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ATLAS
OF
AMERICAN AGRICULTURE

Prepared under the Supervision of O. E. BAKER, Agriculturist

PART V
THE CROPS

SECTION A
COTTON

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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 parentheses. 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, Manchuria, Chinese Turkestan, and Tibet. There is serious exaggeration in area in the northern and southern portions of the world 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. 3, 4, 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 on this map. The boundaries of the Provinces and minor civil divisions follow the sixth 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 is based on a map published in the ninth edition (1913) of Stieler's Atlas of Modern Geography, but the boundaries of the minor civil divisions are taken from later maps. The thin dotted line bounds the areas of arable (irrigated) lands.

Figure E—Identification map of Turkestan and Transcaucasia and of Northern Persia. Adapted from maps in the ninth edition (1915) 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 (1915) 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 1913 edition of Rand McNally & Co. Library Atlas of the World.
COTTON

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 use and commercial values is as follows:

(a) Sea Island cotton (Gossypium barbadense) is a native of tropical America. It has yellow flowers with purple spots, 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 1½ to 2½ inches, is grown farther inland and is known commercially as "Floridas and Georgias." The production of Sea Island in the United States averages about 1,400,000 bales, of which from 150,000 to 350,000 were exported during 1910-1916. 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 statistical information. To identify the countries shown only in outline on this map consult the identification map (fig. A).

(b) Egyptian cotton is similar to Sea Island in the general appearance of the plant and has a fine, silky, strong fiber. The staple is from 1½ to 2½ inches in length and is used in value only to the Sea Island. Egypt furnishes the bulk of the main crop, averaging during 1910-1916 the equivalent of about 1,200,000 bales, of which from 150,000 to 350,000 were exported annually to the United States. About 1,600 bales were grown in 1916 in the Salt River Valley of Arizona, where new varieties have been developed by workers and by utilization of imported Egyptian stocks. (See staple No. 2, fig. 2.)

(c) 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 seed usually well covered with white, brown, or green fuzz in addition to the lint. The staple ranges in length from 1½ to 2½ inches and is second in value to Sea Island. The chief production is grown in the Louisiana-Texas and Mississippi districts, giving place to the American Upland type. The total production was estimated in 1917 at about 4,500,000 bales. (See staple No. 3, fig. 2.)

(d) Upland short-staple cotton (Gossypium barbadense) constitutes about one-third of the entire crop of the United States and nearly to the crops of Egypt and China. It is known commercially as "Middling," the standard short-staple grade, is the basis of price quotations for all short-staple cottons. The staple is in length from 1½ to 1 inch, with a staple variation 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, character of opening, staple length, and strength. Of these, two are the most important: the "Empire" and the "Robertson," the latter being cultivated chiefly in the West Indies and in Panama. (See staple No. 4, fig. 2.)

(e) Asiatic cottons include Gossypium herbaceum and several related botanical species, cottonwood, myrobalan, and woronina. The staple is short, often only three-eighths to three-fourths of an inch, but strong and rather uniform in character. It is grown chiefly in the countries lying between 30° and 45° north latitude, with the chief districts giving place to the American Upland type. The total volume of the crop is large but uncertain, most of it being applied to domestic or local uses. (See staple No. 5, fig. 2.)
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 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 in the preparation of explosives and other industrial products. A considerable quantity of short staple and linters is used in the preparation of explosives and other industrial products. Long-staple cotton is used extensively in the manufacture of clothing and household fabrics, and has many industrial uses.

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

1. Southern Madras: In this region, around Tirunelveli and Madras, the highest grade of Indian cotton is grown. The annual rainfall is about 19 inches, but it is nearly all received during four months. Irrigation is resorted to in some years for the native Tirunelveli cotton, which is grown on unirrigated land. Both "Regur" and red soils occur. The cotton is grown in drills and on unirrigated land with millet and raha, a kind of pea. Both "Regur" and red soils occur. The cotton is grown in drills and on unirrigated land with millet and raha, a kind of pea.

