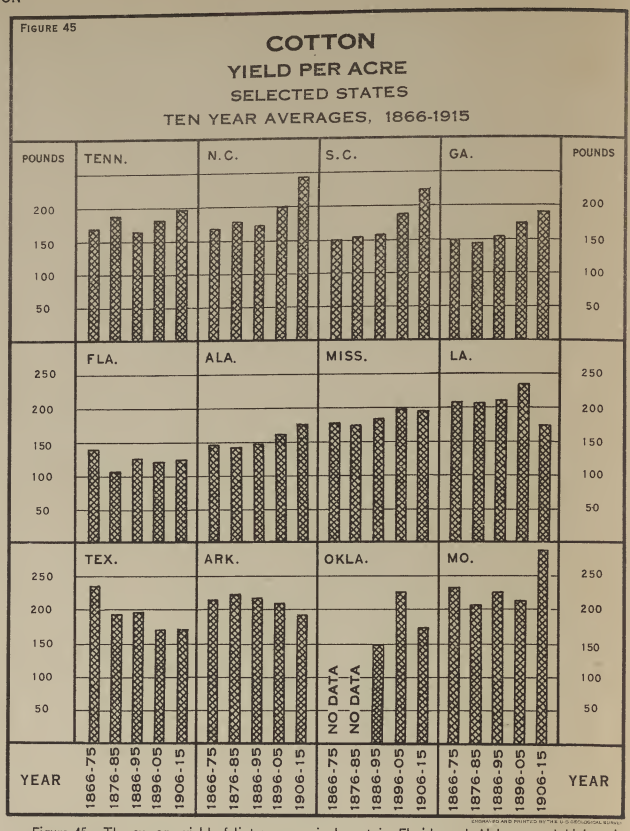


Figure 45.—The average yield of lint per acre is lowest in Florida and Alabama and highest in Missouri and North Carolina. During the last three decades, owing largely to increasing use of fertilizer, there has been an increase in the yields per acre in all the States east of the Mississippi River, except in Florida, and, during the last decade, in Mississippi. In Louisiana, Texas, Oklahoma, and Arkansas, owing to the spread of the boll weevil and in Texas and Oklahoma to the extension of cotton production into regions of lower rainfall, the average yields per acre have declined.

are made wider, as the cotton grows larger and more space is needed for the plants.

As soon as the cotton comes up the field is harrowed with a one-horse harrow, either by taking one side of the row at a time or by removing a tooth from the center of the harrow and straddling the row. After this harrowing, the cotton is chopped to a stand, leaving the plants from 10 inches to 2 feet apart in the row. Besides the first chopping, the cotton is hoed once or twice during the season to kill the crab grass. It is also given a complete cultivation with one-horse implements, usually not less than five times. A second application of fertilizer is sometimes made after the second or third cultivation, and nitrate of soda is often applied later.

If the rainfall during the winter permits, some of the preparation for planting is done in January and February, but most of it is usually done in March. Most of the cotton is planted from the middle to the last of April and cultivating and chopping begins as soon as it is well up, which, if the season is favorable, is shortly after the first of May. The cultivation is finished by the middle of July, and the first picking begins from the 1st to the 20th of September, depending on the earliness of the season.

The cotton field is commonly picked over three times, the month of November finding most of the crop out of the field. It is picked in sacks, usually old fertilizer sacks carried by means of a strap or cord over the shoulder. When the sack is filled it is emptied on a sheet spread on the ground. At the end of the day the sheets are tied up and the cotton hauled in, weighed, and stored. The cotton remains in storage until enough to make a bale or more is picked, when it is hauled to the gin, where the lint is separated from the seed and baled. The cost of ginning and bagging and ties for a 500-pound bale averages about two dollars. The average amount of seed cotton picked per grown person is 150 pounds per day. About 1,360 pounds of seed cotton is required to make a 500-pound bale.

Ellis County, Texas.—In Ellis County, where the land is level and no fertilizer is used, the method is very different. The rows are from 3 to 4 feet apart. The beds are thrown up with a four-horse "middle-buster," the moldboard of which resembles the moldboard of a right-hand and a left-hand turnplow fastened together. This is run in the old row and the dirt thrown to the middle on either side, making beds in the middles between the old rows. When the beds are completed the land is harrowed, and if the stalks have not been cut and turned under they are raked up with an ordinary hay rake and burned. The cotton is drilled on top of the bed, one row at a time, with a two-horse planter, which both smoothes the top of the bed and drops the seed. A bushel of seed is planted per acre. The cotton is chopped to a stand as soon as it is well up, the plants being left from 12 to 24 inches apart. Usually no further hoe work is required. From three to five cultivations are made. Both two-horse cultivators, which take a row at a time, and one-horse cultivators are used.

In Ellis County, as in Anderson County, the land is prepared during January, February, and March, but the time of planting, chopping, and cultivating is a few days earlier than in Anderson County. Picking begins the last of August or the first of September, but owing to the acreage planted per man it is often as late as the last of December or even later before the cotton is all picked. A sack several feet long which fastens over the shoulder and is dragged on the ground is sometimes used in picking instead of the short sack. When the sack is filled, the cotton is weighed and put in a wagon which will hold enough seed cotton to make a bale. This is hauled immediately to the gin.

The cost of ginning and of bagging and ties for a 500-pound bale is usually three dollars per bale. The average amount of seed cotton picked per grown person is 250 pounds per day, or 100 pounds more than in Anderson County. This difference in amount picked is owing chiefly to difference in nature of the cotton. The bolls of the Ellis County cotton are larger and their locks open wider. Also the relatively higher prices paid for labor results in requiring less care in picking and in speeding up the pickers. It requires approximately 1,400 pounds of seed cotton to make a 500-pound bale.

TABLE III.—THE PERCENTAGE OF THE LAND IN PRINCIPAL CROPS THAT IS IN COTTON—UNITED STATES AND SELECTED STATES (per cent cotton acreage constitutes of total acreage of corn, cotton, wheat, oats, barley, rye, potatoes, tobacco, hay, and forage).

States.	Census.				Department of Agriculture estimate, five-year averages.									
	1879	1889	1899	1909	1867 to 1871	1872 to 1876	1877 to 1881	1882 to 1886	1887 to 1891	1892 to 1896	1897 to 1901	1902 to 1906	1907 to 1911	1912 to 1916
United States	8.8	9.3	8.8	10.8	8.1	9.2	9.4	9.1	9.0	9.6	11.0	11.5	11.8	11.6
Alabama	46.6	51.9	50.2	54.6	35.2	45.7	48.1	47.1	46.0	44.5	51.1	51.3	52.1	46.4
Arkansas	38.9	43.9	33.6	41.8	39.2	51.1	44.6	35.9	35.1	34.2	36.6	40.4	42.6	41.5
Georgia	41.6	49.7	45.1	54.0	30.8	34.9	41.6	41.9	42.5	44.0	47.0	47.0	52.1	50.5
Louisiana	51.7	58.5	48.2	34.4	52.9	67.7	55.4	49.7	49.0	47.3	49.4	53.8	41.0	33.0
Mississippi	53.6	60.1	53.9	57.5	46.3	57.4	55.8	51.3	52.2	54.0	55.3	59.3	54.5	44.5
North Carolina	19.5	22.6	19.2	24.7	15.5	19.8	21.3	20.6	19.7	21.5	23.4	24.9	27.5	24.3
South Carolina	43.8	52.4	47.3	53.9	31.5	40.2	44.0	44.8	43.2	44.5	48.2	48.9	51.9	49.4
Texas	40.9	47.4	47.0	57.8	39.5	42.4	41.2	39.8	42.2	52.0	53.2	48.4	52.9	54.7

SEA ISLAND COTTON.

The most intensive type of cotton culture practiced in the South is in the production of Sea Island cotton on the islands of the South Carolina and Georgia coast. Here cotton is invariably grown on ridges, or beds, 5 feet apart. The method of forming and handling these beds is briefly as follows: Beginning in January the old stalks are broken down, the limbs and trash raked into the alleys between the old rows, and the coarser litter burned. Following this, a compost of stable manure, fine straw, marsh grass, and other refuse is strewn in the alleys, and with a two-horse plow a furrow is turned over, or with a hoe dirt is dragged from each side to cover the compost. Later, commercial fertilizer is drilled in the beds thus formed and these beds are rolled with a double roller before planting. The planting is usually done by hand, sometimes with a planter. When the cotton is well up it is cultivated with a sweep and hoed by hand, the dirt being drawn around the plant. Cultivations and hoeings alternate. The cotton is worked every week—8 to 10 times in all. It costs much more to pick Sea Island cotton than it does the Upland cotton since the bolls are smaller and more tedious to pick and greater care in handling the lint is required of the picker.

COTTON IN CALIFORNIA AND ARIZONA.

The newest form of cotton cultivation in the United States is that developed in the irrigated districts of the Southwest. Here the essential and characteristic features are the thorough preparation of the land, careful leveling, so that the entire field can be irrigated uniformly, late thinning, leaving the plants close together in the row, the sparing use of irrigation water until the plants blossom, and frequent light irrigation after blossoming begins until the crop is fully matured.

USE OF IMPLEMENTS AND WORK STOCK.

Wherever crab grass, Johnson grass, and other weeds grow profusely in the fields the cultivation of cotton requires from one to three hoeings per season. With one mule a man can plow, chop, and hoe from 10 to 20 acres, from which 5 to 10 bales of cotton are produced, and this is ordinarily all one family can pick. Therefore, one-horse implements are used over the greater portion of the cotton area. In some sections the topography of the land would make the use of larger implements difficult. In the level, black lands of Texas, however, where, owing to the smaller amount or absence of crab grass, the hoe work is comparatively small and where transient labor can be secured to pick the cotton,

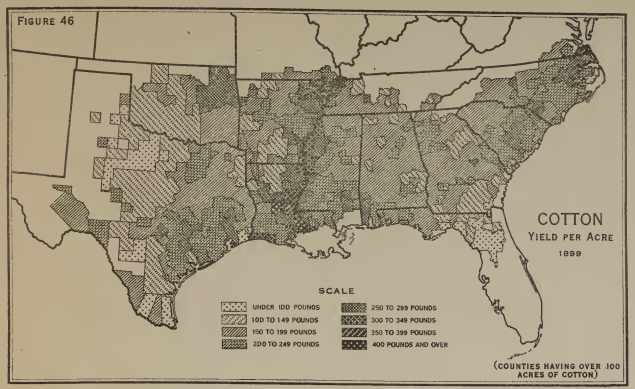


Figure 46.—The yield per acre of cotton in 1899 was greatest along the Mississippi River and lowest in central Texas and in Florida. Over much of the Cotton Belt the yield was from 150 to 200 pounds per acre. Differences in yields are partly due to differences in weather conditions during the season.

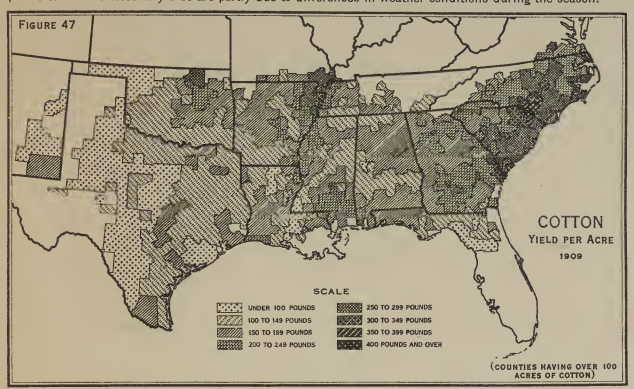


Figure 47.—The highest yields per acre in 1909 were obtained in the East where the cotton land was heavily fertilized (see fig. 48). In Texas and Oklahoma, which experienced a very dry season in 1909, the yield per acre was less than in 1899. Compare with boll-weevil map (fig. 50) and note the area infested in 1909. The yields of cotton have been markedly affected by the boll weevil.

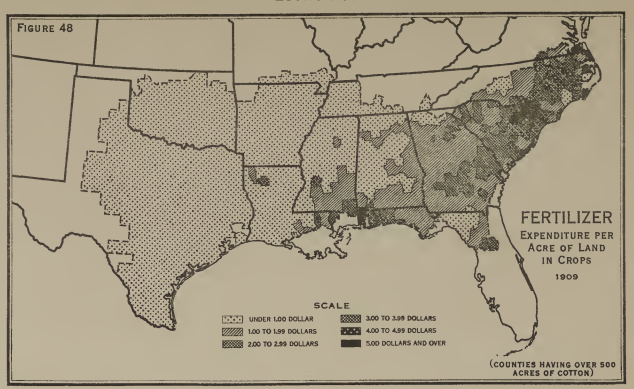


Figure 48.—This map represents the average expenditure per acre for fertilizers for all crops in the counties shown. In typical cotton-producing centers the cotton receives directly or indirectly most of the fertilizer. Commercial fertilizers are used most extensively along the Atlantic Coastal Plain.

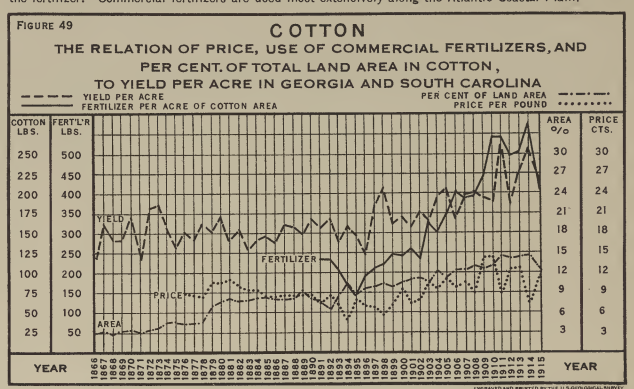


Figure 49.—Beginning about 1895 and continuing up to 1910 the price of cotton rose, the area planted expanded rapidly, and there was a great increase in the use of fertilizers which raised the average yield about 50 pounds to the acre. In years that the yields are exceptionally high prices are low, but an upward trend of prices tends to cause increased yields per acre.

four-horse implements are frequently used in preparing the land and two-horse implements in cultivation. Mules are generally used more extensively than horses in cotton production and as a rule only a sufficient number of work animals are kept to do the necessary work.

USE OF FERTILIZERS.

Fertilizers are used most extensively in the South Atlantic States and consist principally of acid phosphate, cottonseed meal, kainit, muriate of potash, and nitrate of soda. Dried blood, fish scrap, tankage, basic slag, and rock phosphate are also used as fertilizers. On sandy loam soils deficient in potash a common application is from 300 to 1,000 pounds per acre of a mixture containing equal parts of acid phosphate, cottonseed meal, and kainit. In addition to this an application of from 50 to 100 pounds of nitrate of soda is frequently made in the Atlantic Coastal Plain and parts of the Piedmont. Applications of fertilizer are heavier in the Coastal Plain than in the Piedmont regions. In the western part of the Cotton Belt fertilizers are little used, but their use is becoming more common.

ACRES OF COTTON PER FARM.

Since picking requires a greater amount of hand labor than any other operation in growing cotton, unless extra transient labor may be secured at picking time the acreage grown per farm is limited to what one family can pick. The size of the family and the extent to which the women and children are utilized in picking cotton are, therefore, important factors in determining the acreage grown. Wherever transient labor may be obtained for picking the cotton, the acreage per farm is determined by what one man with his family can chop and hoe. In the Atlantic Coast Flatwoods region, for example, where the yield is high and extra labor scarce, the average amount of cotton per farm ranges from 9 to 12 acres, according to the type of tenure; while in the Black Waxy Prairie of Texas, where the yield is lower and extra labor may be obtained for picking and where machinery is extensively used in cultivation, the farms, classified by tenure, average from 30 to 42 acres of cotton. The number of acres of cotton that may be handled by a farmer also depends upon what other crops are grown and how much. The accompanying table shows the conflict in the labor requirements of corn and cotton at two critical periods in the cotton season for these farms, April 13–June 21 and September 13–November 3.

Since the planting and harvesting of the cereal crops require labor at the same time as cotton, the amount of labor expended on these crops may limit the acres of cotton that can be cultivated and picked. When the price of cotton is high the acreage of cotton planted increases and the acreage of other crops declines or their cultivation is neglected. Figure 44 shows that the acreage of corn, for example, varies inversely with the acreage of cotton, and figure 49 shows that the acreage of cotton in Georgia and South Carolina has increased with the rise in price of cotton.

YIELD PER ACRE.

The yields of cotton vary from less than 100 pounds of lint per acre in the semi-arid and weevil-infested regions to over 400 pounds in the high producing counties (fig. 47).

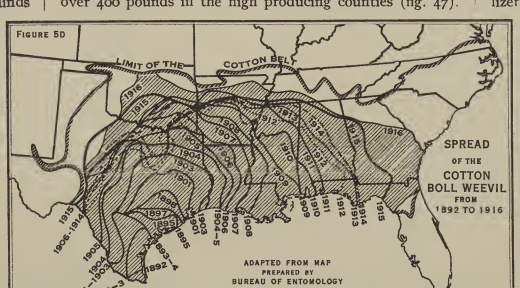


Figure 50.—The shaded area was reported as infested by the boll weevil on December 8, 1916. The lines show the outermost limits of areas infested in each of the years indicated. Beginning in southern Texas in 1892 it has spread north to the limit of the Cotton Belt and east to South Carolina.

FIELD OPERATIONS AND MAN LABOR REQUIREMENTS FOR CROPS.

Operations.	Cotton.		Corn.	
	Season (average).	Days labor per acre.	Season (average).	Days labor per acre.
Cut stalks	Dec. 28–Feb. 4	0.13	Dec. 26–Feb. 3	0.12
Break and bed for cotton and plow for corn	Jan. 14–Mar. 16	.68	Jan. 3–Mar. 2	.80
Harrow or drag and lay off in rows for corn	Feb. 6–Mar. 24	.14	Feb. 9–Mar. 20	.29
Plant	Mar. 31–Apr. 19	.13	Mar. 5–Mar. 29	.14
Cultivate and hoe	Apr. 13–Aug. 4	5.43	Mar. 24–June 21	2.28
Pick and haul cotton and harvest corn	Aug. 29–Dec. 7	6.78	Sept. 13–Nov. 3	.84
	Total cotton	13.29	Total corn	4.47

Compiled by Mr. M. B. Oates, of the Office of Farm Management, from estimates by 72 planters of northwestern Louisiana.

The average for the Cotton Belt in 1909–1914 was 192 pounds per acre. A comparison of figures 47 and 48 shows that it was the heavily fertilized sections of the East that gave the highest yields of lint per acre in 1909. A comparison of figures 46 and 47 with figure 50 shows the effect of the boll weevil upon the infested areas. The boll weevil destroys the late bolls of the cotton, which greatly reduces the yield, especially of late cotton. The boll weevil is most destructive where the rainfall and humidity is greatest; hence southern Alabama, Mississippi, and Louisiana have suffered more than Texas from its ravages.

The yields of cotton are highest on the farms operated by white owners, usually followed in order by the white tenants, negro tenants, and negro owners (Table II). This order is most consistent in the areas where the most fertilizers are used. The use of fertilizers, the difference in the grade of land planted to cotton, and the character of the work stock and equipment are the most important factors causing these variations in the yields. The white owners are in the best position to buy fertilizers, and as on the "plantations" they may keep some of the best land to plant in cotton, and use the best equipment, they are able to make the best yields. Where the two are found in the same area the white tenant is usually given better land than the negro tenant and plants a smaller percentage of land to cotton, which gives him the opportunity to produce better yields on the average than the negro tenant. Since the negro tenant or cropper is furnished part of the fertilizer and equipment he uses, he produces commonly more cotton per acre than the negro owner who uses less fertilizer and inferior equipment and has a poorer grade of land.

The graph above (fig. 49) shows that the yield of lint per acre in Georgia and South Carolina has been increasing since 1896 and that the use of fertilizers has also increased remarkably. The use of fertilizers largely accounts for the higher yields. This increase in yields is the more remarkable because it occurred at the same time that the area planted to cotton was constantly being expanded and included an increasing proportion of less fertile land. The use of large quantities of fertilizers has been stimulated by a rise in the price of cotton since 1898. Fertilizers had been used in these States for many years, but it took some time for the farmers to learn how to use them profitably. By 1890 the methods were fairly well understood, so that when the price of cotton began to go up the farmers were able to make efficient use of fertilizers to increase production. The increasing productivity of the States using fertilizers and improvements in methods of cultivation have more than offset the decline in production caused by the ravages of the boll weevil in the Western States.