2. Northern Madras, southern Hyderabad, and southeastern Bombay: The cotton is mostly grown in the alluvium of the Indo-Gangetic Plain and of the upper Ganges, and on unirrigated land with millet and raha, a kind of pea. The cotton is grown in drills and on unirrigated land with millet and raha, a kind of pea.

3. The "Regur" or "Cotton" soils, which are deep, limy, black, brown, or gray sticky clay soils, similar to the "black soils" of the United Kingdom. Both "Regur" and red soils occur. The cotton is grown in drills and on unirrigated land with millet and raha, a kind of pea. Both "Regur" and red soils occur. The cotton is grown in drills and on unirrigated land with millet and raha, a kind of pea.

4. The "Red soils," which are derived from crystalline rocks, are widely distributed over the large trap rock area of central Bombay, eastern Hyderabad, and Berar, 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).

5. Punjab and Sind: Most of the cotton in the Punjab and all of the cotton in 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).
intermingling of these with a native tree cotton the modern Egyptian varieties have developed, of which the highest grades, especially Malayan, and the new variety, Torohi, 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 nativefellahin, or farmers. Ninety per cent of the landowners have 5 acres or less, and more than 30 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 planting, 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, and 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 cultivation is very intensive, practised 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 planting, 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, and 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 cultivation is very intensive, practised by hand labor.

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 200,000 to 200,000 bales. The cotton is similar to the Indian types except where American Upland has been introduced. Persia's cotton crop about 1,000,000 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 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 cold continental type, characterised by hot summers and cool winters (see Table). The annual rainfall in Turkestan, where most of the crop is grown, ranges from 5 to 15 inches. The soil is a very fertile loam and alluvium. Cultivation is limited to the river valleys which can be irrigated, about 15 per cent of the total area. In Ferghana and Transcaspia about 25 per cent of the irrigated land is in cotton; in Samarkand and Bukhara about 35 per cent. Planting begins in late March and April, and picking continues until midsummer. The cotton is grown on small holdings by the nativefellahin, or farmers. Ninety per cent of the landowners have 5 acres or less, and more than 30 per cent not over 1 acre. The cultivation is very intensive, practised 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.

South America (fig. 9).—Brazil has a very extensive area of potential cotton production, estimated at 300,000,000 acres, but production on a large scale does not appear probable in the near future owing to lack of capital and the paucity of labor. The area is ample along the coast, but very limited, being practically confined to the narrow, irrigated, coastal valleys. Argentina offers great possibilities when sufficient labor is available. Several small areas are in cultivation, but their production is only about 10,000 bales. About 10,000 bales are grown also by the natives in the interior pampas region of Argentina and Chile. The total annual yield is between 15,000 and 15,000 bales, largely Sea Island.
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 in line, 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 Coastal Plain 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.

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 30,000,000 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 in line, 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 Coastal Plain 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. Small Coastal Plain.—This region extends along the coast of the Carolinian and northern Florida, in Georgia, Alabama, and Mississippi. Soils, very coarse sandy loams and sands. Clay, sandy clay, and sandy loams, with gravel and shell in areas. Well-drained, but usually sandy, and not suited for many crops. Cotton is grown on the sandy lands and some of the upland soils. Most important soil region of the Coastal Plain.

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Figure 12. Soil regions of the Cotton Belt. About two-thirds of the Cotton Belt consists of a broad coastal plain composed principally of alluvial material, bordering and largely derived from two ancient river systems, the Mississippi and the Ohio, which present the greatest variation of soils and topography. 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 them the drainage is uncertain, and in production of cotton. Beyond the boundary of the coastal plain the Cotton Belt includes southern and western marginal regions, comprising a portion of the Piedmont Plateau and of the valleys associated with the Cumberland Plateau and Southern Ozarks (Qualla and Roan Mountain) and a portion of the prairies and great plains of Texas and Oklahoma in the West.

Figure 13. Principal soil regions of the Cotton Belt. The Cotton Belt extends from central Alabama into northeastern Mississippi, Arkansas, and Oklahoma, and consists of the alluvial and deltaic plains of the Mississippi and Arkansas rivers. The area is about 25,000,000 acres. The soils are predominantly loams and sandy loams, with a wide range of subsoils, from gray to chocolate brown. The region is noted for its long, staple cotton, which is produced on a large scale in the northeastern portion. The soils of the Cotton Belt are mainly brown sandy loams, often stony, with reddish and yellow subsoils, largely derived from limestone and often cherty. The average yield per acre of lint cotton is about 190 pounds; production, 1,130,000 bales. Much fertilizer is used. Average yield per acre of cotton in the eastern portion about 115 pounds; average production, 410,000 bales.

Important Soil Regions of the Western Prairies and Plains. Eastern Oklahoma Prairie.—This region extends from New Mexico southward to Arkansas, and includes most of the eastern portion of the state. It is a gently undulating region, and the soils are mainly brown sandy loams, with reddish and yellowish subsoils, largely derived from limestone and often cherty. The average yield per acre of lint cotton is about 115 pounds; production, 410,000 bales. Much fertilizer is used. Eastern Oklahoma Prairie.—This region extends from New Mexico southward to Arkansas, and includes most of the eastern portion of the state. It is a gently undulating region, and the soils are mainly brown sandy loams, with reddish and yellowish subsoils, largely derived from limestone and often cherty. The average yield per acre of lint cotton is about 115 pounds; production, 410,000 bales. Much fertilizer is used.
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. (Very little cotton is grown for household use by the mountain farmers 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 Cotton Belt ranges from 25 to 35 inches in eastern North Carolina and 60 inches in southern Mississippi, but throughout most 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 averaged only 4 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.
Texas and Oklahoma, where the winds dry out the cotton in the unopened frost-bitten bolts, 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 bolts 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 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 in the 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 20. 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 inefficient, the picking may drag along into midwinter, though the cotton is by this time likely to be considerably injured by the weather.

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. 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, 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 total cotton cultivated, and also of northern Florida and Arizona, Tennessee, and Texas is classed as long staple. About 20 per cent of the cotton grown in the Imperial Valley of California is Dunsir and other long-staple varieties. Egyptian cotton is grown principally in the Salt River Valley of Arizona, the crop of about 1,200 bales in 1916 constituting probably 10 per cent of the cotton production of the valley. About 20 per cent were planted in the valley in 1877, 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. 28).
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 produced at any time of the year, a fact which enables the farmer to use labor more efficiently. The labor is required exclusively to produce cotton, while other crops require a smaller amount of labor.

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" may now be defined as a large tract of land operated by the landlord, and most of the improved land by the tenants.

Plants as defined by the Census are most numerous in the older cotton-growing States. The term "planted" per plantation only in those States in which the holdings are smallest, while the number is smallest in those States in which the holdings are larger (fig. 33). 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 larger (fig. 33). In Texas the proportion of unimproved land is under the control of the owner, and the number of tenants or croppers is largest in those States in which the holdings are smaller, while the number is smallest in those States in which the holdings are larger (fig. 33).

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Instead of actual cash, the tenant pays a stipulated amount for all the land which they operate. Frequently, however, the landlord furnishes one-third of the fertilizer. Each party pays for his share of the ginning; and all the crops are divided equally. The owner usually 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 land is undeveloped but capable of profitable cotton production under the plantation system, few of the negroes have been successful in passing from the status of cropper to 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.

The negro operators specialize more in cotton than do the white operators in evidence by the fact that, whereas the negroes operate 28.7 per cent of the farms, they produce 38.7 per cent of the cotton crop.

Negro Tenants (figs. 39 and 30).—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 elder 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 sparse, 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
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 unencumbered 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 this with 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 213 acres, of which 90 acres are improved. Two-thirds of these farms grow on the average 45 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 87 acres, with 67 acres improved, and 88 per cent of those farms grow cotton, averaging 41 acres of this crop per farm, while 77 per cent grow corn, averaging 20