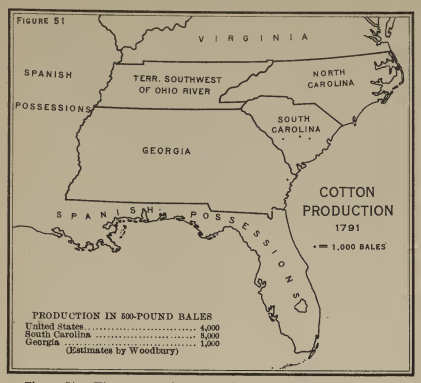


Figure 51.—The commercial production of cotton in the South began before 1791. Sea Island cotton was grown on the islands of Georgia, and other cottons were grown on the uplands of Georgia and South Carolina.

Figure 52.—The Whitney gin was invented in 1793. By 1801 the use of this gin had led to a great increase in the production of short-staple cotton in Virginia, the Carolinas, Georgia, and Tennessee.

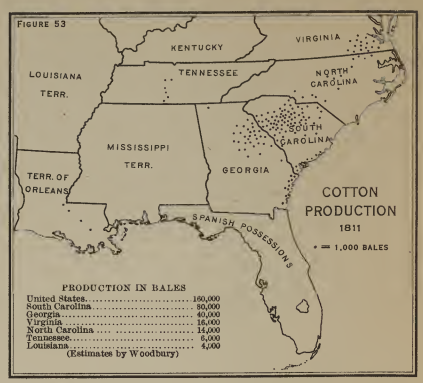


Figure 53.—The purchase of Louisiana in 1803 added a new cotton-producing region to the United States. The production in the South Atlantic States increased rapidly during the decade 1801–1811.

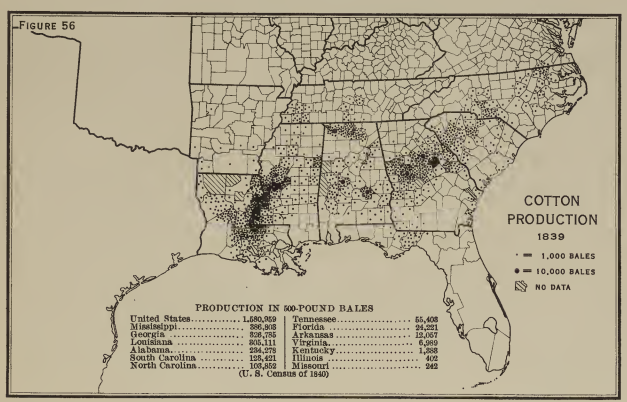


Figure 56.—This map is based upon the returns of the first agricultural census. In 1830 the Choctaws were removed from Mississippi and in 1836 the Creeks and Cherokees from Georgia and Alabama. By 1839 cotton planters had occupied much of the lands vacated by these Indians, and Mississippi had become the leading State in cotton production.

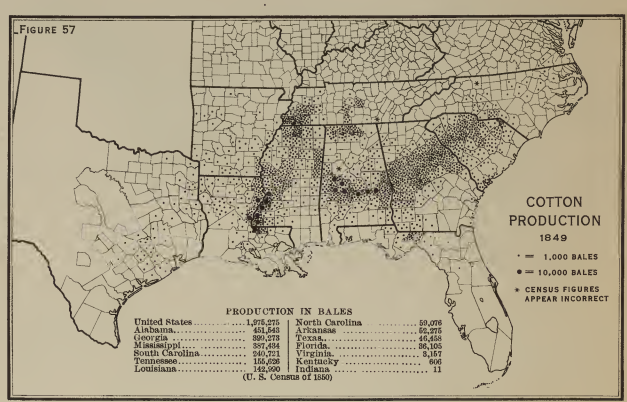


Figure 57.—In 1845 Texas was added to the list of cotton-producing States. The most marked development during the decade was the increase in production in northern Mississippi and the Black Prairie of Alabama. The low prices of cotton in the early forties led many planters in Louisiana to change from cotton to sugar cane. The cotton crop of 1849 was only slightly larger than that of 1839.

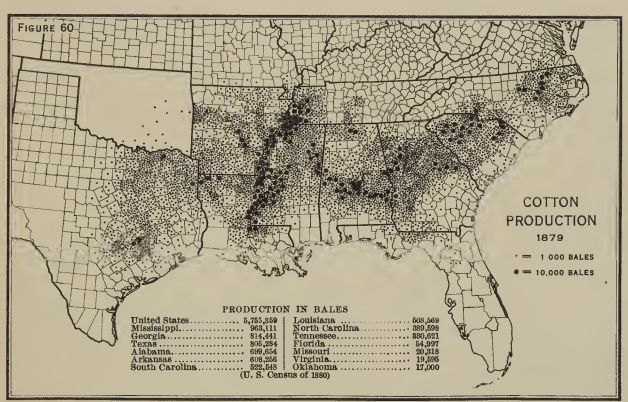


Figure 60.—By 1879 Texas and Arkansas had greatly increased their production, and Indian Territory had begun to grow cotton. Fertilizers were beginning to be extensively used in the Piedmont region and in the Upper Coastal Plain. Although in the regions of densest production in 1859 there was more cotton produced in 1859 than in 1879, the total crop of 1879 exceeded that of any previous year.

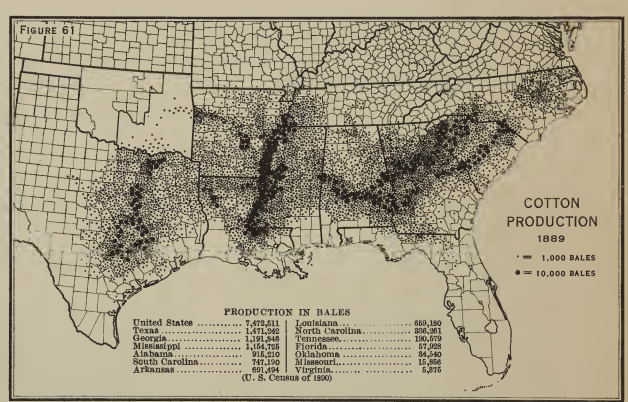


Figure 61.—The extension of transportation facilities in the previous decade made possible the development of cotton production in the Black Waxy Prairie region of Texas in the decade ending in 1889. This State now led all others in production. In the East the extensive use of fertilizer in the Middle Coastal Plain led to the development of another new important belt of cotton production.

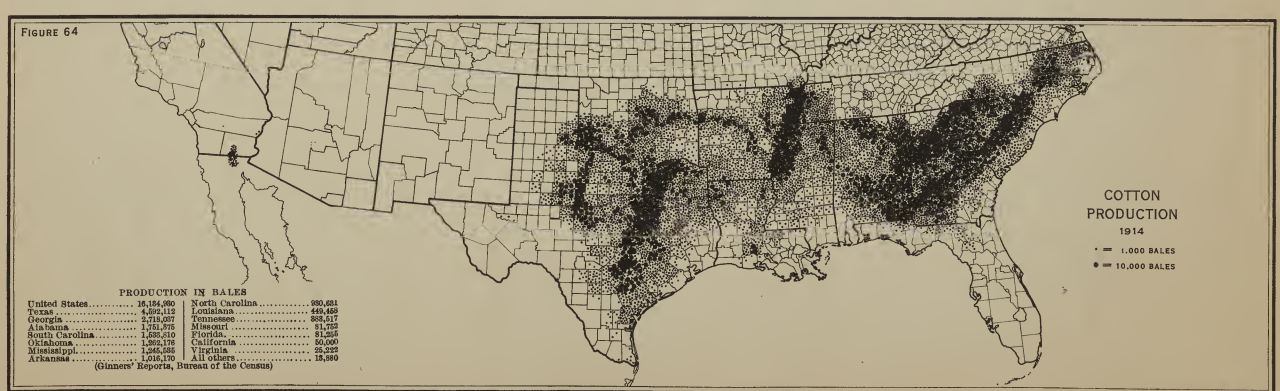


Figure 64.—The crop of 1914 was the largest ever produced in the United States. The South Atlantic States have continued to increase their production by using more fertilizer, the westward shift in Texas and Oklahoma has continued far out into the semiarid districts, and a beginning has been made in cotton production upon irrigated lands in Arizona and California. The boll weevil has continued its ravages, greatly reducing the crop of southern Mississippi and of Louisiana along the Mississippi River (see figs. 50 and 80).

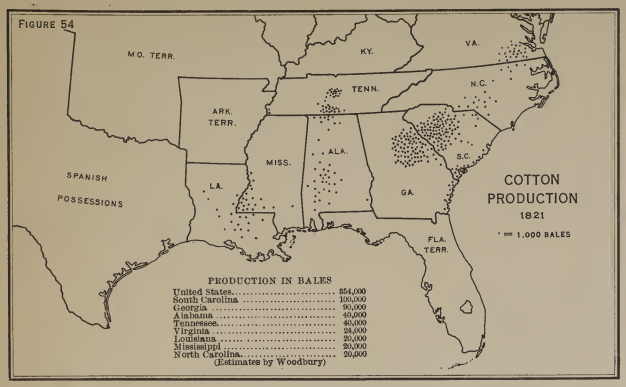


Figure 54.—This map marks the first great westward shift in cotton production. By 1821 most of the best cotton lands in the South Atlantic States had been occupied by planters and the overflow into the Mississippi Valley and Gulf States had begun. Some of the territory in Georgia, Alabama, and Mississippi was still held by the Indians.

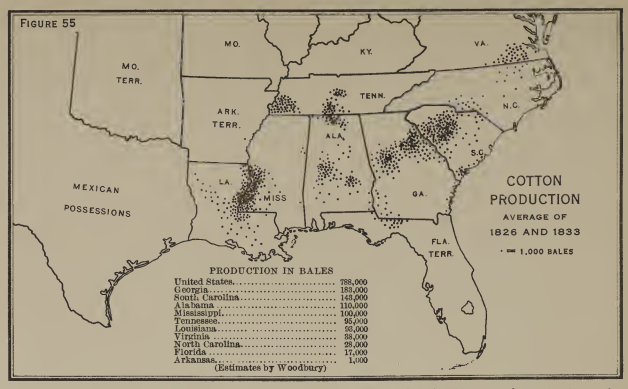


Figure 55.—This map represents the average of the crops of 1826 and 1833, no estimate by States for 1831 being available. Production had more than doubled since 1821, the greatest increases being in the West. Less than half the cotton was now grown in the Atlantic States. The greatest development in the decade was along the Mississippi River from the mouth of the Yazoo River to New Orleans.

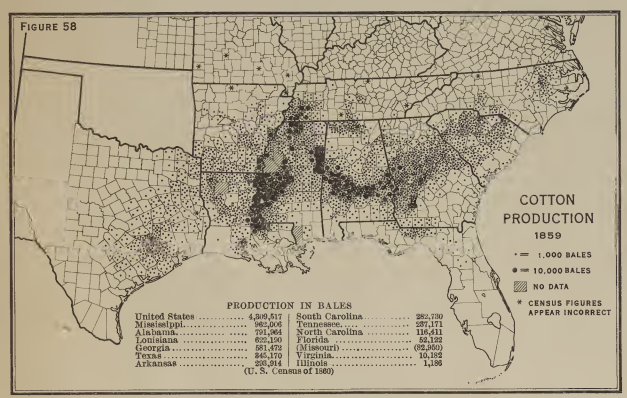


Figure 58.—Cotton production doubled in the decade ending in 1859, which year marked the climax of the development before the Civil War. The Black Prairie of Alabama and Mississippi and the alluvial bottoms of the Mississippi Valley contributed greatly to this increase. Texas became an important producing State, although only the eastern counties were growing cotton extensively.

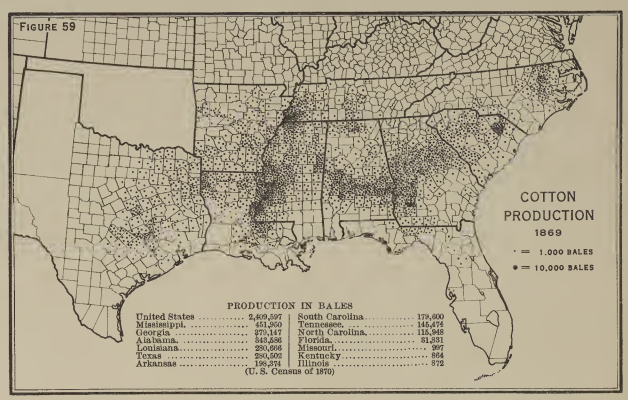


Figure 59.—In 1869 the South had not recovered from the effects of the Civil War (compare with fig. 58). Alabama, Mississippi, and Louisiana produced less than half as much cotton in 1869 as in 1859. Only North Carolina produced approximately as much as before the war. On the other hand, some of the border counties in Arkansas and Texas produced more than in 1859.

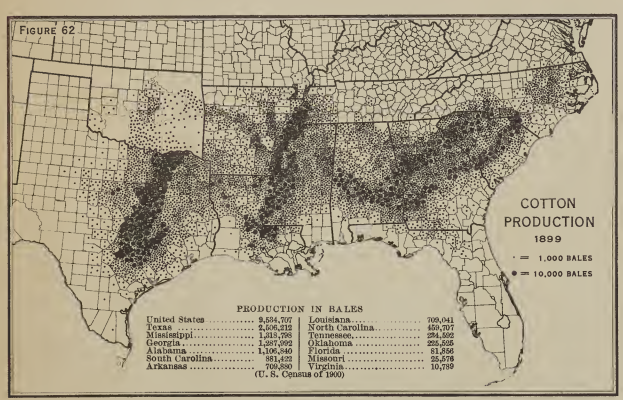


Figure 62.—The boll weevil entered Texas in 1892, but had not spread far by 1899 (see fig. 50). The cotton production of Texas nearly doubled in the decade 1889–1899, and in 1899 was greater than the entire crop of the South in 1869. In the East production continued to increase both in the Piedmont and in the Middle and Upper Coastal Plain regions.

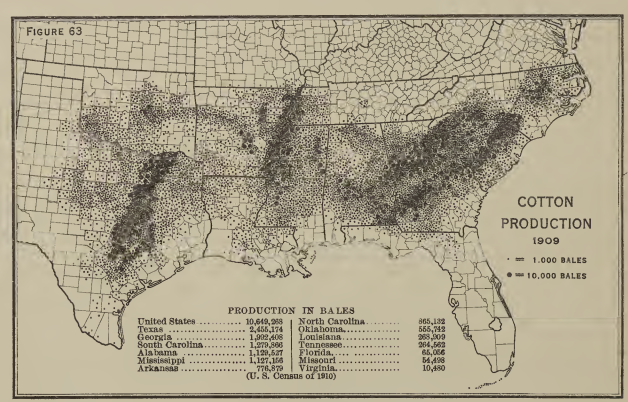


Figure 63.—The westward shift in Oklahoma and Texas during the decade 1899–1909 added a large acreage to the Cotton Belt. In this decade the boll weevil spread over most of Texas, all of Louisiana, and portions of Mississippi and Arkansas (see fig. 50). In the East improved methods of cultivation and a great increase in the amount of fertilizers used greatly increased the production.

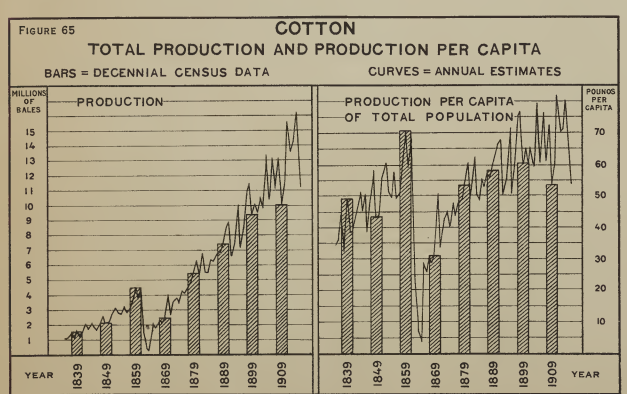


Figure 65.—The great increase in cotton production during the past 80 years is shown on the left-hand side of this graph. It required about 15 years to recover from the effects of the Civil War. The right-hand side shows that the production has increased more rapidly than the population of the United States. The highest production per capita was reached in 1911 and the highest total production in 1914.

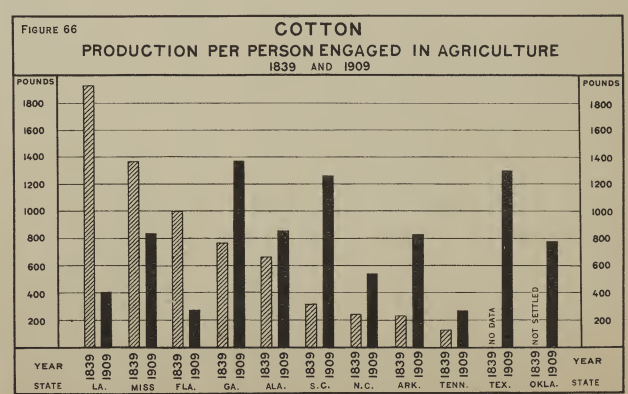


Figure 66.—The agricultural population of Louisiana, Mississippi, and Florida apparently specialized more in cotton growing in 1839 than in 1909, whereas in the other cotton-growing States there was a greater specialization in 1909 than in 1839. Georgia, Texas, and South Carolina led in production per person engaged in agriculture in 1909, whereas Louisiana and Mississippi led in 1839.

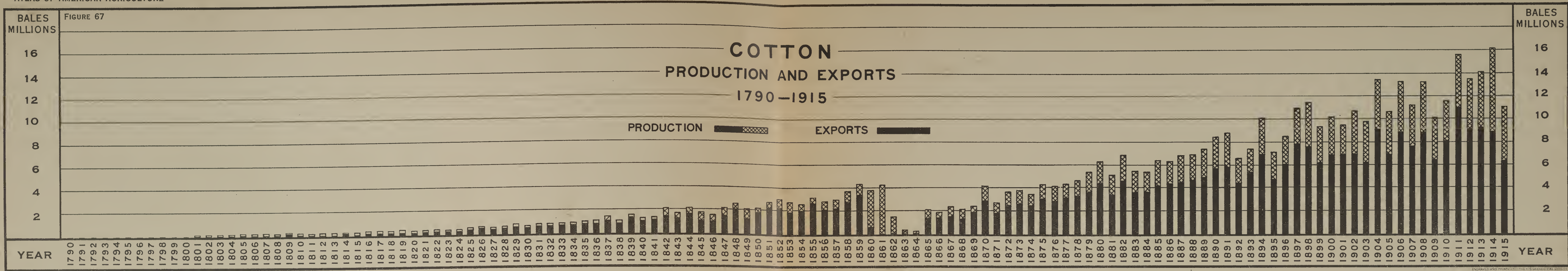


Figure 67.—*Production:* Beginning with 3,000 bales in 1790, the production of cotton increased to 100,000 in 1801, and by 1835 had reached a million bales (see Table IV). During the seven years from 1835 to 1842 the production doubled, and it doubled again by 1859, being about 4½ million bales in that year. During the Civil War little cotton was produced, and the crop of 1866, after the war, was less than that of 1842. By 1878, however, the South was again producing crops equal to that of 1859, and during the next 16 years the production gradually increased to 10,000,000 bales in 1894. The crop of 1914, 16,000,000 bales, was the largest ever produced, being nearly four times that of 1859 and 60 per cent greater than the crop of 1894. *Exports:* From 1790 to 1814 the quantity of cotton annually exported varied considerably (see Table IV). Beginning in 1814 and continuing through a century, excepting the period of the Civil War, the United States annually exported a large proportion of the crop produced. Exports have increased with production, though not at the same rate, in recent years an increasing proportion being retained for domestic consumption.

HISTORY OF PRODUCTION.

Cotton was domesticated long before the first settlement was made in Virginia. Columbus found it growing on the West Indian Islands and on the mainland of South America, where the natives manufactured its fibers into garments and fishing nets. The Spaniards later found cotton clothing in common use in Mexico, and one of them, Cabeza de Vaca, in 1536 found cotton in what is now the southwestern part of the United States.

1607–1783, THE COLONIAL PERIOD.

Cotton was introduced into all of the southern colonies by the first settlers. The first seed was planted in Virginia at Jamestown in 1607 as an experiment; in the Carolinas in 1664 by some colonists from Barbados, who settled on the Cape Fear River, where they cultivated cotton for their own use; and in Georgia in 1734 or 1735, soon after the first settlement was made. Cotton was introduced into Louisiana by the early French colonists, probably from San Domingo, which was a touching point for the French ships, and it is reported to have been seen growing at Natchez in 1722. Seeds were imported from time to time from the West Indies, Cyprus, Smyrna, and Turkey, and numerous experiments were made in growing cotton in the colonial period.