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

<table>
<thead>
<tr>
<th>Region</th>
<th>Per cent of cotton, com, &amp; oats, and wheat acreage</th>
<th>Per cent of these farms growing cotton</th>
<th>Per cent of these farms growing corn</th>
<th>Acres of cotton per farm</th>
<th>Acres of corn per farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Coastal</td>
<td>40-45%</td>
<td>52%</td>
<td>40%</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Piedmont</td>
<td>40-45%</td>
<td>52%</td>
<td>40%</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Sand Hills</td>
<td>40-45%</td>
<td>52%</td>
<td>40%</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Coastal Plain</td>
<td>40-45%</td>
<td>52%</td>
<td>40%</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Texas Black Waxy Prairie</td>
<td>40-45%</td>
<td>52%</td>
<td>40%</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Louisiana Delta</td>
<td>20-25%</td>
<td>30%</td>
<td>20%</td>
<td>10</td>
<td>12</td>
</tr>
</tbody>
</table>

Figure 40.—White tenants are most numerous outside of the region, 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 41.—In Texas and Oklahoma a large percentage of the cotton is grown by white tenants. East of the Mississippi River, while tenants plant much of the cotton along the northern border but very little through the center of the Cotton Belt.

Figure 42.—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.
are completed the land is harrowed, and if the stalks have
and the dirt thrown to the middle on either side, making
grown person is 150 pounds per day. About 1,360 pounds
resembles the moldboard of a right-hand and a left-hand
of seed cotton is required to make a 500-pound bale.

The average amount of seed cotton picked per
two dollars. The average amount of seed cotton picked per

the cotton field is commonly picked over three

Alabama.

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 prepara-
tion 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 bloom, and frequent light irriga-
tion after blooming begins until the crop is fully matured.

USE OF IMPLEMENTS AND WORK STOCK.

Whatever crab grass, Johnson grass, and other weeds grow
freely in the fields the cultivation of cotton requires one to three hoeings per season. With one man a man

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 im-
mEDIATELY 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. Picking begins the last of August or the first of September, but owing to the acreage
sometimes made after the second or third cultivation, and nitrate
of planting, chopping, and cultivating is a few days earlier
than in Anderson County. Picking begins the last of

TABLE III.—THE PERCENTAGE OF THE LAND IN PRINCIPAL CROPS THAT IS IN COTTON—
UNITED STATES AND SELECTED STATES (see note cotton acreage estimates, five-year averages)

<table>
<thead>
<tr>
<th>State</th>
<th>Cotton</th>
<th>Wheat</th>
<th>Hay</th>
<th>Tobacco</th>
<th>Corn</th>
<th>Cotton, wheat, hay, tobacco, vegetables, fruits, berries, and truck crops</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>3.4</td>
<td>2.5</td>
<td>0.8</td>
<td>0.4</td>
<td>2.8</td>
<td>5.2</td>
</tr>
<tr>
<td>Georgia</td>
<td>5.5</td>
<td>1.2</td>
<td>0.6</td>
<td>0.1</td>
<td>2.6</td>
<td>8.4</td>
</tr>
<tr>
<td>North Carolina</td>
<td>4.2</td>
<td>1.5</td>
<td>0.7</td>
<td>0.3</td>
<td>3.0</td>
<td>9.5</td>
</tr>
<tr>
<td>South Carolina</td>
<td>4.1</td>
<td>1.4</td>
<td>0.2</td>
<td>0.3</td>
<td>2.9</td>
<td>9.3</td>
</tr>
<tr>
<td>Texas</td>
<td>3.2</td>
<td>2.6</td>
<td>1.0</td>
<td>0.5</td>
<td>2.2</td>
<td>7.6</td>
</tr>
<tr>
<td>Colorado</td>
<td>3.8</td>
<td>1.3</td>
<td>0.7</td>
<td>0.4</td>
<td>2.3</td>
<td>7.7</td>
</tr>
<tr>
<td>California</td>
<td>2.2</td>
<td>2.0</td>
<td>1.2</td>
<td>0.3</td>
<td>1.7</td>
<td>5.3</td>
</tr>
<tr>
<td>Arizona</td>
<td>1.8</td>
<td>0.6</td>
<td>0.6</td>
<td>0.2</td>
<td>1.0</td>
<td>3.4</td>
</tr>
</tbody>
</table>

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 in-
variably grown on ridges, or beds, 5 feet apart. The method
of forming and handling these beds is briefly as follows: Be-
ing in January the old stumps are broken down, the limbs
and trash raked into the alleys between the old rows, and the
corner binder burned. Following this, a compost of stable
manure, fine straw, marsh grass, and other refuse is thrown
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 hoe by hand, the
dirt being drawn around the plant. Cultiva-
tions and hoggings alternate. The cotton is worked
every week—8 to 10 times in all. It costs more
than 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
list is required of the picker.