The early experiments were successful, but previous to the outbreak of the War for Independence very little cotton was grown except for home use in the southern colonies. There was little demand for cotton. The manufacture of clothing by the colonists was discouraged or prohibited by the mother country, and the people of Europe with whom the colonists traded were only just beginning to manufacture and wear cotton clothing. Although cotton manufacturing was carried on in England as early as the first quarter of the seventeenth century, and possibly even earlier, the industry did not become very extensive until the period of the great inventions in textile machinery, beginning with Arkwright's first patent in 1769.

The Revolutionary War.—The first stimulus to cotton culture in the colonies was furnished by the Revolutionary War. With the stopping of importations from European countries cotton became an important factor in clothing the people. The practice of using homespun was common in the upper districts of Georgia, the Carolinas, and Virginia when the war began, and the home manufacture of cotton clothing greatly increased during the war. Jefferson, writing in 1786, says "the four southernmost States make a great deal of cotton. * * * Those four States furnish a great deal of cotton to the States north of them."

1783–1815, DEVELOPMENT OF THE SOUTH ATLANTIC STATES.

At the close of the war the States were without restrictions on manufacturing or trading. In the meantime the demand for cotton had been greatly augmented by the invention and improvement of machinery for manufacturing cotton clothing. In Great Britain, where these improvements and inventions were made, the average annual imports increased from 4,750,000 pounds in the period 1771–1775 to 26,000,000 pounds in the period 1791–1795. In the beginning of the cotton trade England imported cotton goods from the East Indies and raw cotton from Turkey and Smyrna. In the period of the Revolutionary War she began importing also from the West Indies and Brazil, and these countries supplied most of the cotton for some years after the war. The sources of Great Britain's cotton supply in 1787, when none was received from the United States, were:

	Pounds.
British West Indies	6,800,000
French and Spanish Colonies	6,000,000
Smyrna and Turkey	5,700,000
Dutch Colonies	1,700,000
Portuguese Colonies	2,500,000
Isle of Bourbon	100,000
Total	22,800,000

The Beginning of Commercial Production.—The commercial production of cotton in the United States began soon after the close of the Revolutionary War. Small quantities of cotton grown in Georgia, the Carolinas, and Virginia had been sold in New England or shipped to foreign countries from time to time, but regular commerce in cotton did not begin until 1784. In that year eight bags were received in England from the United States, and, excepting the year 1787, there has been since then an annual foreign trade in American cotton. The first exports were probably of a miscellaneous collection from many small producers of different varieties of cotton grown for home use. Sea Island cotton, which was introduced into Georgia from the West Indies in 1786, was from the first a commercial crop, and as soon as its culture became established, planters began to grow large crops. In 1789 20 persons were said to be growing Sea Island cotton in Georgia, and in the next year

TABLE IV.—PRODUCTION, PRICE, EXPORTS, NET IMPORTS AND POTENTIAL CONSUMPTION OF RAW COTTON, UNITED STATES, 1790–1915.

Year.	Production (equivalent 500-pound bales, gross weight).	Export price, average per pound (cents).	Exports of domestic cotton (equivalent 500-pound bales).	Net imports (equivalent 500-pound bales).	Consumption (equivalent 500-pound bales).
1790	3,135	25.0	379	730	3,486
1791	4,180	....	277	1,165	5,068
1792	6,270	....	1,097	5,763	10,936
1793	10,449	....	3,565	5,370	12,254
1794	16,719	....	9,414	8,999	16,304
1795	16,719	....	12,213	9,151	13,657
1796	20,899	....	7,577	7,683	21,005
1797	22,989	....	18,720	8,129	12,398
1798	31,348	....	19,065	7,888	20,171
1799	41,797	....	35,580	9,290	15,507
1800	73,145	....	41,822	9,098	40,421
1801	100,313	22.0	47,768	178	52,367
1802	114,943	21.0	75,424	1,201	38,318
1803	125,392	21.8	70,068	188	55,512
1804	135,841	24.6	76,780	474	59,535
1805	146,290	23.4	71,315	1,004	75,979
1806	167,189	22.3	127,889	1,528	40,828
1807	167,189	20.9	21,261	6,489	152,417
1808	156,740	16.7	101,981	1,678	53,081
1809	171,369	16.2	186,523	581	....
1810	177,638	15.6	124,116	442	53,964
1811	167,189	10.7	57,775	933	110,347
1812	156,740	12.2	38,220	3,257	121,777
1813	156,740	15.1	35,458	105	121,387
1814	146,290	21.1	165,997	274	....
1815	208,986	29.4	163,894	46	45,046
1816	259,143	26.4	171,299	2,107	89,951
1817	271,682	33.9	184,942	3,177	89,917
1818	261,233	24.0	175,994	4,585	80,654
1819	349,007	17.4	255,720	4,726	88,561
1820	334,378	16.1	249,787	440	85,031
1821	376,176	16.6	289,350	202	86,624
1822	438,871	11.8	347,447	113	91,537
1823	386,625	15.4	284,739	959	102,845
1824	449,321	20.9	352,900	27	96,448
1825	532,915	12.2	409,071	81	123,925
1826	731,452	10.0	588,620	75	142,907
1827	564,263	10.7	421,181	607	143,689
1828	679,206	10.0	529,674	41	149,491
1829	762,800	9.9	596,918	384	166,266
1830	731,452	9.1	553,960	22	177,514
1831	804,598	9.8	644,430	22	160.146
1832	815,047	11.1	649,397	71	165,721
1833	929,990	12.9	769,436	312	160,866
1834	961,338	16.8	774,718	1,593	188,213
1835	1,060,711	16.8	847,263	432	213,880
1836	1,127,836	14.2	888,423	515	238,898
1837	1,426,891	10.3	1,191,905	358	235,344
1838	1,091,838	14.8	827,248	322	264,912
1839	1,651,995	8.6	1,487,882	299	164,412
1840	1,346,232	10.2	1,060,408	1,220	287,044
1841	1,396,821	8.1	1,169,434	108	227,495
1842	2,033,354	6.2	1,584,594	1,847	450,607
1843	1,748,231	8.1	1,327,267	520	421,484
1844	2,076,737	5.9	1,745,812	684	330,241
1845	1,804,223	7.8	1,095,116	388	709,495
1846	1,602,087	10.1	1,054,440	122	547,769
1847	2,126,208	7.6	1,628,549	561	498,220
1848	2,612,299	6.5	2,053,205	22	559,116
1849	2,064,028	11.3	1,270,763	489	793,754
1850	2,133,851	12.1	1,854,474	332	279,709
1851	2,796,365	8.0	2,186,461	513	610,417
1852	3,127,067	9.8	2,223,141	1,427	905,353
1853	2,763,304	9.5	1,975,666	1,145	788,783
1854	2,705,252	8.7	2,016,849	1,440	692,843
1855	3,217,417	9.5	2,702,863	2,306	516,860
1856	2,870,678	12.6	2,096,565	1,682	775,795
1857	3,008,869	11.7	2,237,248	....	771,621
1858	3,754,346	11.6	2,772,937	....	981,409
1859	4,541,285	10.9	3,535,373	....	1,005,912
1860	3,837,402	11.1	615,032	....	3,222,370
1861	4,485,893	23.0	10,129	61,672	4,537,436
1862	1,594,984	42.6	22,770	67,633	1,639,847
1863	448,589	52.8	23,988	52,357	476,958
1864	299,060	38.0	17,789	68,736	350,007
1865	2,091,470	30.8	1,301,146	10,348	800,672
1866	1,952,543	21.4	1,401,697	1,037	549,809
1867	2,350,744	13.8	1,502,757	346	848,333
1868	2,203,181	18.4	1,300,449	1,875	904,607
1869	2,539,113	18.9	1,987,708	3,048	554,453

its cultivation was established on the sea islands of South Carolina. The first bag of Sea Island was exported in 1788, and the exports increased rapidly for several years thereafter. That other varieties of cotton were beginning to be grown quite extensively in the interior is evidenced by the statement of Phineas Miller, who says that in 1792 "the culture of the green seed cotton had just commenced as a crop in the upper country, and two or three millions of pounds of this article had been raised and picked in from the field, but for the want of a suitable gin only a small part of it had been prepared for market." According to the estimates of Levi Woodbury, the total production of both Sea Island and Upland cotton was 1,000,000 pounds in 1789, and increased to 2,000,000 pounds in 1791.

Cotton Production, 1791.—Georgia and South Carolina in 1791 were the cotton producing States (see fig. 51). Cotton was also being grown for domestic use in Virginia and North Carolina, and in Louisiana, which was not yet a part of the United States, but we have no estimate of the production of these regions at this time.

Of the crop of 1791 only 138,000 pounds, equivalent to 277 bales of 500 pounds each, were exported. Charleston and Savannah were the points of export. Charleston exported in this year 77,000 pounds, more than half of the total exports. Woodbury's estimate of production may be too large, but it is certain that a large part of the cotton grown in the South was consumed in the home manufacture of clothing. The mill manufacture of cotton goods was just beginning in the United States. There was one mill in operation at Beverly, Mass., and one began operation in 1791 at Providence, R. I. In 1791–92 more cotton was imported than was exported. In 1789 the United States, upon the recommendation of Hamilton, had placed a duty of three cents per pound upon raw cotton to protect the producers in the Southern States against importations from the West Indies and Brazil.

The cotton production of the world in 1791 was estimated by Woodbury at 490,000,000 pounds, equivalent to 980,000 bales. His estimates for the various countries are as follows:

	Pounds.
India	130,000,000
Rest of Asia	190,000,000
Africa [1]	46,000,000
Brazil	22,000,000
Rest of South America and Mexico	68,000,000
West Indies	12,000,000
United States	2,000,000
Elsewhere	20,000,000
Total	490,000,000

[1] Egypt produced no cotton at this time.

While these figures are mere guesses they may aid the reader to form some idea of the relative position of the United States in the production of the cotton of the world at the beginning of our history.

Sea Island Cotton.—The first step in the development of commercial cotton production in the United States was taken in the introduction and development of the culture of Sea Island cotton. In 1791 the production of Sea Island was probably small, as it had been planted only six years in Georgia and two years in South Carolina, and the methods of its culture were still in the experimental stage. Conditions were, however, especially favorable for the production of this cotton. The planters along the sea coast of Georgia and South Carolina were suffering from a depression in the rice and indigo industries, and the equipment of their plantations was easily adaptable to the cultivation of cotton. Sea Island cotton took the lead in the market as soon as it became known and sold at very high prices. Another circumstance in its favor was the fact that the long lint could be easily separated from the smooth black seed by the roller gin which was then in use.

At first the methods of cultivation were experimental. In 1791 the seeds were either deposited in small hills about five feet apart each way, or in holes made in the level land, separated at that distance. It was cultivated with the hoe, the plow being very seldom used. Except in isolated instances the yield did not equal 100 pounds per acre, which at four acres per "hand" gave but 400 pounds per "hand." In 1794 the West Indian method of drilling the seed along a ridge, and leaving the plants about 6 inches apart on the ridge was begun and was soon adopted by all the growers of Sea Island. This change in practice resulted in a great increase in the yield per acre. For a number of years prices were high and with the increased yields profits were large, averaging at times as much as $500 per laborer employed. Consequently the production of Sea Island cotton increased very rapidly in the decade 1791 to 1801. In 1804 approximately 9,000,000 pounds were produced.

Upland Cottons.—In 1791 many different species of cotton were being grown in Louisiana and on the uplands of Georgia, the Carolinas, and Virginia. All of these cottons were shorter stapled than Sea Island and more difficult to clean. The cottons of Louisiana and Georgia were mostly of the smooth black-seed varieties, while the green-seed cotton was grown to some extent in Virginia and the Carolinas. The seed of the green-seed cotton, being invested with a thick green down adhering closely to it, was the most difficult to separate from the lint. But the green-seed cotton was the best suited to the conditions of production in the inland districts.

The development of the short-staple cotton industry awaited the invention of an effective means of separating the seed from the short, closely adhering lint. The "churka" or roller gin long used in India was early introduced into this country from the West Indies. This machine in its simplest form consisted of two hardwood rollers set in upright posts and was turned by hand. It required two boys to operate it, one to turn and one to feed the cotton between the rolls. Four or five pounds could be cleaned per day on this machine. The method of preparing the cotton for ginning and marketing by using a bowstring to beat out the trash and loosen up the knots in the fiber was introduced into Georgia from the West Indies. This facilitated ginning and improved the quality of the lint, the process giving rise to the trade name "bowed Georgia cotton." The first step in improving the roller gin was to employ the treadle in turning the rollers so that one person could operate it. Other improvements were made from time to time but in 1791 the small treadle roller gin was generally used. As long as cotton was grown only for home use, the seed might be picked out by hand at the rate of one pound per day or ginned at the rate of four or five pounds per day, but this was too tedious for the commercial production of short-staple cotton in the United States.

Whitney's Invention.—In 1793 Whitney invented the gin, which consisted of a cylinder fitted with wire teeth, which were designed to draw the lint through a wire screen, leaving the seed behind. The first model was capable of ginning about 50 pounds per day, but later improvements, especially the substitution of circular saws for the wire teeth, greatly increased the capacity of the machine without changing its essential principle. This machine, operated by horse power or water power, was capable of cleaning 1,000 pounds of the green-seed cotton per day. The first gin was put in operation in Georgia in 1794. In 1795 one was erected in South Carolina and one in Mississippi. In the next year there were 30 Whitney gins in different parts of Georgia. Saw gins were speedily put in operation wherever short-staple cotton was being grown. The great amount of labor required to separate the seed from the lint being the chief obstacle to the production of large quantities of short-staple cotton, the invention of the gin gave a great impetus to its cultivation. The invention came at an opportune time. Already the inventions of Arkwright, Hargreaves, and Cartwright had worked a revolution in the textile industry of England, furnishing machinery for the manufacture of cheap cotton goods, which gave rise to a great demand for the raw cotton.

Production, 1801–1815.—The first great expansion of the upland cotton industry occurred in the Piedmont region of South Carolina and in east central Georgia (see fig. 52). In the latter part of the eighteenth century this region was for the most part occupied by small farmers engaged largely in diversified agriculture and practicing a self-sufficing economy. It was separated from the coast settlements by a broad belt of pine barrens, which was occupied by graziers, timber workers, and a few small farmers, widely scattered. The only means of communication between the Piedmont and the coast was by the navigable streams flowing down from the mountains. In the Piedmont region grain and tobacco were the principal crops grown, and tobacco was the principal market crop. The use of the saw gin made the production of short-staple cotton so much more profitable than tobacco that this region was quickly transformed into a cotton plantation community and became the principal center of cotton production.

Since a great amount of hand labor is required to produce a cotton crop, cheap labor was necessary to the rapid development of cotton culture in the United States, and the Negro slaves of the South furnished the cheap labor. Before the commercial production of cotton was entered upon, slaves were employed as field laborers, chiefly in the production of tobacco, rice, and indigo. The use of the saw gin made it possible to clean all the cotton that could be picked in a season, and every slave, old and young, male and female, could be employed for a considerable part of the year in cultivating and picking cotton. The cotton industry, therefore, became a very profitable field of employment for slave labor. The slaves who had been employed in cultivating rice and indigo along the Atlantic coast and in Louisiana were kept on the old plantations to grow cotton there, but in the Piedmont section there were few slaves. As soon, however, as it became evident that slaves could be employed profitably in cotton production the tobacco planters in this region turned their slave labor to cotton. Planters who had no slaves invested in them, buying from States north, and many came from Virginia with their slaves to engage in cotton culture.

The presence of Indians prevented the extension of production into central or western Georgia, but settlers pushed into Tennessee and began producing cotton there. In 1804

TABLE IV.—PRODUCTION, PRICE, EXPORTS, NET IMPORTS AND POTENTIAL CONSUMPTION OF RAW COTTON, UNITED STATES, 1790–1915—Concluded.

Year.	Production (equivalent 500-pound bales, gross weight).	Export price, average per pound (cents).	Exports of domestic cotton (equivalent 500-pound bales).	Net imports (equivalent 500-pound bales).	Consumption (equivalent 500-pound bales).
1870	4,034,598	13.2	2,922,757	1,806	1,113,647
1871	2,763,172	17.5	1,824,937	6,390	944,625
1872	3,659,303	16.4	2,470,590	10,039	1,198,752
1873	3,882,631	13.8	2,682,631	3,549	1,203,549
1874	3,537,851	13.4	2,504,118	3,794	1,037,527
1875	4,312,683	11.3	3,037,650	4,509	1,279,542
1876	4,129,566	11.0	2,839,418	4,845	1,294,993
1877	4,501,755	10.9	3,197,439	5,054	1,309,370
1878	4,754,483	10.0	3,290,166	5,060	1,469,377
1879	5,473,346	11.6	3,742,752	7,587	1,738,181
1880	6,361,337	11.3	4,455,495	5,452	1,911,294
1881	5,145,053	11.5	3,376,521	3,267	1,771,799
1882	6,831,610	10.8	4,591,331	4,714	2,244,993
1883	5,524,664	10.6	3,733,369	11,253	1,802,548
1884	5,495,037	10.7	3,730,170	7,149	1,772,016
1885	6,371,845	9.9	4,200,646	8,273	2,179,472
1886	6,316,439	9.5	4,301,542	7,554	2,022,451
1887	6,884,756	9.9	4,519,254	11,983	2,377,485
1888	6,917,475	10.0	4,730,192	15,270	2,202,553
1889	7,465,038	10.2	4,928,921	18,316	2,554,433
1890	8,557,418	10.0	5,850,219	45,555	2,752,754
1891	8,935,990	8.8	5,896,800	64,358	3,103,548
1892	6,653,462	8.5	4,485,251	85,673	2,253,884
1893	7,481,869	7.8	5,307,295	59,366	2,233,940
1894	10,010,165	5.8	6,961,372	99,248	3,148,041
1895	7,139,611	8.2	4,761,505	111,899	2,490,005
1896	8,507,107	7.4	6,126,184	114,607	2,495,530
1897	10,974,142	6.0	7,839,467	105,658	3,240,333
1898	11,424,178	5.6	7,655,281	103,020	3,871,917
1899	9,345,391	7.9	6,221,541	134,639	3,258,489
1900	10,123,027	9.3	6,860,917	116,429	3,378,539
1901	9,509,745	8.3	6,928,697	189,867	2,770,915
1902	10,630,945	9.0	6,960,880	148,807	3,818,872
1903	9,851,129	12.0	6,290,245	100,136	3,661,020
1904	13,438,012	8.9	9,119,614	130,107	4,448,505
1905	10,575,017	11.0	6,975,494	133,335	3,732,858
1906	13,273,809	10.7	8,825,236	211,764	4,660,337
1907	11,107,180	11.4	7,779,508	147,262	3,474,934
1908	13,241,799	9.4	8,889,724	172,900	4,524,975
1909	10,004,940	14.2	6,491,843	158,557	3,671,654
1910	11,608,620	14.4	8,025,991	241,693	3,824,322
1911	15,692,700	10.2	11,081,332	239,672	4,851,040
1912	13,703,420	12.0	9,199,093	235,618	4,739,945
1913	14,156,480	12.9	9,234,195	249,351	5,171,636
1914	16,134,930	8.5	8,702,429	380,139	7,812,640
1915	11,191,820	11.2	6,113,328	439,965	5,518,457

Prepared by G. K. Holmes, Bureau of Crop Estimates.

Year.—The year mentioned is for production. The year of exports and imports begins October 1 of the growth year for the period 1790–1842 (1842 is a 9-month year); July 1, for 1843–66 (1866 is a 14-month year); September 1 for 1867–1913 (1913 is an 11-month year); August 1 for 1914, and subsequently.

Production.— 1790–1834 (report of Secretary of Treasury Woodbury, Ex. Doc. 146, 24th Cong., 1st sess.) and 1839 (census production), total net weight in pounds divided by net weight per bale; 1835–38, 1840–48, 1850–58, 1860, 1865–68, 1870–78, 1880–88, 1890–93, commercial crop, Latham, Alexander & Company's Cotton Movement and Fluctuation; 1861–64, commercial crop, Production and Price of Cotton for One Hundred Years, by James L. Watkins, Bul. 9, Bureau of Crop Estimates, U. S. Department of Agriculture; 1894–98, commercial crop, James L. Watkins, Bul. 17, Bureau of Crop Estimates; 1849, 1859, 1869, 1879, 1889, 1899, and subsequently, Bureau of the Census; round bales reckoned as half bales for 1899 and subsequently.

Production (equivalent 500-pound bales, gross weight).— 1790–1858, and 1860–65, total net weight divided by 478.5 pounds net lint, allowance for tare (bagging and ties) 21.5 pounds; 1859, and 1866–1898, total gross weight divided by 500; 1899, and subsequently, computed by Bureau of the Census.

Price of domestic exports.—Average export price per pound, gross weight. Total value gross weight, divided by total gross weight. All prices have been reduced to gold for 1862–78.

Domestic exports.— 1790–1819, American State Papers; 1820, and subsequently, Bureau of Foreign and Domestic Commerce. Including reëxports, 1790–1800, not including reëxports, 1801–19. In Civil War period, 1860–64, records of exports are deficient. Linters first appeared in trade soon after 1870 and are apparently included to 1896; excluded, 1897–1904; included, 1905–13; excluded, 1914, and subseueqntly.

Net imports (imports less reexports).—Including reëxports, 1790–1800, excluding reëxports, 1801–18, American State Papers; 1819, Report of Secretary Woodbury, above; 1820, and subsequently, Bureau of Foreign and Domestic Commerce. Imports given for 1791–93 are for the following calendar years, being more nearly coincident with the commercial crop years. Reports of imports for 1857–60 either wanting or fragmentary as to quantity. Total gross weight in pounds divided by 500.

Potential consumption.—No account taken of stocks at beginning and end of year, but in 10-year averages this omission is rendered almost immaterial. The figures are from the formula of production plus net imports minus domestic exports, and do not stand for consumption in any certain year, concerning which for 1906, and subsequently, see annual bulletins of the Bureau of the Census concerning Supply and Distribution of Cotton in the United States; but they do indicate a possible yearly consumption in the absence of carry-over.

a large area of cotton-producing lands was added to the United States by the purchase of Louisiana. Production continued to increase until the Nonintercourse Act of 1807 and the Embargo of 1809 so restricted exports that prices fell to a low point (fig. 68). On account of the blockade during the War of 1812 it was necessary for the American producers to depend largely upon the local market. While the exports of raw cotton were hindered the imports of cotton goods were reduced, and cheap cotton, with a protected market for goods, encouraged the expansion of the cotton manufacturing industry. Whereas in 1807 there were in the United States only 15 cotton mills operating 4,000 spindles, in 1815 there were 165 mills in the New England States operating 119,310 spindles, besides the mills in the Middle, Southern, and Western States. At the close of the war the prices of cotton rose in the United States and fell in England, and the English importers flooded the American market with cheap cotton goods, which, together with the higher prices for raw cotton, compelled many of the mills in the United States to close.

1815–1839, PERIOD OF WESTWARD EXPANSION.

The close of the War of 1812 marked the beginning of a new period of prosperity for the cotton grower. A large and steadily increasing foreign market was opened immediately upon the resumption of unrestricted commerce. During the four years 1815–1818, the price of cotton averaged 28 cents per pound, and production more than doubled. In the meantime Louisiana, Mississippi, and Alabama were being rapidly settled, and by 1819 the new territory had begun to contribute greatly to the cotton production of the United States. In 1819 a large crop and a financial crisis combined to cause a sharp decline in prices, 11 cents below the average of the five preceding years. Then followed a period, 1819–1831, in which prices remained relatively lower, ranging from 9 to 17 cents a pound, except for a slight rise in 1824–25. In the first eight years of this period production doubled again, but the low prices of 1826–1831, averaging 10 cents, retarded somewhat the further expansion of cotton production for a brief period. In the meantime the market demands, both foreign and domestic, were continually increasing. Beginning with 1832 there followed seven years of prosperity, during which period prices averaged 14 cents per pound. Between 1832 and 1839 production doubled again, so that the crop of 1839 was eight times that of 1815.

In the beginning of the decade 1830–1839 large areas of new lands in Georgia, Alabama, and Mississippi were opened to settlement by the removal of Indian tribes. As a result of the higher prices of cotton and this sudden addition of so great a territory adapted to cotton production there was wild speculation in land and slaves, culminating in the crisis of 1837. Notwithstanding the financial crisis and the low prices of 1837 the crop of 1839 was the largest that had ever been produced, and the average price of cotton was only 8.6 cents per pound.

The expansion of production in the Western States, with the consequent low prices, had a marked effect on cotton culture in the East. The production of Sea Island being limited to a small area, the planters growing it early systematized their methods of cultivation and began to fertilize their land. But in the upland districts, where there was an abundance of fertile unoccupied land, planters gave no attention to maintaining the fertility of their fields. Land being cheaper than slaves, the fields were abandoned when their fertility had declined so much that it seemed unprofitable to cultivate them longer without expending some labor to improve their condition. In consequence of this policy there was a continued movement of planters with their slaves from the East to the new lands in the West, and the West became the market for slaves from the eastern and northern border States.

THE DEVELOPMENT BETWEEN 1839 AND 1859, WITH SLAVES.

Period of Severe Depression in the South, 1839–1849.—In 1839 all of the territory of the Cotton Belt east of Texas had been opened to occupation by cotton planters and was being rapidly developed (figs. 55, 56). The addition of vast areas of new land had caused overproduction and greatly depressed prices, and this condition continued through the decade, the price of cotton averaging only 8 cents per pound. The lowest point was reached in 1844, when the price of cotton averaged 5.6 cents. However, the lack of home markets for other products, the large amount of fixed capital invested in slave labor, the inelasticity of the plantation organization, and the heavy financial obligation of the planters forced them to cling to the one cash crop in most sections of the South, even though often unprofitable. In consequence of the causal connection between expansion in production and price depression and of the tendency to employ wasteful methods of cultivation, the westward shifting of the cotton industry left in its wake ruin and privation. The effect upon cotton production in

FIGURE 68

COTTON
PRICE PER POUND
1790—1915

Figure 68.—This curve is based on export prices (see Table IV for 1790 and 1801–1915 and Bul. 134, Bureau of the Census, for 1791 to 1800). Prices were rising when Whitney invented the gin. The increase in production after 1800 caused a sharp decline, and the Embargo and Nonintercourse Acts, together with the blockade at the beginning of the War of 1812, greatly depressed prices. For a brief period, 1814–1818, prices were relatively high, and production increased so much that prices fell again and, excepting in 1824, remained low until 1832. Again prices were high from 1832 to 1838, after which a panic and later a great expansion in production depressed prices to a very low point. Beginning at 5.9 cents in 1844 prices rose until 1856, after which large crops caused a slight decline until the Civil War began, when the blockade forced prices up to 52.8 cents in 1863. After the War, as the cotton of the South again became available and production increased, prices fell to the lowest point in history, 5.6 cents, in 1898. Low prices retarded the rate of increase in production, and consequently prices rose again from 1899 to 1910. From 1911 to 1914 large crops and in 1914 the European War caused lower prices. Since 1914 prices have advanced.

the border States of Virginia and North Carolina was very marked (fig. 57). In 1828 the production of these two States was estimated at 104,000 bales; in 1849 they produced only 62,000 bales.

Notwithstanding the low prices prevailing during the decade 1839–1849, cotton production increased 50 per cent. The Western States of the Cotton Belt not only made good the loss in the East but added 50 per cent to the total crop. Natural conditions were far more favorable to cheap production in these new regions than in the old, which explains the increase in production in spite of very low prices. The Western States of the Cotton Belt were favored not only by better soils but by accessibility to food supplies from the North. During the thirties and forties the upper Mississippi Valley was being rapidly developed, and the South, to which the Mississippi River furnished cheap transportation, was the nearest market for the produce of this region. The cheapness of the supplies from the North encouraged specialization in cotton production in the Gulf States. However, the very low prices of cotton in the early forties led many of the planters of Louisiana to change from cotton to sugar cane.

Prosperity in the South, 1849–1859.—Prices were better during the decade 1849–1859, averaging over 10 cents per pound. The depression of the previous decade had led to a discussion of diversification in some parts of the Cotton Belt, but with higher prices this came to a sudden end and cotton became again the all-compelling motive force of southern economic, social, and political activity. There was a great increase in production in all parts of the Cotton Belt, but the greatest gains were made in the Southwestern States (fig. 58). In this decade Texas and Arkansas began to contribute greatly to the annual cotton crops of the United States. In this and in the preceding decade railroads were constructed from the coast to the interior in North Carolina, South Carolina, Georgia, and Alabama, greatly increasing transportation facilities and thereby encouraging the further development of cotton production in these States.

Sea Island Cotton.—Upon its introduction into Georgia the cultivation of Sea Island cotton was confined to the warm, higher lands of the sea islands, and for many years its production was restricted to the islands and low coast lands of Georgia and South Carolina. The total production in 1849 was approximately the same as in 1804, but there had been a shift in the producing area. Between 1839 and 1849 the production of the sea islands of Georgia declined considerably, while some progress was made in the development of the industry in Florida. The production by States in 1858 has been estimated as follows:

	Bales.
Florida	25,685
South Carolina	26,663
Georgia	10,008

TABLE V.—SEA ISLAND COTTON—EXPORTS, PRODUCTION BY STATES, AND AVERAGE PRICE AT SAVANNAH.

[Available statistics, 1804–1915.]

Year.	Exports.	Year.	Crop.					Average price per pound at Savannah.	Exports.
			Florida.	Georgia.	South Carolina.	Texas.	Total.		
	Pounds.		*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Cents.*	*Bales.*
1804	8,787,659	1865	2,428	10,957	5,630	....	19,015	....	18,231
1805	6,096,082	1866	11,212	10,015	11,001	....	32,228	....	30,706
1806	8,926,011	1867	10,402	6,296	4,577	....	21,275	....	19,859
1807	949,051	1868	6,703	6,371	5,608	....	18,682	....	17,239
1808	8,664,213	1869	9,948	9,225	7,334	....	26,507	....	24,716
1809	8,604,078	1870	8,753	4,934	7,218	704	21,609	....	9,905
1810	8,029,576	1871	5,624	1,567	8,755	899	16,845	....	15,584
1811	4,367,806	1872	10,764	1,269	13,156	1,100	26,289	....	23,469
1812	4,134,849	1873	8,825	1,408	8,759	920	19,912	....	18,873
1813	2,520,338	1874	8,313	1,110	7,400	204	17,027	....	15,046
1814	8,449,951	1875	8,950	1,213	4,756	77	14,996	....	12,936
1815	9,900,326	1876	10,832	2,558	4,933	29	18,352	....	13,234
1816	8,101,880	1877	11,675	3,556	6,249	30	21,510	....	16,295
1817	6,457,335	1878	10,214	2,052	7,133	202	19,601	....	12,698
1818	7,488,775	1879	11,300	3,420	10,142	....	24,862	28	17,023
1819	11,569,015	1880	16,950	3,179	14,868	24	35,021	28	24,395
1820	11,344,066	1881	20,992	6,049	10,796	25	37,862	24	24,756
1821	11,250,635	1882	16,898	3,126	16,591	94	36,709	26	23,457
1822	12,136,688	1883	16,762	1,399	7,329	....	25,490	32	13,579
1823	9,525,722	1884	23,526	4,327	12,588	11	40,452	26	21,565
1824	9,665,278	1885	23,501	5,780	8,497	....	37,778	23	16,428
1825	5,972,852	1886	29,991	6,411	8,735	....	45,137	18	26,651
1826	15,140,798	1887	22,614	8,304	8,561	....	39,479	21	20,613
1827	11,288,419	1888	22,471	12,000	9,618	....	44,089	22	23,326
1828	12,833,307	1889	23,918	13,629	9,256	....	46,803	24	28,242
1829	8,147,165	1890	22,214	29,613	16,306	....	68,133	19	39,123
1830	8,311,762	1891	17,059	30,576	11,499	....	59,134	16	27,431
1831	8,743,373	1892	9,882	28,324	7,212	....	45,418	21	22,540
1832	11,142,987	1893	19,107	39,367	2,578	....	61,052	18	38,021
1833	8,085,937	1894	15,031	53,703	5,894	....	74,628	15	40,744
1834	7,752,736	1895	20,771	61,312	9,971	991	93,045	16	50,443
1835	7,849,597	1896	26,219	65,040	10,701	2,597	104,557	14	58,452
1836	5,286,971	1897	25,171	41,599	10,201	10	76,981	12	41,913
1837	7,286,340	1898	21,189	40,787	5,629	6	67,611	11	35,566
1838	5,107,404	1899	29,607	60,888	7,810	....	98,305	15	46,179
1839	8,779,669	1900	25,374	54,974	8,377	....	88,725	21	31,730
1840	6,237,424	1901	22,770	52,263	8,641	....	83,674	20	30,124
1841	7,254,099	1902	26,280	67,040	12,635	....	105,955	19	51,547
1842	7,515,079	1903	27,562	39,303	9,549	....	76,414	23	35,919
1843	6,099,076	1904	38,026	51,880	12,273	....	102,179	19	40,296
1844	9,380,625	1905	33,635	76,440	13,714	....	123,789	18	38,170
1845	9,388,533	1906	20,170	31,425	8,037	....	59,632	30	20,767
1846	6,293,973	1907	27,993	44,340	12,727	....	85,060	21	32,783
1847	7,724,148	1908	39,045	46,971	15,404	....	101,420	18	22,872
1848	11,969,259	1909	28,711	53,415	14,592	....	96,718	27	29,428
1849	8,236,463	1910	28,849	45,646	13,416	....	87,911	28	22,935
1850	8,299,656	1911	42,484	75,138	5,144	....	122,766	21	26,914
1851	11,738,075	1912	22,176	43,528	8,376	....	74,080	20	15,977
1852	11,165,165	1913	25,515	43,305	8,670	....	77,490	20	15,924
1853	10,486,423	1914	32,252	41,077	5,528	....	78,857	18¼	3,913
1854	13,058,590	1915	27,494	55,073	6,211	....	88,778	23¼	2,727
1855	12,797,225	....	....	....	....	....	....	....	....
1856	12,940,725	....	....	....	....	....	....	....	....
1857	12,101,058	....	....	....	....	....	....	....	....
1858	13,713,556	....	....	....	....	....	....	....	....
1859	15,598,698	....	....	....	....	....	....	....	....
1860	6,170,321	....	....	....	....	....	....	....	....
1861	66,443	....	....	....	....	....	....	....	....
1862	527,747	....	....	....	....	....	....	....	....
1863	133,521	....	....	....	....	....	....	....	....
1864	330,584	....	....	....	....	....	....	....	....

Year.— 1804–1842 beginning Oct. 1 (1842 is a 9-month year); 1843–1915 beginning July 1.

Exports and production.— 1804–1864, Bureau of Statistics, U. S. Treasury Department, Cotton in Commerce (1895); 1865–1875 quotation from Annual Circular of Messrs. Ellison & Co.; 1876–1877 by Dana, W. B., in Cotton from Seed to Loom (1878); 1878–1915 Sheppersons' Cotton Facts (1916).

Prices.— 1879–1915 Gordon & Co., Annual Sea Island Cotton Report (1916).

DEVELOPMENT IN METHODS OF PRODUCTION BEFORE THE CIVIL WAR.

Sea Island Cotton.—On the sea islands throughout the first half of the century the industry was a very intensive type of agriculture. High ridges were thrown up from 4 to 6 feet apart by the use of the hoe, and so laborious was the process that the ridges were permanently maintained. By the best planters the most careful methods of seed selection were practiced, the fields were heavily fertilized with marsh mud, and were cultivated often with the hoe, the plow being seldom used. The customary allotment to each laborer was 3½ acres. In order to prevent injury to the fiber by dust, rain, and wind, the cotton field was picked over from 10 to 12 times, as rapidly as the bolls opened, and the lint was carefully handled. The aim of the planter was to secure a high quality of cotton.

Upland Cotton.—Extensive methods of cultivation prevailed in the short-staple cotton industry, the aim of the planter being to secure the maximum crop per hand rather than maximum production per acre. Exhortations to the contrary were generally disregarded because of the superior profitableness of extensive methods with cheap land and high-priced slaves. It should be observed that the extensive methods of cotton culture did not result in cultivating a large proportion of the acreage annually, but involved the holding of a large acreage, only a small portion of which was cultivated while other parts were resting.

In the forties soils and soil fertility and methods of increasing yields began to be widely discussed in the Eastern States, and the more progressive planters began to experiment with rotations, green manuring, liming, and composts of manures and cotton seed. In the fifties, the price of cotton having risen, interest in yields became greater and many planters began using cotton seed and manure composts for increasing the fertility of their lands. But since few domestic animals were kept on the farm, manure was scarce, and composting required a great amount of labor, consequently only limited areas were manured. In 1858 the railways of Georgia gave a great impetus to the use of commercial fertilizers by reducing freight rates on all fertilizers. Only small quantities had been carried before this date, while in 1859 the Central Georgia Railway system handled 3,854,850 pounds and in the next year 16,937,430 pounds, most of which was guano.

In the early years of the cotton industry there was no uniformity of practice in planting, and planters were experimenting with many different methods. Gradually a fairly uniform system developed, although there is much diversity in detail even to-day. Almost everywhere throughout the South the ridge method of husbandry was adopted. The ridges were from 3 to 6 feet apart and were formed by first running one furrow and then throwing dirt upon it from each side with a turnplow. The ridges were opened for planting with homemade openers of various forms, shaped to fit the ridge and fitted with a piece of iron projecting through the center in such a way as to open a narrow drill through the center of the bed. The seed was strewn by hand in the

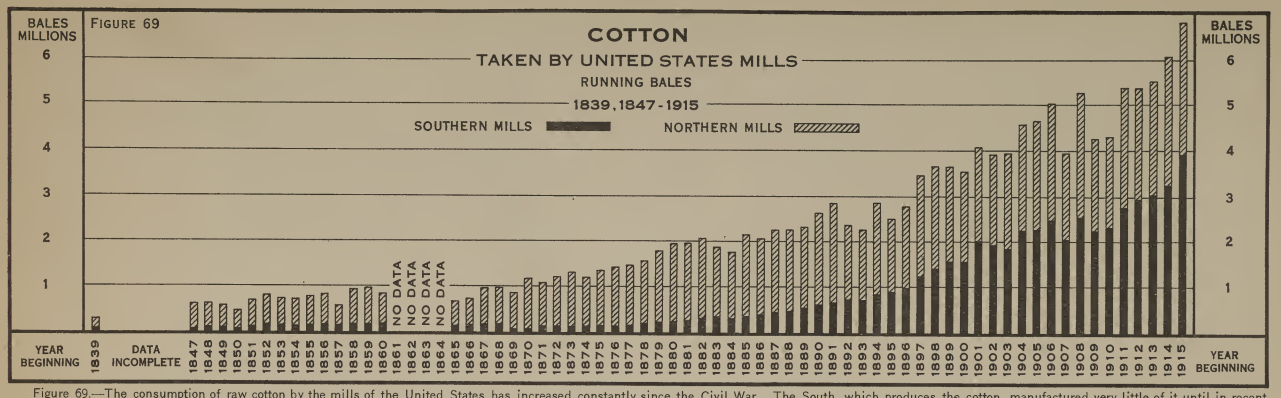


Figure 69.—The consumption of raw cotton by the mills of the United States has increased constantly since the Civil War. The South, which produces the cotton, manufactured very little of it until in recent years. Before the Civil War there were only a few mills in the South, and after the war there was little development until about 1880. Beginning with 1880 there was a rapid expansion of the cotton manufacturing industry in the cotton-growing States, until in 1915 the mills of these States consumed more than half of the cotton retained for consumption in the United States (see also fig. 96).

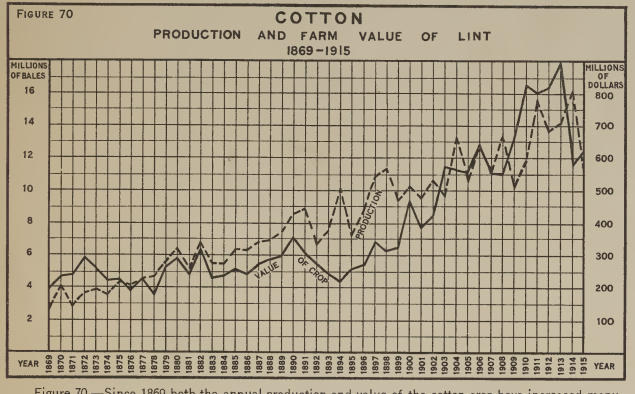


Figure 70.—Since 1869 both the annual production and value of the cotton crop have increased manyfold. Between 1872 and 1898 production increased more rapidly than value, whereas between 1898 and 1914 value increased more rapidly than production. A comparison of annual fluctuations shows that a large crop is frequently worth less than a small crop.