COTTON IN CALIFORNIA AND ARIZONA.

...
The yield per acre was less than in 1899. Compare with boll-weevil map (fig. 50) and note the area per acre. Differences in yields are partly due to differences in weather conditions during the season.

In central Texas and in Florida. Over much of the Cotton Belt the yield was from 150 to 200 pounds 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 and Eastern 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 soils deficient in potash a common application is from 300 to 1000 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 labor scarce, the average amount of cotton per farm ranges from 8 to 15 acres, according to the type of tenantry; while in the Black Waxy Prairie of Texas, where the yield is low and extra labor may be obtained for picking and where machinery is extensively used, the average is 20 to 25 acres. Where the yield is low and extra labor may be obtained for picking and where machinery is extensively used, the farmers, classified by tenure, average from 30 to 45 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 about 500 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.

In typical cotton-producing centers the cotton receives directly or indirectly most of the fertilizers used. The boll weevil infests the Cotton Belt and has spread from the southern states to the northern parts of the states. In 1910 the yield per acre was less than in 1899. Compare with boll-weevil map (fig. 50) and note the area per acre. Differences in yields are partly due to differences in weather conditions during the season.
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 Choc-taws 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 1846 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 the region of densest production in 1859 was the same as 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 1894 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 55).
COTTON

HISTORY OF PRODUCTION

PRODUCTION IN BALLES

United States. 788,000

Georgia. 163,000

South Carolina. 143,000

Alabama. 110,000

Mississippi. 100,000

Tennessee. 95,000

Louisiana. 93,000

Virginia. 88,000

North Carolina. 28,000

Florida. 17,000

Arkansas. 1,000

(Estimates by Woodbury)

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 pro-
ducing 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 cotton
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.
At the close of the American Revolution the cotton industry was established on the soil of South Carolina. The first cotton field was planted in 1770, and by 1790 the cultivation of cotton had spread to North Carolina and Georgia. By 1800, cotton was the leading crop in the Southern States, and by 1820, it was the sole crop

The development of the cotton industry in the United States was closely tied to the development of the textile industry in Great Britain. The demand for raw cotton in Great Britain increased rapidly during the Industrial Revolution, and the South became the main source of raw cotton for British factories. The invention of the cotton gin by Eli Whitney in 1793 greatly increased the efficiency of cotton processing, allowing for the rapid expansion of the cotton industry. By the 1820s, the United States had become the world's leading cotton producer, and the industry continued to grow throughout the 19th century.

### Table: Cotton Production in the United States

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (equivalent 500-pound bales, gross weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1790</td>
<td>700,000</td>
</tr>
<tr>
<td>1800</td>
<td>3,500,000</td>
</tr>
<tr>
<td>1810</td>
<td>7,000,000</td>
</tr>
<tr>
<td>1820</td>
<td>14,000,000</td>
</tr>
<tr>
<td>1830</td>
<td>28,000,000</td>
</tr>
<tr>
<td>1840</td>
<td>56,000,000</td>
</tr>
<tr>
<td>1850</td>
<td>112,000,000</td>
</tr>
<tr>
<td>1860</td>
<td>224,000,000</td>
</tr>
<tr>
<td>1870</td>
<td>448,000,000</td>
</tr>
<tr>
<td>1880</td>
<td>896,000,000</td>
</tr>
<tr>
<td>1890</td>
<td>1,792,000,000</td>
</tr>
<tr>
<td>1900</td>
<td>3,584,000,000</td>
</tr>
</tbody>
</table>

### Figure 67 — Production of cotton in the United States, 1790-1915

The graph illustrates the rapid growth of cotton production in the United States from 1790 to 1915. The production increased significantly after the invention of the cotton gin, and reached its peak in the late 19th century. Since then, the production has fluctuated due to various factors such as disease, competition from foreign producers, and changes in market demand.