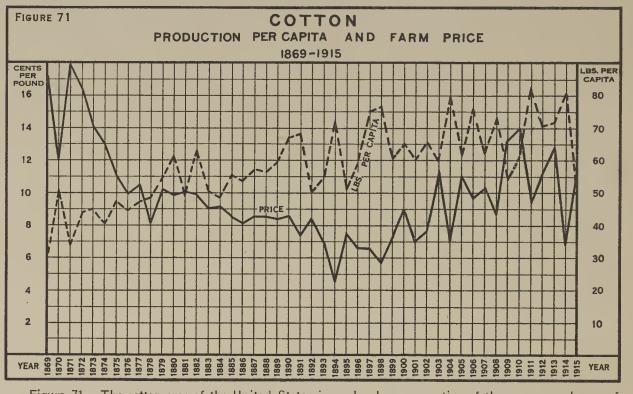


Figure 71.—The cotton crop of the United States is such a large proportion of the commercial crop of the world that its size has a great influence upon prices, and consequently price, as a rule, varies inversely with the production of the United States. Since 1869 production has increased more rapidly than the population of the United States, though since 1898 but a little more rapidly.

drills, and in the earlier period it was covered with a turning plow, but later, with a block of wood beveled on the edges, notched so as to leave a ridge over the seed, and fastened to a plowstock. Some planters employed a machine similar to a roller, but shaped to fit the bed, which held wire teeth so arranged that holes would be successively opened in the bed at regular intervals through the revolution of the machine. Planting the cotton in hills thus marked was thought to economize time in "chopping out" or thinning the crop.

It is difficult to reduce to generalization the diversities in methods of cultivation. In the earlier years the hoe and shovel plow were the only instruments used. In the course of time instruments, such as the scraper, the skimmer, and the sweep were used to clean out the weeds from between the rows and throw dirt to the cotton. The substitution of the use of one of these instruments for one or more of the cultivations with the plow and hoe greatly economized labor. One sweep cleaned the weeds out of the entire interval between the rows of cotton, whereas otherwise three or four furrows of the common shovel or turning plow were necessary; and this greatly reduced the work for the hoe by shaving the bed close to the cotton. These labor-saving devices were, of course, better adapted to the level lands of alluvial regions or prairies than to the rolling, stumpy fields of upland regions.

There is considerable evidence that there was some increase in the capacity of laborers for picking cotton. In the beginning 50 pounds per day was considered a fair day's work, whereas by 1840 the amount required per "hand" was from 150 to 200 pounds per day. Since the amount that can be picked determines the amount that may be prepared for market, this increase greatly affected the acreage grown with a given amount of labor. From 8 to 10 acres per hand were planted in 1840, whereas in the beginning only about 4 acres was the allotment.

THE CIVIL WAR.

The blockade during the Civil War temporarily ruined the cotton industry of the South. The crop of 1861 was large, and consequently the South had large stocks of cotton on hand at the beginning of the war when it was cut off from market. During the war some cotton was produced, but for the most part agricultural activity was diverted from cotton to the production of food supplies. The South consumed some cotton in its own manufactures, some cotton ran the blockade, some was exported through Mexico, and some was released to the North as the northern armies advanced into the South. At the close of the war there was some cotton on hand in the South which immediately became available for market and sold at a high price. The war not only shut the South off from a market for a brief period of years, but turned over the world market to competitors and left the South so disorganized that it was impossible at once to resume its place among the producers of the world.

The manufacturers of cotton goods in the United States and Europe had accumulated large stocks of cotton when the war broke out, but these were soon exhausted, and the prices of cotton rose to a very high point. The high prices caused manufacturers to seek cotton elsewhere, and this encouraged other countries to increase their production. The cultivation of cotton in the States of the North bordering on the Cotton Belt was attempted, but with slight success, and the manufacturers of the North were compelled to import from foreign countries. In 1857 the English manufacturers, who for many years had depended upon the United States almost solely for their supply of raw cotton and had secured it at low prices, became alarmed at the rising prices, and, believing that the United States had reached its maximum production, organized an association to promote cotton-growing in other countries. The high prices resulting from the blockade of the South aided the efforts of this association to increase production in all other countries. The English manufacturers bought large quantities of Indian cotton at prices which made the industry very profitable, resulting in a great increase in production in India. There was also a marked increase in the productions of Egypt and Brazil. Japan and China for a time ceased to be importers from India, and China became an exporter to England.

TABLE VI.—ESTIMATED QUANTITY OF COTTON SEED PRODUCED, COTTON SEED CRUSHED, AND VALUE AND QUANTITIES OF CRUDE PRODUCTS OBTAINED: 1874-1915.

Year.	Cotton seed.		Crude products.				
	Produced (tons).	Crushed (tons).	Value.	Oil (gallons).	Cake and meal (tons).	Hulls (tons).	Linters (500-lb. bales).
1874	1,687,000	84,000	$2,530,000	3,370,000	30,000	.....	.....
1875	2,057,000	123,000	3,970,000	4,940,000	63,000	.....	.....
1876	1,969,000	98,000	2,610,000	3,940,000	34,000	.....	.....
1877	2,128,000	130,000	3,910,000	6,020,000	53,000	.....	.....
1878	2,368,000	181,000	3,810,000	7,260,000	64,000	.....	.....
1879	2,616,000	235,000	5,640,000	9,420,000	82,000	.....	.....
1880	3,239,000	182,000	4,610,000	7,490,000	64,000	.....	.....
1881	2,453,000	295,000	8,380,000	11,780,000	103,000	.....	.....
1882	3,266,000	392,000	10,640,000	15,680,000	137,000	.....	.....
1883	2,619,000	396,000	9,850,000	15,840,000	138,000	.....	.....
1884	2,625,000	499,000	10,470,000	19,950,000	174,000	.....	.....
1885	3,045,000	578,000	10,970,000	23,140,000	202,000	.....	.....
1886	3,018,000	694,000	12,820,000	27,770,000	243,000	.....	.....
1887	3,991,000	823,000	17,130,000	32,910,000	288,000	.....	.....
1888	3,310,000	794,000	20,370,000	31,770,000	278,000	.....	.....
1889	3,493,000	874,000	16,400,000	34,950,000	306,000	.....	.....
1890	4,853,000	1,023,000	19,790,000	40,930,000	358,000	.....	.....
1891	4,274,000	1,068,000	20,590,000	42,740,000	374,000	.....	.....
1892	3,784,000	1,050,000	18,630,000	42,010,000	368,000	.....	.....
1893	3,579,000	1,431,000	28,500,000	57,260,000	501,000	.....	.....
1894	4,792,000	1,677,000	24,870,000	67,090,000	587,000	.....	.....
1895	3,126,000	1,438,000	20,180,000	57,390,000	502,000	.....	.....
1896	5,070,000	1,628,000	26,260,000	65,120,000	570,000	.....	.....
1897	5,253,000	2,101,000	26,680,000	84,040,000	735,000	.....	.....
1898	5,472,000	2,353,000	27,960,000	94,110,000	823,000	.....	.....
1899	4,668,000	2,479,000	42,410,000	91,330,000	884,000	1,169,000	124,544
1900	4,830,000	2,415,000	48,230,000	96,610,000	845,000	1,139,000	111,096
1901	4,630,000	3,154,000	62,980,000	118,610,000	1,125,000	1,487,000	145,103
1902	5,992,000	3,269,000	71,890,000	122,910,000	1,165,000	1,541,000	150,366
1903	4,716,000	3,241,000	73,930,000	121,880,000	1,156,000	1,528,000	194,486
1904	6,427,000	3,345,000	69,310,000	133,820,000	1,360,000	1,213,000	235,586
1905	5,060,000	3,131,000	64,960,000	125,700,000	1,272,000	1,135,000	219,397
1906	5,913,000	3,844,000	94,380,000	153,760,000	1,786,000	1,593,000	307,518
1907	4,959,000	2,565,000	65,980,000	103,050,000	1,043,000	927,000	256,487
1908	5,904,000	3,570,000	86,090,000	146,790,000	1,492,000	1,330,000	330,277
1909	4,462,000	3,269,000	105,720,000	131,000,000	1,326,000	1,189,000	296,640
1910	5,175,000	4,106,000	142,710,000	167,970,000	1,792,000	1,375,000	379,576
1911	6,997,000	4,921,057	131,340,000	201,650,000	2,151,000	1,642,000	533,099
1912	6,104,000	4,579,508	132,230,000	185,750,000	1,999,000	1,540,000	583,092
1913	6,305,000	4,847,628	159,670,000	193,330,000	2,220,000	1,400,000	660,089
1914	7,186,000	5,779,665	129,880,000	229,860,000	2,648,000	1,677,000	829,274
1915	4,992,000	4,202,313	180,960,000	167,110,000	1,923,000	1,220,000	889,577

1865-1879, RECONSTRUCTION.

In 1865 the South was again free to enter into the cotton trade of the world, and over two million bales were marketed the first year. This, however, included cotton on hand in the South when the blockade was lifted. The crop of 1866 amounted to nearly two million bales, which was less than half that of 1859 and but a little greater than the crop of 1839. The average price received for this crop reduced to a gold basis was 21.4 cents, which is more than was received for any crop between 1818 and 1861.

Before the war cotton production depended upon slave labor, after the war it depended mainly upon the labor of the freedmen. The work of the slaves had been organized and directed by the owners or overseers of the plantations, and slave labor had become skilled in cotton production. After the war some of the freedmen left the plantations for the cities and many migrated to the North or moved from one section to another. It was not only difficult to keep them in a community but still more difficult to control their daily activities. Nevertheless, as there was no other labor available, the resumption of cotton production depended upon finding ways and means of employing and directing the labor of the freedmen.

Many of the freedmen remained on the old plantations and continued to work under supervision as in slavery times. The profitableness of cotton with the prevailing high prices was a strong incentive to the planters to resume cotton production and to offer the freedmen favorable terms in order to induce them to stay on the plantations. The wage system of employment was tried in many cases with varying degrees of success. The superior profitableness of cotton production in some sections and the scarcity of labor in those sections was largely responsible for the migrations of freedmen from one section of the Cotton Belt to another. Many moved from Georgia and Alabama to Mississippi because of the offer of higher wages in Mississippi. The wage system of employing the freedmen failed, however,

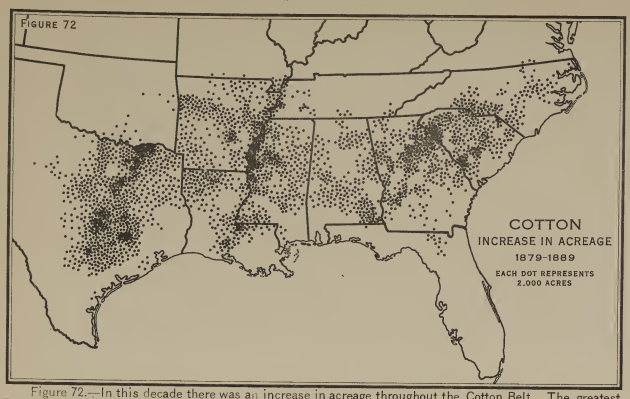


Figure 72.—In this decade there was an increase in acreage throughout the Cotton Belt. The greatest increases were in Texas, in the bottoms of the Mississippi and Arkansas Rivers, and in the Upper Coastal Plain and Upper Piedmont regions of the Carolinas and Georgia.

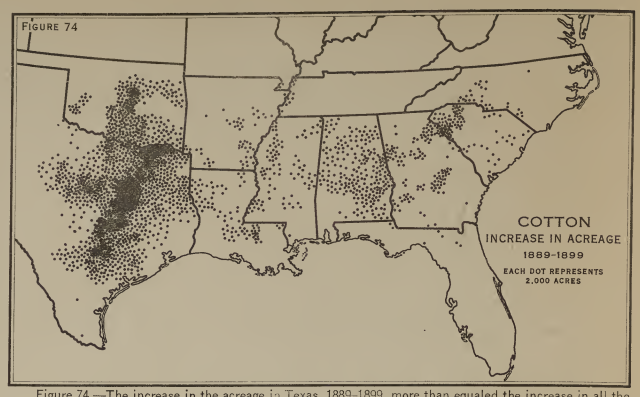


Figure 74.—The increase in the acreage in Texas, 1889–1899, more than equaled the increase in all the other States. Low prices were unfavorable to an increase in the acreage planted in cotton in the States which were already well developed, although there was a considerable increase in central Alabama.

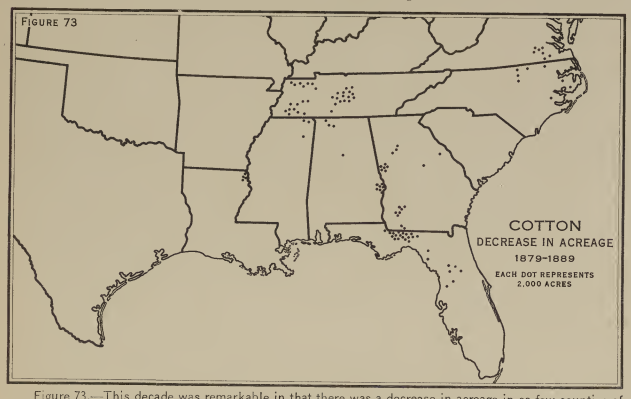


Figure 73.—This decade was remarkable in that there was a decrease in acreage in so few counties of the South. Virginia and Florida are the only States in which there were decreases in the total acreage. There were also a few counties in North Carolina, Georgia, and Tennessee in which the acreage decreased.

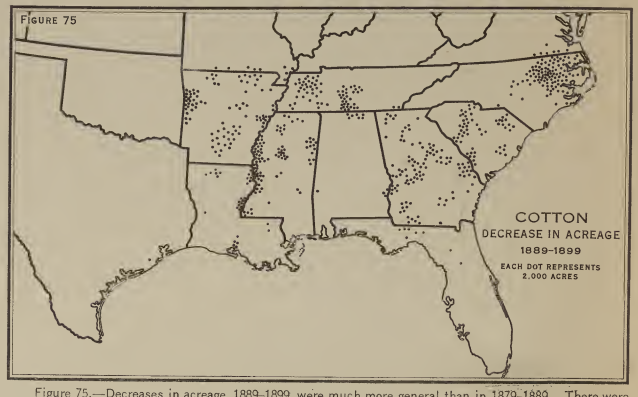


Figure 75.—Decreases in acreage, 1889–1899, were much more general than in 1879–1889. There were no decreases in Oklahoma and only a few in Alabama and Texas. In a few States the total acreage decreased, while in South Carolina, Georgia, and Mississippi decreases almost balanced increases.

in many cases to secure adequate control of the labor by the planter, since the freedman wanted to be independent of supervision. A system of renting to the freedman, for a definite amount of cotton or a share of the crop, a plot of land as large as he would cultivate was finally inaugurated. The freedman generally lived on the plantation, and while he was making the crop was furnished equipment and supplies by the owner of the plantation or by a merchant, for which he returned cotton or cash when the cotton was sold. This system resulted in making his subsistence depend upon raising cotton, and he was so bound by legal restrictions when in debt to the landlord or merchant that it was difficult for him to move.

The high price of cotton during the earlier part of the Reconstruction Period stimulated cotton production by the small farmers along the northern border of the Cotton Belt and in Arkansas and Texas, where slavery had not dominated agricultural activities previous to the Civil War. It was not so difficult to reorganize agricultural activities where the farms were small. The difficulties of reorganizing and operating the large plantations led to the breaking up of many into smaller farms. The census figures showing farms classified by acres of improved land for 1870 compared with those for 1860 indicate the extent of this breaking up of plantations and renting to the freedman during the first five years of Reconstruction.

NUMBER OF FARMS CLASSIFIED AS TO ACRES OF IMPROVED LAND.

State.	Under 10 acres.		10 to 19 acres.		20 to 49 acres.	
	1860	1870	1860	1870	1860	1870
Alabama	1,409	4,491	4,379	9,128	16,049	26,541
Arkansas	1,823	5,356	6,975	11,744	13,728	20,853
Georgia	906	3,857	5,803	6,942	13,644	21,971
Louisiana	626	3,701	2,222	7,493	4,882	8,854
Mississippi	563	11,003	2,316	8,981	10,967	26,048
North Carolina	2,030	7,037	4,879	14,257	20,882	35,280
South Carolina	352	10,474	1,219	9,146	6,695	16,413
Total	7,729	45,319	24,093	67,691	86,847	155,962

State.	50 to 99 acres.		100 to 499 acres.		500 and over acres.	
	1860	1870	1860	1870	1860	1870
Alabama	12,060	14,003	13,455	11,719	2,712	1,155
Arkansas	6,957	7,640	4,821	3,465	376	166
Georgia	14,129	18,371	18,821	17,490	3,594	1,925
Louisiana	3,064	3,888	4,955	3,753	1,532	792
Mississippi	9,804	15,967	11,408	8,938	2,349	1,086
North Carolina	18,496	29,367	19,220	13,819	1,492	1,005
South Carolina	6,980	8,148	11,369	7,112	1,841	594
Total	70,890	86,184	83,459	66,296	13,899	6,723

Another result of the conditions prevailing after the war was the more extensive use of fertilizers. The price of cotton being high and the labor difficult to control, it was more profitable to use fertilizers and cultivate a smaller acreage of the land that would yield the best returns than to cultivate extensively. Cotton seed was universally used as a fertilizer, and large quantities of Peruvian guano were imported into Alabama, Georgia, and South Carolina. The phosphatic rocks of South Carolina began to be mined and used as fertilizer about 1869.

The production of cotton increased but little in the first five years after the Civil War, the crop of 1869 being but little greater than that of 1866. The crop of 1870, however,

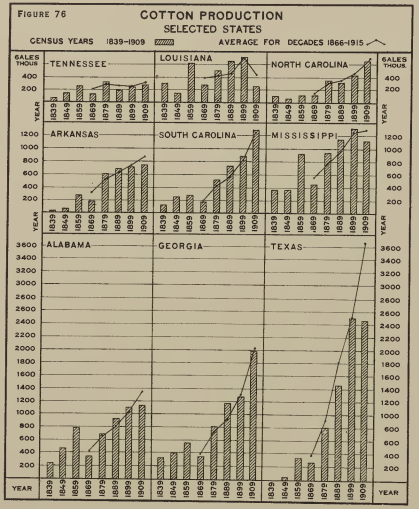


Figure 76.—Texas and Georgia are the leading cotton States, and there has been a rapid increase in the production of these States since the Civil War. Louisiana is the only State in which there was a decline in the average production of the last decade. This decline was due to the destructiveness of the boll weevil.

was larger than the crop of 1860. That this was above the normal crop for this period is evident from the fact that production did not again reach this point until 1875. By 1879 conditions in the South had become fairly stable again and the crop of that year was the largest that had ever been produced (figs. 60, 65). All of the States except Alabama and Louisiana produced more cotton in 1879 than in 1859 (fig. 76).

1879–1914, A PERIOD OF EXPANSION.

1879–1898, Prices Falling.—Production doubled between 1879 and 1898 while prices fell from 11.6 cents to 5.5 cents per pound, the lowest in the history of cotton (figs. 67, 68). During the first decade prices remained about on a level while production increased, and in the second decade prices fell while production continued to increase. In the West the increase in production was largely from new lands. The building of railroads in Texas was followed by the rapid development of cotton production in the Black Waxy Prairie region, grazing and grain farming giving way to cotton. Production in Arkansas and Oklahoma also increased rapidly in this period. In the East the increase in production was largely the result of the extensive use of fertilizers on sandy soils and of improvements in methods of production

1899–1914, Prices Rising.—From 1899 to 1909 the total acreage in cotton increased 32 per cent and it continued to increase up to 1914. The development of Oklahoma and western Texas added a large acreage to the cotton producing area of the United States (fig. 77). The yield per acre also increased in many of the States (see fig. 45). The cotton crop of 1914 amounted to 16,000,000 bales, which was four times the amount produced in 1860. Prices were favorable except in 1914, when the very large crop and the commercial disturbance created by the European war greatly depressed prices. This period is marked by the spread of the boll weevil, by intensification of efforts to produce higher yields and better grades of cotton, by the introduction of cotton into the irrigated districts of southern California and Arizona, by a great increase in the value of cotton seed, by a rapid development of cotton manufacturing in the South, and by increased competition from foreign countries.

The Boll Weevil.—The boll weevil entered Texas from Mexico about 1892 and has since then infested the greater part of the Cotton Belt (fig. 50). The immediate result of the ravages of the weevil in the communities where conditions are most favorable for its operations is the demoralization of agricultural activities (see figs. 78, 80). The amount of money advanced on the cotton crop by merchants and banks is greatly curtailed because of the failure of crops. Tenants are unable to pay rents on debts, owners lose their lands and homesteads, and a period of poverty and distress among all classes of agricultural people follows. After the panic caused by the first destruction of crops the farms and farm practices are reorganized, and the farmers continue to grow cotton (see figs. 63, 64) by using methods which bring the crop to early maturity and destroy as many weevils as possible. Fortunately, however, the boll weevil is not equally destructive in all infested regions. Weevils may only destroy a small part of the crop, reducing the yield per acre but leaving the farmer a sufficient return to induce him to

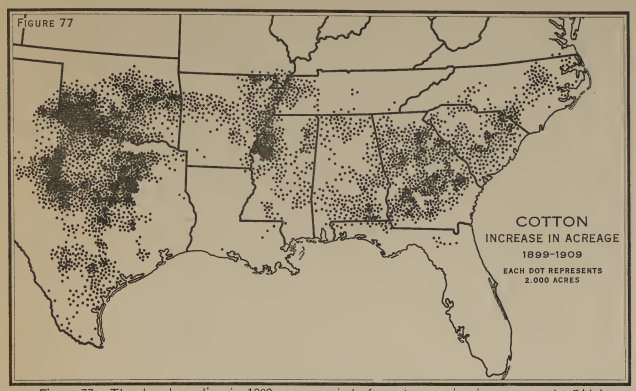


Figure 77.—The decade ending in 1909 was a period of great expansion in acreage. In Oklahoma and Texas there was a shift westward into new regions. The acreage increased also in the middle Coastal Plain of South Carolina and Georgia, the Piedmont of Georgia, northern Mississippi, and in Arkansas.

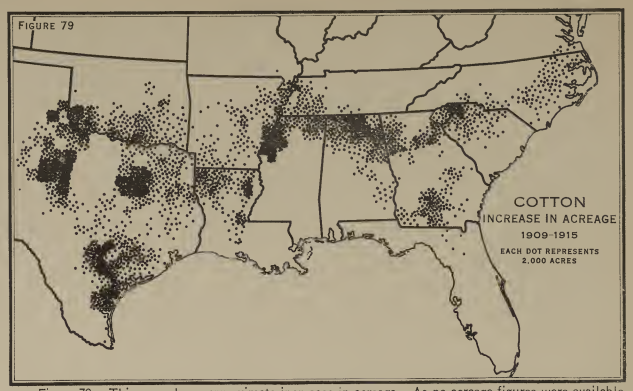


Figure 79.—This map shows approximate increases in acreage. As no acreage figures were available, the acreage was computed by dividing the increase in the production of each county by the average yield for the State. The most marked increases are in the northern and western portions of the Cotton Belt.

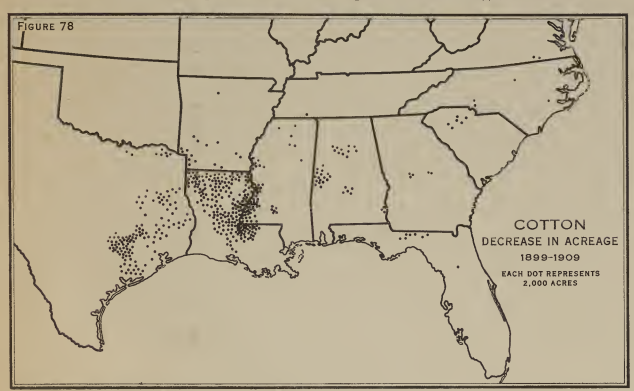


Figure 78.—This map shows the effect of the ravages of the boll weevil upon the acreage planted in cotton. Compare the area showing decreases with the area infested with the boll weevil in 1908 (fig. 50). Few of the counties outside of the infested area decreased in acreage between 1899 and 1909.

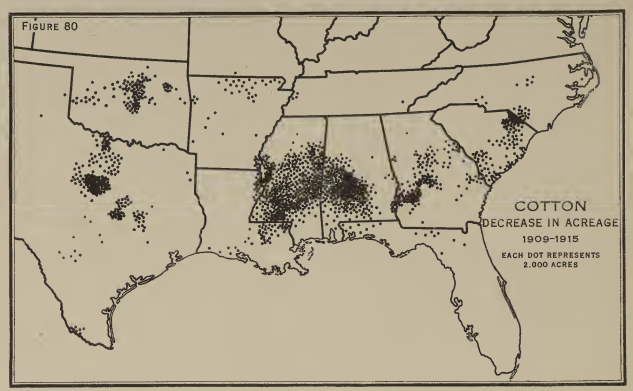


Figure 80.—The decreases in acreage by counties between 1909 and 1915 were computed in the same manner as the increases for the map above (fig. 79). The marked decreases shown in Alabama and Mississippi are in counties recently infested with the boll weevil (see fig. 50). The weevil has infested other parts of the South, but has not been equally destructive in all parts.

continue to grow cotton as before. Winter temperature affects the number of weevils that survive, and summer temperature and rainfall affect their reproduction. In some years severe winters have completely destroyed them over considerable areas along the northern border (fig. 50). In Texas the low rainfall during spring and summer, together with the high temperature especially in the western part of the State, prevents the weevil from doing great injury to the crop, and consequently that State has maintained its normal production of cotton.

Progress in Methods of Culture.—The principal forms of technical progress in cotton production have been in the improvement of varieties, the use of improved machinery for planting and cultivating the crop, and a more general application of methods of maintaining and increasing the fertility of the land. Interest in improving the grades of cotton has become widespread in the South and has resulted in increasing the quantity of long-staple cotton produced. Where extra labor for picking cotton may be employed machinery for planting and cultivating a large acreage per man has become quite generally used. However, since cotton must be picked by hand the labor of picking remains the limiting factor, and there is little need for economizing the labor of planting or cultivating beyond what may be necessary to produce what may be picked. In the East great progress has been made in maintaining and increasing the fertility of the cotton lands. The fields subject to erosion have been terraced, lowlands have been drained, and large quantities of fertilizers have been annually distributed on the lands under cultivation.

Fertilizers.—About 1880 it was discovered that certain light sandy soils in the eastern Cotton Belt States, which were ordinarily not planted in cotton because of their low productivity, could, by the addition of small amounts of commercial fertilizers, be made productive (figs. 60–64). It was also discovered that the use of certain fertilizers caused earlier maturity, and thus enabled cotton to be extensively grown farther north than was possible without them. Consequently, the result of using fertilizers in the Eastern States was not only to increase the yields of the land ordinarily planted in cotton, but to extend the area (figs. 72, 77). Through the use of fertilizers the production of cotton has been greatly increased in a tier of counties to the north of the Cotton Belt in the Carolinas and Georgia and in several counties to the southeast in the Carolinas, Georgia, and Alabama. According to the census returns the farmers of the cotton-growing States expended for fertilizers 13 millions of dollars in 1879, 20 millions in 1889, 25 millions in 1899, and 69 millions in 1909. More than three-fourths of the large expenditure in 1909 was in the four States—North Carolina, South Carolina, Georgia, and Alabama (see fig. 48). The great increase in expenditures between 1889 and 1909 had a marked effect upon the production of these States (figs. 76 and 77).

Cotton Production in California and Arizona.—The expansion of the Cotton Belt has approximately reached its climatic limits, and future increases in acreage must be mainly by a more complete utilization of the land within these limits. There is, however, in the southwestern part of the United States a large area suitable to cotton production

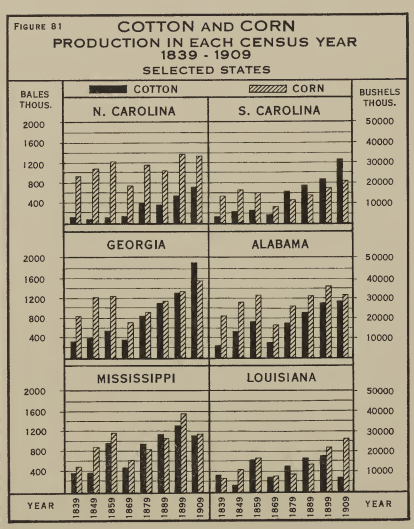


Figure 81.—In all States, except Louisiana and Mississippi in the last two census years, there was greater specialization in cotton production after the Civil War than before (see also fig. 44). In Louisiana and Mississippi there was a high degree of specialization in the beginning, which increased after the war until the boll weevil began to destroy much of the cotton of these States.

when irrigated. Cotton growing under irrigation in southern California and Arizona was begun in 1909, when 350 bales were grown on 450 acres. In 1916 the production of this region had increased to 43,000 bales. In 1912 the Department of Agriculture, after having experimented for several years with Egyptian cotton in the Southwest, distributed some of the seed to a number of farmers in the Salt River Valley of Arizona. As a result of this distribution 375 bales were produced in 1912, and by 1916 the area planted in the Salt River Valley amounted to 9,000 acres.

Cotton Seed.—The utilization of the cotton seed has become an important economic factor in the production of cotton (see Table VI). At first planters commonly considered all of the seed waste material, except that used for planting, but as soon as they began to give some attention to maintaining the fertility of their soils they found the seed valuable fertilizing material. Before the Civil War experiments were being made in feeding the seed to live stock and crushing it for oil. In 1859 there were seven establishments in the United States engaged in the manufacture of cottonseed products. After the Civil War there was a great demand for fertilizers in the eastern States of the Cotton Belt, and the cotton seed was almost universally used for this purpose. In 1875 refined cottonseed oil was put on the New Orleans market, and since then the cottonseed oil industry has developed with remarkable rapidity. In 1879 there were 45 mills in operation, and in 1909 the number had increased to 817.

Increased demand for the various products of the crushed seed has greatly increased the value of the seed. The whole seed is rarely used as fertilizer now, but some of the products of the crushed seed are used as fertilizers or in the manufacture of fertilizers. In 1915 cottonseed meal constituted 15.7 per cent (by weight) of all the fertilizers sold in the South. In 1915 oil mills paid farmers an average of $33.60 per ton for the seed. At this price the seed from a 500-pound bale of cotton adds $16.80 to its value, which equals an advance of 3.3 cents on the value of a pound of lint over its value when the seed was only waste material.

Foreign Competition.—With the fall in prices following the resumption of production in the United States after the Civil War all countries except Egypt declined to their positions before the war. The prices steadily rising after 1898 again stirred the European manufacturers to action to increase the supply of raw cotton elsewhere. The British Cotton Growing Association was formed in 1902 with the object of establishing and extending the growth of cotton in the British Empire and to relieve as far as possible the "dangerous condition" of the Lancashire cotton industry, owing to the fact that it was dependent upon the United States for the bulk of its supplies of raw material. This association has done much work in India, the West Indies, West Africa, Uganda, Nyasaland, and the Anglo-Egyptian Sudan, and, aided by the higher prices of cotton, has markedly influenced the cotton production of these countries in recent years. The United States, however, maintains the position of the leading cotton-producing country in the world, and the great cotton-manufacturing establishments of Europe are dependent upon this country for most of their raw cotton.

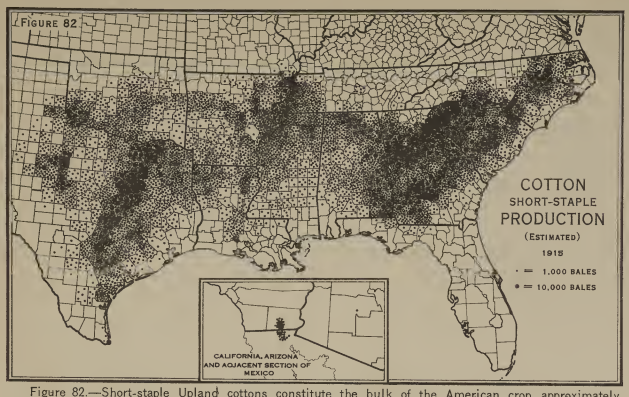


Figure 82.—Short-staple Upland cottons constitute the bulk of the American crop, approximately 92 per cent in 1915, and are grown throughout the inland districts of the cotton-growing States. The fiber of these cottons averages $\frac{7}{8}$ to $1\frac{1}{16}$ inches in length.

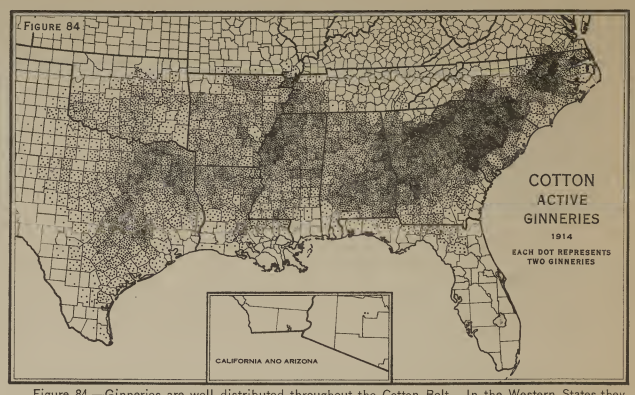


Figure 84.—Ginneries are well distributed throughout the Cotton Belt. In the Western States they are larger and relatively less numerous than in the Eastern States. In 1914 ginneries in Texas averaged 1,007 bales, while those in Georgia averaged 705, and in South Carolina only 490 bales.

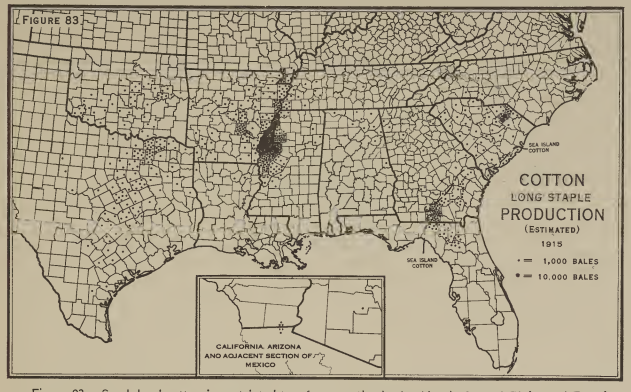


Figure 83.—Sea Island cotton is restricted to a few counties in the Alantic Coastal Plain, and Egyptian cotton to the Salt River Valley of Arizona. Long-staple Upland cotton is grown in many sections of the South, but the densest production is in the Yazoo-Mississippi Delta and in Darlington County, S. C.

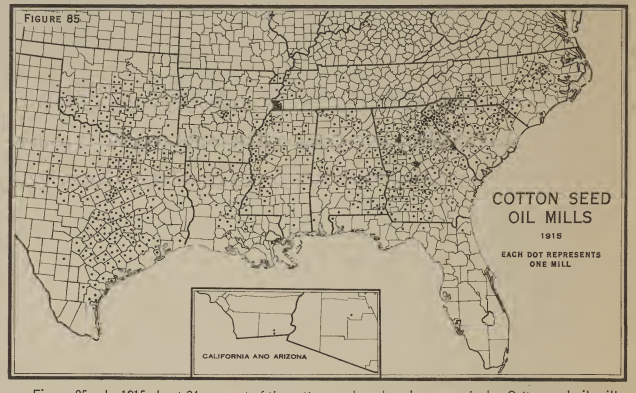


Figure 85.—In 1915 about 84 per cent of the cotton seed produced was crushed. Cottonseed-oil mills are located in all the important centers and in many of the small towns of the South. Memphis is the most important cottonseed-crushing center in the South.

MARKETING AND DISTRIBUTION.[a]

The entire cotton crop is produced for market. The course of the cotton from producer to consumer depends on the point of origin, the location of the mills for which it is destined, the means of transportation, and methods of trading. The price that the producer receives depends not only upon the supply and demand at the consuming points, but also upon the cost of handling in the course of the movement from producer to consumer and the ability of the producer to take advantage of the most economical methods in marketing his crop. All cotton must be ginned and in most parts of the Cotton Belt the producer gins before he sells. The producer who receives his baled cotton at the ginnery may sell at once or hold it until some future date. He may sell directly to a mill buyer, or to some one of the numerous classes of dealers in cotton. In any case facilities for storage and standards for grading are essential parts of the machinery for marketing. Much of the cotton grown in the South Atlantic States is consumed in local mills; but this is only about one-fourth of the total crop of the South, the remainder of which must be transported long distances. A system of organized markets and extensive transportation facilities therefore is a necessary part of the machinery for marketing the great cotton crop of the South.

SHORT-STAPLE AND LONG-STAPLE COTTONS.

The length and character of the fiber, or staple, are the most important characteristics governing the valuation of cotton. Staples differing in length and character are produced in different parts of the South and require different methods in handling and marketing. For convenience all cotton may be divided into two classes—short staple, that of $1\frac{1}{16}$ inches and under, and long staple, over $1\frac{1}{8}$ inches in length. The length and strength of fiber in any locality depends on the variety planted, soil, climatic conditions, and cultural methods.

Short Staple.—The great bulk of the American crop is short staple, estimated by the Bureau of Crop Estimates in 1915 to be 91.6 per cent of the total crop. The short-staple cotton is grown throughout the inland districts of the cotton-growing States (fig. 82). The staple of this cotton varies from seven-eighths to one and one-sixteenth inches in length. In parts of the Piedmont region and on the best upland soils the length is often more than an inch, while on the sandy lands and on other poor soils it may be less than seven-eighths of an inch. In the rich river bottoms and on the black prairie lands of Texas cotton with a strong staple, usually $1\frac{1}{16}$ inches in length, is grown, but its character varies considerably from year to year, the fiber being harsher and shorter when the growing season is dry. The short-staple varieties are more commonly grown on upland soils, largely because they usually yield more cotton per acre on such soils and require less care in handling than do long-staple varieties.

Long Staple.—The long-staple crop of 1915 amounted to 918,000 bales, of which approximately 825,000 bales were of long-staple Upland, 1,000 bales of Arizona-Egyptian, and 92,000 bales of Sea Island cotton (fig. 83). The Upland varieties, with a fiber $1\frac{1}{16}$ to $1\frac{1}{2}$ inches in length, are grown in many parts of the South, the production of many sections being recognized by characteristic differences in quality and strength of staple. In Arkansas and, to some extent, in Mississippi and Tennessee a good character of strong, heavy-bodied staple, $1\frac{1}{16}$ to $1\frac{3}{16}$ inches in length, known as "Benders," is grown. A large part of the long-staple Upland crop is grown in the Yazoo-Mississippi delta, which produces a staple about $1\frac{1}{4}$ inches in length, sometimes designated "extra staples." In Darlington County, S. C., an important small center of long-staple production has recently developed. A good quality of $1\frac{1}{16}$ to $1\frac{1}{4}$ inch staple is also produced in the Imperial Valley of California.

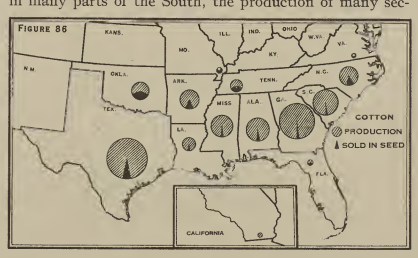


Figure 86.—Through the center of the Cotton Belt nearly all of the cotton is ginned before marketed by the producers, whereas on the borders of the Cotton Belt much is sold in the seed.

Sea Island has always been a distinct type of American cotton, noted for its length of staple, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches, and its strong, very fine, and silky fiber. The Sea Island cotton of South Carolina has the longest and finest staple, while that grown in Georgia and Florida is but little longer than the best long-staple Upland, though it is of a finer and more silky staple. In length, the staple of Arizona-Egyptian cotton is between that of the long-staple Upland and the Sea Island cotton, being $1\frac{1}{2}$ to $1\frac{3}{4}$ inches, and the fiber is very strong and fine.

GINNING.

Ginning is the first step in marketing the cotton crop. The producer hauls his cotton to a ginnery. If he does not own the ginnery, he usually pays for the ginning and receives the cotton in the bale from the ginner. The quality of ginning is an important factor in determining the value of the cotton and consequently the condition of the cotton for ginning, the type of gin, and care in ginning are important considerations.

All cotton should be dry before ginning and the gin should separate all the seed from the lint without cutting or crushing the seed, or cutting the lint. There are two radically different kinds of gins, the saw-gin for the Upland long- and short-staple cotton and the roller gin for the Arizona-Egyptian and Sea Island cotton. The saw gin cuts the fibers of the Egyptian and Sea Island cotton, but may be used on the Upland long staples without injury, provided the speed of the saw is not too great, provided also that the seed cotton does not contain excessive moisture and that it is not fed too fast. The roller gin can not be operated as cheaply or as rapidly as the saw gin, hence it is in use only for ginning the Arizona-Egyptian and Sea Island varieties of cotton.

As the lint comes from the gin it is put up in packages of different sizes and shapes. Upland cottons and also Arizona-Egyptian usually are pressed into a gin-box 54 inches long and 27 inches wide, to a depth of about 45 inches. This produces the standard flat bale which weighs about 500 pounds. It is covered on two sides and on the ends with bagging and is tied with iron bands. In the western States of the Cotton Belt there are some gin presses which make a round compressed bale 35 inches long and about 22 inches in diameter, weighing about 250 pounds. This bale is completely covered with bagging. The Sea Island cotton of South Carolina is put up in bags $7\frac{1}{2}$ feet long and $2\frac{1}{2}$ feet in diameter, weighing approximately 350 pounds, while that of Georgia and Florida is put up in bales 54 by 26 inches, weighing about 400 pounds.

All of these bales except the round bale are of comparatively low density. For long-distance shipments it is desirable to reduce the space occupied by each bale as much as possible. Spinners object to high compression of Sea Island cotton, but the standard bale of Upland cotton may be compressed to a high density without injuring the fiber. There are some gin-compresses, but most of the compressing is done at points of concentration (fig. 88).

[a] D. E. Earle, specialist in cotton classing; R. A. Freret, assistant in cotton marketing; and A. M. Agelasto, specialist in cotton classing, assisted in the preparation of this section.

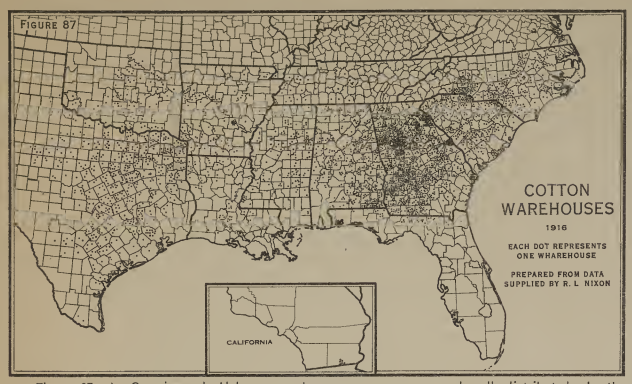


Figure 87.—In Georgia and Alabama warehouses are numerous and well distributed. In the Carolinas, where much of the cotton goes to mills for storage, and in the Western States where much is exported soon after ginning, warehouses are less numerous and generally located at concentration points or large markets.

Figure 88.—Compresses are located at large markets and points at which cotton is collected from the smaller markets to be shipped long distances. In the West, where most of the cotton is exported or shipped to New England, they are numerous; while in the East, where much cotton is consumed in the local mills, they are few.

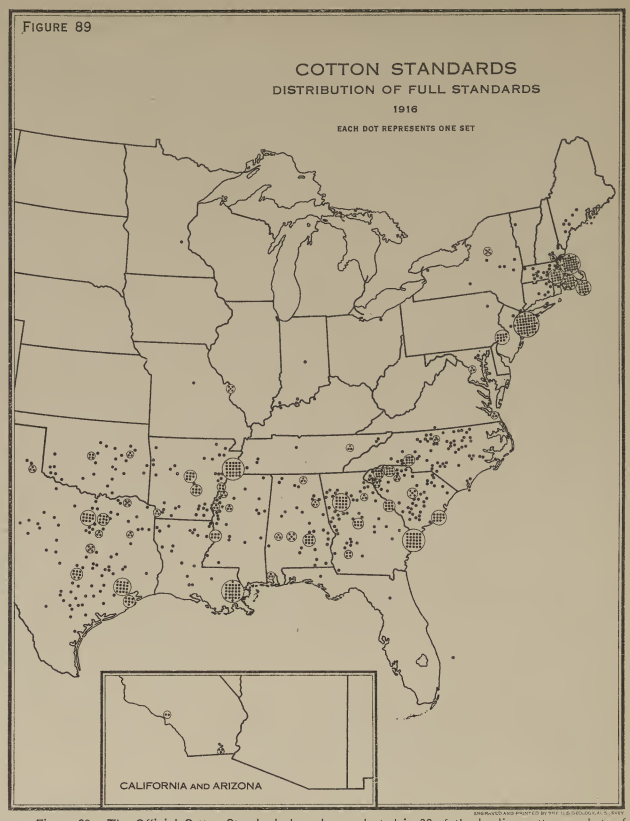


Figure 89.—The Official Cotton Standards have been adopted in 30 of the leading cotton markets of the United States, and sets have been bought by many dealers in markets which have not adopted the standards. Up to and including December 7, 1916, 850 full sets (809 white and 41 colored) and 103 fractional sets had been distributed to the cotton trade.

Ginneries are established at shipping points in every locality where the production of cotton is large enough to support one, the number of gins varying with the quantity of cotton to be ginned and the capacity of the gins (fig. 84). There are ginneries on plantations in the East, but as a rule they are small and relatively not very numerous. During the season of 1914–15 there were in actual operation 24,547 ginneries, which ginned on an average 648 bales each.

Selling Cotton in the Seed.—In some sections of the Cotton Belt farmers sell much of their cotton before it is ginned (fig. 86). The amount sold in the seed, though important in some States, is not a large proportion of the whole—estimated to be 8.5 per cent of the total crop in 1915. The practice is most prevalent in those sections recently developed or where cotton is not extensively grown. The ginner buys the seed cotton as it is brought to him and gins only when enough has accumulated for a run. In settling with the producer the average out-turn of the community usually is taken as a basis. Cotton on the average thirds itself, 1,500 pounds in the seed ginning a bale of 500 pounds, but the proportion of seed to lint varies greatly in different soil regions, with different varieties, and between different loads. The application of averages often results in not giving the farmer who has superior cotton the price he deserves. Through the center of the Cotton Belt, where the farmers produce large quantities of cotton and the gins run regularly, little is sold in the seed.

Custom Ginning.—As a rule the cotton is ginned for the producer. In the West he usually hauls it from the field to the gin, while in the East he frequently stores it on the farm as it is picked until a bale or more is accumulated and than hauls it to the gin. Each wagon-load is ginned separately. The seed passes from the gin through a conveyor into the seed box, from which it is delivered to the producer, or into a storage room when purchased by the ginner. The farmer pays a toll varying in different sections and with different conditions. The charge for ginning and baling a 500-pound bale of Upland cotton ranges from $1.50 to $4.75. It costs much more to gin the long-staple cotton with the roller gin. The present price for ginning Arizona-Egyptian cotton is $14 per bale, which includes ginning, bagging, ties, and baling. The farmer receives the baled lint and the seed, if he wishes, and both are then ready for market.

THE COTTON SEED.

As indicated above, about two-thirds of the weight of cotton hauled to the gin is seed. Some seed must be returned to the farm for planting the next crop, but the most of it is usually sold to the ginner or some agent of an oil mill. The seed is a valuable part of the cotton crop and is becoming still more valuable as the demand for its products increases.

Oil Mills.—In 1915 there were 844 seed-crushing oil mills well distributed throughout the Cotton Belt (fig. 85). The seed being bulky the cost of transportation makes long distance shipments unprofitable, consequently mills have been located generally in producing regions at points to which the seed can be conveniently collected from the ginneries.

About 84 per cent of all the seed of the 1915 crop was crushed. The four primary products from crushing cotton seed are linters, hulls, cake, and oil. The process of crushing, briefly described, is as follows: The seed having been separated from the trash and dirt is passed through a de-

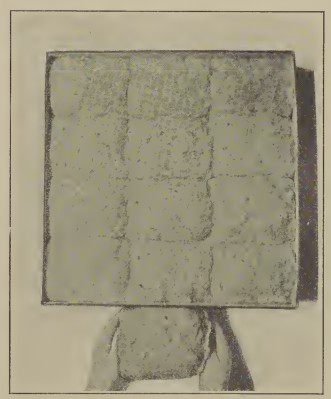


Figure 90.—Grading by standards. A full set of white standards consists of 9 boxes, each containing 12 samples of the same grade of cotton. The 12 samples indicate the range of diversity allowed within the grade.

linting machine which removes the short lint, known as "linters;" it is then passed through a machine that separates the hulls from the kernels, except in the "cold-press" mills in which the seed is ground without the hulls being removed; and, finally, the oil is expressed from the kernels, leaving a residue which is called "oil cake." The development of the cottonseed products industry since 1874 is shown in Table VI, page 21.

WAREHOUSING.

The warehousing of cotton after picking and ginning is a very important economic consideration. Leaving the baled cotton exposed to the weather results annually in a large economic loss from the rotting of the fiber—known as "country damage." The cotton warehouse is a place of shelter and protection from fire and theft, a place for classing and assembling in even-running lots for the market and, finally, it may be a place of deposit under conditions which enable the owner of the cotton to secure money advances upon it until such time as he chooses to sell. Receipts of responsible warehouses are considered the best kind of security in borrowing money. The Federal Warehouse Act of August, 1916, will facilitate the use of warehouse receipts by producers in financing the harvesting of crops and in holding their cotton for favorable market conditions. The receipts of the warehouses holding a Federal license will be recognized as good security by any bank which is a member of the Federal Reserve banking system.

Warehouses.—Warehouses for storing cotton have been built at many local markets, as well as at the larger concentration points throughout the South (fig. 87). In Arkansas, Oklahoma, and Texas, where much of the cotton is customarily marketed as soon as it is ginned, and is shipped directly to the mills or exported, there are few warehouses, except at concentration points where cotton is held by merchants. The same is true of Tennessee, Mississippi, and Louisiana. In the Eastern States warehouses are usually accessible to farmers.

NUMBER, CHARACTER, AND CAPACITY OF WAREHOUSES.

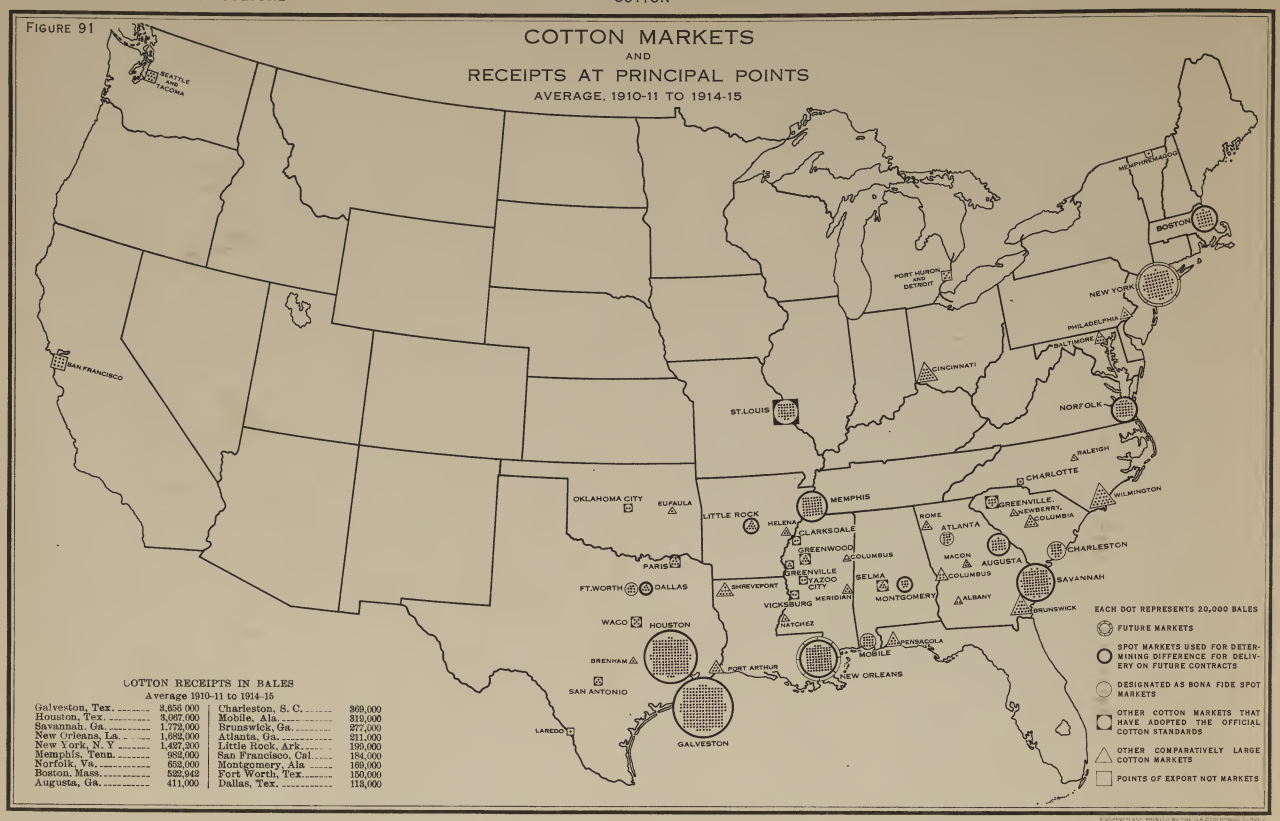
[Data furnished by R. L. Nixon, Assistant in Warehouse Investigations.]

Name of State.	Number classified as to control.				Storage capacity.	
	Total.	Public warehouses.	Private warehouses.	Unclassified.	Number of warehouses reporting	Average storage capacity bales.
Georgia	1,081	555	48	478	559	2,296
Texas	546	369	14	163	372	1,916
Alabama	393	216	30	147	223	1,921
South Carolina	264	199	23	42	166	2,386
North Carolina	240	139	15	86	96	1,719
Mississippi	118	71	5	42	72	2,876
Arkansas	96	70	4	22	73	1,923
Oklahoma	87	61	2	24	61	1,715
Louisiana	72	31	3	38	32	5,146
Florida	35	12	1	22	12	1,737
Tennessee	35	22	.....	13	20	1,490
Virginia	9	4	.....	5	3	13,333
Missouri	5	1	2	2	3	1,333

GRADING COTTON.

The value of cotton to the consumer is measured not only by the length and strength of the staple but also by the color and amount of foreign material that it contains. Cotton varies somewhat in color, depending upon the soil and climatic conditions under which the crop is grown. The lint becomes stained by coloring matter from newly opened bolls, leaves, long exposure to weather, or as a result of the action of frost upon the bolls before opening.

FIGURE 91



COTTON RECEIPTS IN BALES
Average 1910-11 to 1914-15

Galveston, Tex.	3,656,000	Charleston, S. C.	369,000
Houston, Tex.	3,067,000	Mobile, Ala.	319,000
Savannah, Ga.	1,772,000	Brunswick, Ga.	277,000
New Orleans, La.	1,692,000	Atlanta, Ga.	211,000
New York, N. Y.	1,427,200	Little Rock, Ark.	199,000
Memphis, Tenn.	982,000	San Francisco, Cal.	184,000
Norfolk, Va.	652,000	Montgomery, Ala.	169,000
Boston, Mass.	532,942	Fort Worth, Tex.	150,000
Augusta, Ga.	411,000	Dallas, Tex.	118,000

Figure 91.—All points of export on the Gulf and Atlantic coasts are also cotton markets. North of Norfolk the markets receive some cotton overland and some by water from the southern ports. Cotton markets are "spot" markets to the extent that they deal in "actual cotton" on hand. New York and New Orleans are also "future" markets, New York dealing principally in "futures." Fifteen of the spot markets have been designated by the Department of Agriculture as bona fide spot markets, of which 11 have been selected for determining the difference in value between middling and other grades, the average difference being taken as a basis for the settlement of future contracts on the New York future market. The dots in the figures represent at Boston and New York gross receipts overland and by sea, at points of export not markets and at Baltimore and Philadelphia exports only, at other points total receipts.

Frost on an immature boll stains the lint, the discoloration varying with the degree of immaturity of the boll, and with climatic conditions. In picking and handling the cotton, broken leaves, stems, and other foreign substances become mixed with the fiber, reducing the value of the cotton in proportion to the quantity of such foreign material.

Standards for Grading.—As there was great confusion in the system of marketing cotton, owing to the fact that different markets had different standards and the producers and even some buyers in the primary markets knew little or nothing about the grading of cotton, the United States Department of Agriculture undertook to standardize cotton grades. In December, 1914, after much preliminary study, the Department of Agriculture established and promulgated standards for short-staple Upland cotton which, while not compulsory, were readily adopted by a large portion of the cotton trade (see fig. 90). These standards were officially adopted by exchanges in 30 of the leading cotton markets, while sets of standards have been bought by cotton dealers in many other markets (fig. 89).

Bolly Cotton.—During each season more or less cotton is damaged by frost, the bolls not opening fully. These bolls are gathered and put through machinery which separates the seed cotton from the burrs, after which the cotton is handled similarly to that picked by hand. The grade, staple, and quality of bolly cotton vary greatly, depending on the degree of maturity and the length of time that the bolls are exposed to the weather before they are gathered. The staple of bolly cotton is usually light, fluffy, and soft, and naturally immature, inasmuch as the growth of the boll is stopped by frost before it has had sufficient time to reach its full development.

Long Staple Cottons.—There are no official standards for grading Sea Island and other long staple cottons. They are classed commercially by the place of growth qualified by terms denoting grades of quality.

COTTON MARKETS.

The annual cotton crop is moved through a well-organized system of markets. A cotton market may be defined as a place where a number of men meet to buy and sell cotton. The system begins with the village or town where dealer meets producer and ends with the point where dealer delivers to spinner. The trading may be in actual cotton or only in contracts for future delivery. The term "spot cotton" is used to designate actual cotton on the market, and a "spot market" is one dealing in spot cotton. In the future market trading is in contracts to deliver at some future date and many of the dealers never receive cotton, disposing of the contracts for it before the time for delivery.[1]

Spot Markets (fig. 91).—The spot markets are classified according to their location and their functions in cotton trading as follows:

Primary markets: Villages and towns where baled cotton is first put on the market and sold by the producer are known as primary markets. Cotton buyers go into almost every village and town where a ginnery is to be found.

Interior markets: Large towns and cities where cotton from primary markets is received and sold by merchants or primary buyers are generally known as interior markets. Such markets are usually the points of concentration for grading, compressing, assembling in commercial lots, and consigning to destination for consumption.

FIGURE 92

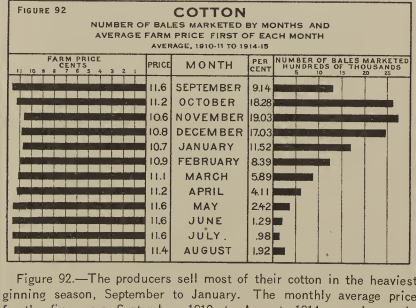


Figure 92.—The producers sell most of their cotton in the heaviest ginning season, September to January. The monthly average price for the five years, September, 1910, to August, 1914, was lowest in November and highest in May, June, and July.

Export markets: The cities along the Atlantic and Gulf coasts where cotton is sold and from which it is exported are called export markets.

Consuming markets: Cities or towns in which cotton is purchased for manufacturing are called consuming markets. Boston, New York, and Philadelphia are both export and important consuming markets. The consuming markets for about half of the American cotton are in foreign countries.

[1] A future contract sold upon a future exchange must specify the quantity of cotton, the month of delivery, and the price. The unit of trading, or "one contract," is one hundred bales of approximately 500 pounds each, and is generally referred to in terms of the month in which the cotton is to be delivered. For example, "one May" is understood to mean one hundred bales of cotton to be delivered during the month of May. When the grade is not specified it is understood to be middling, although other grades within certain limits may be delivered on the contract.

For the purpose of the administration of the Cotton Futures Act, enacted in 1914 and reenacted in 1916, fifteen markets having cotton transactions in such volume and under such conditions as accurately to reflect the value of middling and other grades of cotton have been designated by the Secretary of Agriculture as bona fide spot markets (fig. 91). Eleven of these bona fide markets have been selected as the markets to be used in determining the relative value with respect to middling of the different grades of cotton delivered against future contracts upon markets which are not bona fide spot markets.

Future markets (fig. 91).—There are two future cotton exchanges in the United States—New Orleans and New York. The importance of these markets is not indicated by their receipts or exports of cotton, as much of the cotton dealt in never reaches these points. New Orleans is both a spot market and a future market, while New York is primarily a future market. Liverpool is an important foreign future market dealing extensively in American cotton. There are future exchanges also at Bremen and Havre which deal in American cotton.

MARKETING AND PRICES.

All of the markets are closely connected through the operations of dealers, and the future exchanges stand at the apex of the system determining prices in all the other markets. When the harvest season begins contracts covering a large part of the cotton crop have already been made and are being dealt in daily upon the future exchanges. While dealing in futures is to some extent speculation, under normal conditions it is also a means of insurance against loss and a means of stabilizing prices. The spinner who has made a contract to deliver cotton goods sometime in the future, orders cotton from a responsible dealer who "hedges" against a rise in the price of cotton, generally by buying a contract for it upon a future exchange. On the other hand, the dealer who is buying or expects to buy cotton at the primary markets may "hedge" against a fall in prices by selling a contract to deliver cotton at some future date at a price sufficient to insure him against loss or even to make a profit. Dealers on the future cotton exchanges daily keep watch on the demand for cotton in all the important consuming markets, and upon the conditions as to production and movement of cotton, for the purpose of forecasting prices as far ahead as possible. Their forecasts guide them in their activities in buying and selling contracts for future delivery, and the quotations of sales as they are made are followed closely by dealers in actual cotton at all the markets.

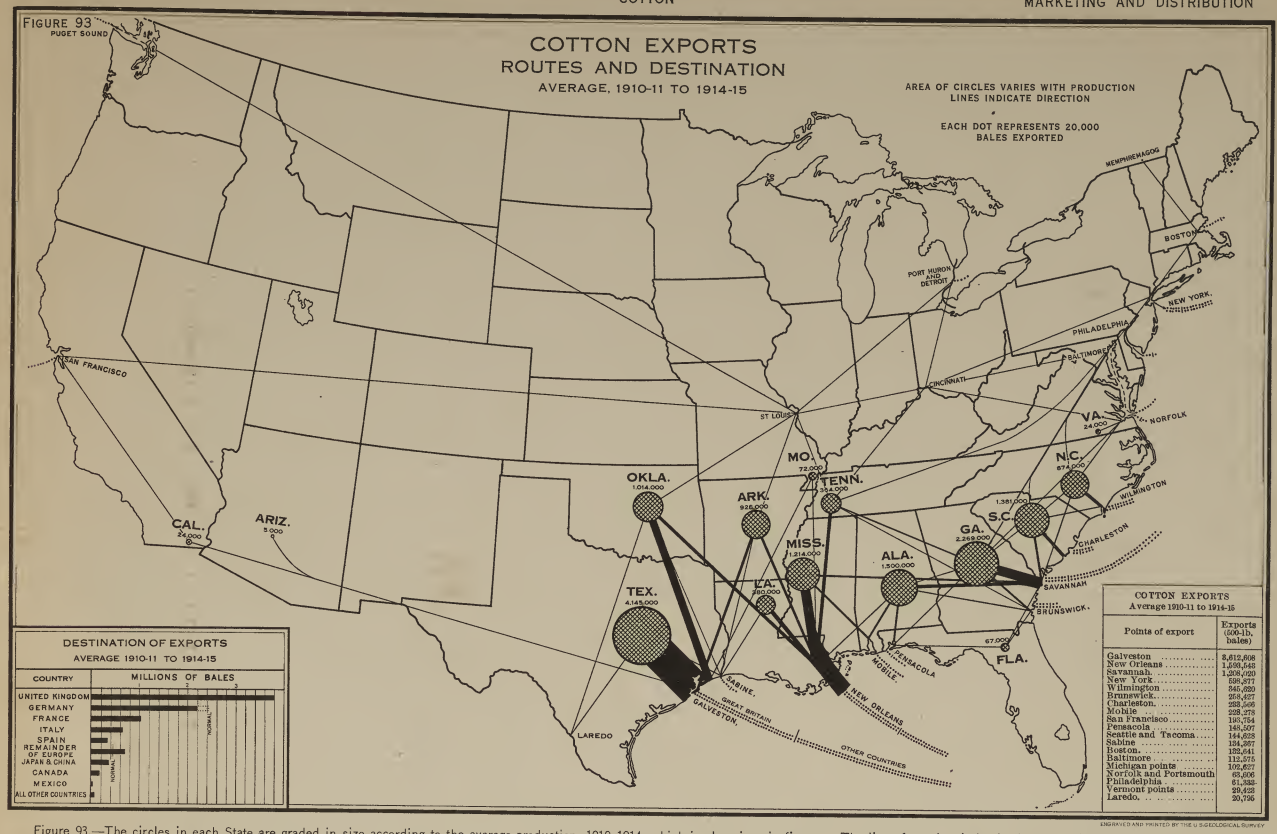


Figure 93.—The circles in each State are graded in size according to the average production, 1910–1914, which is also given in figures. The lines from the circles lead to the points of export through which the bulk of the cotton destined for foreign countries moves. The breadth of the lines varies with the volume of the movement, excepting that no attempt is made to represent the volume of overland movements to northern points. Dots show the average amount of cotton exported from the different points. Some of the cotton exported from the North Atlantic ports reaches those ports by sea and some overland. Galveston is the leading export point and is followed in order by New Orleans, Savannah, and New York. The United Kingdom receives two-fifths of all the exports, the Continent of Europe taking most of the remainder of the exports. Japan, China, Mexico, and Canada also receive some cotton from the United States.

Marketing cotton.—Buyers become active in the primary markets as soon as ginning begins. Much of the cotton is grown under mortgage and is sold promptly in order to meet pressing financial obligations. Where only small quantities are grown, it is usually sold to the ginner or local merchant in the nearest town or village. Through the center of the Cotton Belt the tenants on plantations, usually having pledged their crops in advance, sell at once to the owners of the plantations or to merchants, factors, or buyers representing large dealers. With many producers, however, the time of selling is a matter of choice.

When cotton is bought in greater quantities than can be moved or consumed at once, the purchaser must bear the expense of storage and risk of loss, and he, therefore, pays the producer a lower price for it (figs. 92, 94). On the other hand, the producer who can hold his crop must consider the expenses of storage, insurance, and interest on money involved in estimating the profitableness of holding. It may be that in some cases the buyer can hold at less expense than the farmer and can afford to pay such a price that the farmer would lose by holding. Many successful farmers follow the fixed policy of selling promptly at least half of their crop and holding the remainder as conditions and circumstances seem to warrant. The cotton sold under stress and of choice soon after ginning is a large percentage of the total crop (fig. 92).

It requires some time to assemble the cotton at the large primary and interior markets, and to ship it to points of export or consumption. Dealers move some of it as rapidly as possible, but hold some in storage at primary markets through a part of the year and some at the larger interior markets and concentration points (fig. 97). Dealers deliver to spinners throughout the year almost as regularly as the mills consume it, and spinners as a rule do not carry a very large supply of cotton on hand. The operations of the future exchanges enable dealers through hedging to buy and hold the cotton many months or to ship it a long distance without undue hazard from changes in prices.

Prices.—The basis for price quotations upon all the markets is the quotations for middling upon the future exchanges. The relation of the price that the producer receives for his particular cotton to the market quotations depends upon the location of his market with respect to other markets, the grading of his cotton, and his bargaining with the dealer. At each primary market a deduction from the price quotations must be made to cover expenses of handling and transportation. In the small primary markets where grades are often not well recognized classifications may not be carefully made, and producers for the most part rely upon the buyers to grade the cotton and make the best bargain with them that they can. If there are many buyers on the market the grading may be fairly close and the prices paid close to the limit that will allow a reasonable profit to the buyer.

Prices in the larger primary and interior markets are determined as in the smaller primary markets. However, grading has become standardized in these markets, and at each market the grades above and below middling are settled for according to the differences prevailing in that market. An approximate average of the differences "on"

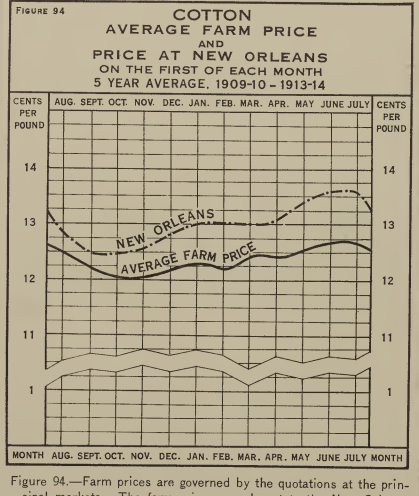


Figure 94.—Farm prices are governed by the quotations at the principal markets. The farm prices are closest to the New Orleans prices from August to December, in the period of heaviest ginning.

and "off" middling in the eleven designated spot markets covering the period August 1, 1915, to July 31, 1916, is given below.

Grades.	White.	Yellow tinged.	Yellow stained.	Blue stained.
	Cents.	*Cents.*	*Cents.*	*Cents.*
Middling Fair	1 on			
Strict Good Middling	¼ on	¼ on		
Good Middling	⅛ on	Even.	⅛ off	⅛ off
Strict Middling	¼ on	⅛ off	¾ off	⅛ off
Middling		⅛ off	1 off	1⅛ off
Strict Low Middling	⅜ off	1 off		
Low Middling	⅞ off	1¼ off		
Strict Good Ordinary	1⅜ off			
Good Ordinary	2 off			

Prices vary with length of staple more than with grade and quality. The following statement of averages approximates the premiums paid for strict middling delta cotton over strict middling short cotton during the years 1913–16.

Length of staple, inches	1⅛	1 1/16	1¼	1 3/16	1⅜	1 5/16	1½
Premium, cents	1⅛	2¾	4	5¼	6¾	7⅝	9

These differences in price between middling and the other grades and the premiums for the longer staples vary from time to time because of special demands or the effects of the season upon the supply of the different grades and lengths of staple.

The price paid for middling cotton delivered in fulfillment of a future contract is the contract price. When grades other than middling are delivered the receiver pays for these grades so much above or below the contract price as the rule of the market determines. Under the United States Cotton Futures Act the eleven bona fide spot markets chosen for this purpose report daily to the future exchanges in the United States and to the Secretary of Agriculture the ruling prices for middling and grades "on" and "off" middling. New Orleans being a bona fide spot market, the differences in price of grades of spot cotton in that market are used in determining the prices of grades other than middling when they are delivered on a future contract; whereas the New York future exchange uses the average differences "on" and "off" middling as reported by the eleven bona fide spot markets.

There are no regular market quotations for the best grades of Sea Island, as most of it is sold in crop lots, spinners buying outright from the producers or local dealers. Bollies and linters also constitute classes of cotton fiber for which there are no regular market quotations.

TRANSPORTATION.

At primary markets buyers accept any and all grades of cotton offered by the growers, and sample, classify, and assemble in lots for shipment. If the cotton is destined for a mill within a comparatively short distance, it is usually shipped uncompressed in carload lots. If, on the other hand, it is destined for consumption at distant mills, or for export, it is compressed so as to save space and freight charges in transportation. The standard 500-pound bale as it comes from the gin has a density of only 12 to 15 pounds per cubic foot, and from 30 to 35 bales fill a 36-foot box car. When this is compressed at the

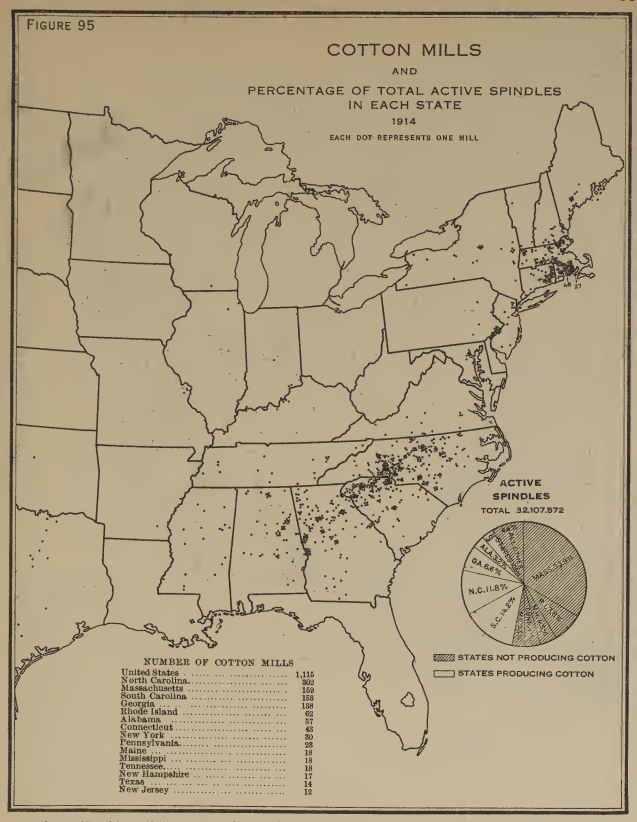


Figure 95.—Most of the cotton mills of the North are located in a few manufacturing towns of New England; in the South most of the mills are along the "Fall Line" and upon the Piedmont Plateau, where water power is available. Massachusetts leads in the number of active cotton spindles, with South Carolina second. Sixty-two per cent of the spindles are in mills outside of the cotton-growing States. There is one mill at Oakland, California, which is not shown on the map.

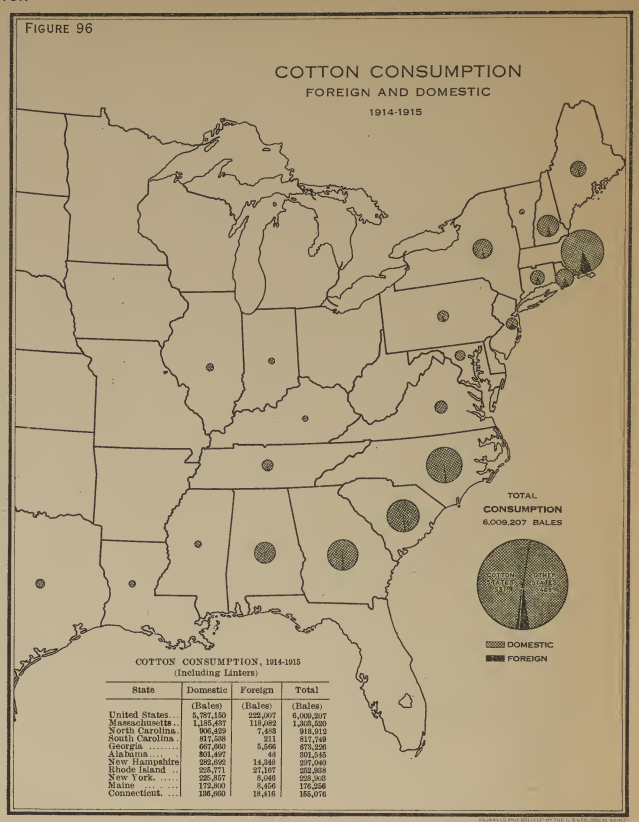


Figure 96.—In 1914–15 the United States consumed about 35 per cent of the 1914 crop. The cotton-producing States consumed more cotton than all the other States. Massachusetts leads the States in the mill consumption of raw cotton and is followed in order by North Carolina, South Carolina, and Georgia. Only 3.6 per cent of the cotton consumed was of foreign origin. Most of the foreign cotton imported was consumed in the mills of New England and of New Jersey.

ordinary railroad compress to a density of 22 to 24 pounds, from 65 to 75 bales may be loaded into a car. The ordinary round gin-compressed bale weighing about 250 pounds has a density of from 32 to 37 pounds per cubic foot and a car will contain about 200 round bales, equivalent to 100 standard bales. There are also gin compresses which produce a square bale having a density of about 35 pounds to the cubic foot. It is obvious that compression results in great economy in transportation. Compression at the gin not only saves car space but also makes it possible to ship through from point of origin to ports without rehandling. Railroads generally quote two rates, one on compressed and one on uncompressed cotton.

Where there are no facilities for compressing the cotton at point of origin, railroads accept it and have it compressed in transit (see distribution of compresses, fig. 88). An agent of the railroad company receives the cotton for shipment, and it is carried to the compress and there unloaded. The cotton is then sampled, weighed, and tagged, and the samples marked for identification and given to the owner or his agent to be used in selling to spinners, exporters, or others. To each bale is added bagging sufficient to cover all the sample holes and to make up the usual tare allowance, and the bale is compressed to about half its original size. The charge for compressing averages about 12 cents per hundred. Additional charges are made for patching. The charges for compressing are added to the freight charges and collected by the railroad company. To secure through shipping rates all cotton is shipped to concentration points with reshipment privileges. When the cotton is to be reshipped the owner surrenders his receipts and it is forwarded to destination on the rate quoted from point of origin. At some of the concentration points and ports, such as Houston, Galveston, New Orleans, Mobile, and Savannah, there are high density compresses which recompress the railroad-compressed bale, increasing the density to about 35 pounds per cubic foot, which results in a still greater saving of car and cargo space.

The following figures indicate the usual distribution of the cotton crop of the South and the direction of movements from the producers to the consumers:

	Bales, average 1910-1915.
Southern spinners from the interior	2,761,000
Southern spinners from ports	105,000
Total	2,866,000
Northern spinners from overland	1,149,000
Northern spinners from ports	1,475,000
Total	2,624,000
Exported	8,797,000

NOTE.—The figure given for northern spinners includes 152,000 bales sent overland to Canada.

EXPORTS.

The average annual exports of cotton for the five years 1910–11 to 1914–15 was 62.8 per cent of the annual production (see fig. 93). Galveston ranked first among the ports, followed by New Orleans, Savannah, and New York. The supremacy of Galveston is due to the fact that it is the nearest port for the cotton of Texas and Oklahoma, which States combined produce about one-third of the total crop, but consume only a few thousand bales annually, whereas in the eastern cotton States there are a great number of

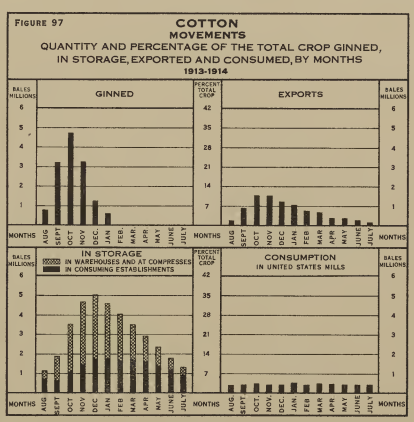


Figure 97.—Ginning begins in July and ends in February or March. October is the busiest month. Averaging 1913-14 and 1914-15, by months, the amount in storage increased from August to December and then gradually declined, not reaching above 36 per cent of the total crop. The heaviest export movements were from September to January, during the heaviest ginning season. Mills consumed regularly, and had on hand at the end of the year only enough cotton to supply them for about two months running.

mills to consume the cotton and more ports to divide the shipments. New Orleans and Savannah handle large exports by reason of their location as ports and their excellent transportation facilities. New York is important, first, because of its financial supremacy; second, because it has long been a center of exchange in the cotton trade; and third, it is a port for all the regular trans-Atlantic steamers, thus enabling shippers to deliver cotton promptly to foreign points.

CONSUMPTION OF COTTON.

The consumption of American cotton in the mills of the United States has increased from a little more than one-third of the crop in 1913 to one-half in 1915. During the season 1914–15 6,009,207 bales were consumed, consisting of 5,295,911 bales of domestic Upland, 79,394 bales of Sea Island, 411,845 bales of linters, and 222,057 bales of foreign cotton. The cotton-growing States consumed 53.1 per cent, and all other States 46.9 per cent of the total (fig. 96). Although the North consumes less cotton it has more spindles than the South (fig. 95). The North spins the finer yarns and consumes more high-grade cotton, taking a large part of the Sea Island crop and of the imports of Egyptian cotton. The manufacturers in the cotton-growing States use very little Sea Island or foreign grown cotton. More than one-half of the Sea Island cotton consumed in the United States is manufactured in Massachusetts and Rhode Island. A very large proportion of the foreign cotton consumed in the United States is Egyptian.

The Sea Island and Egyptian cottons are used in the manufacture of the highest grade cotton goods, which require a long fiber of great strength. Rough Peruvian cotton is imported to some extent for mixing with wool in the making of woolen textiles, while Indian and Chinese cotton is used to a very limited extent for mixing with the American upland cotton in the manufacture of cheaper grades of goods. Linters are used in upholstering and in the manufacture of mattresses, comforts, batting, cushions, wadding and pads; for mixing with shoddy and for making low-grade yarns, wrapping twine, cheap rope, and lamp and candle wicks; for making absorbent cotton, and in the manufacture of guncotton, nitropowders, and writing papers.

Export and Imports of Cotton Goods.—Closely related to the consumption of cotton in the domestic manufacture of cotton goods is the foreign trade in these fabrics. In 1915 the export of cotton goods was valued at $71,685,000 and the imports at $46,205,000; that is, in addition to exporting nearly two-thirds of the raw cotton produced, the United States has a balance of about $25,000,000 worth of cotton goods exported. Cotton goods are exported chiefly to the Orient, the West Indies, the Central American States, Canada, and the United Kingdom. Cotton goods are imported principally from the United Kingdom, Germany, France, Switzerland, and Japan.