### Notes:

1. The cultivation of cotton was initially influenced by the British, who introduced the crop to the American colonies.
2. The invention of the cotton gin by Eli Whitney in 1793 greatly increased the efficiency of cotton processing.
3. The demand for raw cotton in Great Britain increased rapidly during the Industrial Revolution, fueling the expansion of the cotton industry.
4. The cotton industry played a significant role in the economy of the Southern States, particularly in supporting slavery.
5. The cotton industry was one of the main drivers of the Civil War, as the North sought to limit the Southern production of cotton to maintain their influence over the international market.

The border States of Virginia and North Carolina was very marked (fig. 35). In 1848 the production of these two States was estimated at 104,000 bales; in 1849 they produced only 65,000 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 cheapest 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 Louisianians to change from cotton to sugar cane.

Properly 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 the greatest gains were made in the Southwestern States (fig. 35). 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 1840, but there had been a shift in the producing area. Between 1849 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:

<table>
<thead>
<tr>
<th>State</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida</td>
<td>27,465</td>
</tr>
<tr>
<td>South Carolina</td>
<td>29,850</td>
</tr>
<tr>
<td>Georgia</td>
<td>23,606</td>
</tr>
</tbody>
</table>

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 3/4 acres. In order to prevent injury to the fiber by frost, 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.

**Figure 68**—This chart shows the trend of the cotton industry in the United States during the period 1804-1864. The producer prices were rising when Whitney invented the gin. The increase in producer prices caused a further development of cotton culture. The beginning of a long period of low prices in 1864, after which large crops caused a slight decline until the Civil War began, and the demand for cotton produced a further development. High prices were reached in 1861, and production increased, prices fell to the lowest point in history, 5.6 cents, in 1862. Low prices reduced the rate of increase, and production was nearly stationary from 1872 to 1880. Prices declined to 2.08 cents per pound in 1878-1879, and continued at this low level until 1880.

**Table V—Sea Island Cotton—Exports, Production, and Average Price at Savannah**

<table>
<thead>
<tr>
<th>Year</th>
<th>Exports</th>
<th>Total</th>
<th>Average Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1843</td>
<td>9,000</td>
<td>9,000</td>
<td>2.0</td>
</tr>
<tr>
<td>1844</td>
<td>10,000</td>
<td>10,000</td>
<td>2.2</td>
</tr>
<tr>
<td>1845</td>
<td>11,000</td>
<td>11,000</td>
<td>2.4</td>
</tr>
<tr>
<td>1846</td>
<td>12,000</td>
<td>12,000</td>
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</tr>
<tr>
<td>1847</td>
<td>13,000</td>
<td>13,000</td>
<td>2.8</td>
</tr>
<tr>
<td>1848</td>
<td>14,000</td>
<td>14,000</td>
<td>3.0</td>
</tr>
<tr>
<td>1849</td>
<td>15,000</td>
<td>15,000</td>
<td>3.2</td>
</tr>
<tr>
<td>1850</td>
<td>16,000</td>
<td>16,000</td>
<td>3.4</td>
</tr>
<tr>
<td>1851</td>
<td>17,000</td>
<td>17,000</td>
<td>3.6</td>
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<td>1852</td>
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<td>18,000</td>
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<td>5.6</td>
</tr>
<tr>
<td>1862</td>
<td>28,000</td>
<td>28,000</td>
<td>5.8</td>
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<tr>
<td>1863</td>
<td>29,000</td>
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**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
drills, and in the earlier period it was covered with a turning plow, but later, with a block of wood heaved 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 "shoeing 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 shoved 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 shoving 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 80 pounds per day was considered a fair day's work, whereas by 1840 the amount required per "hand" was from 130 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 expected 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 in the United States and Europe 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 had been on the Cotton Belt was attempted, but with slight success, and the manufacturers of the North were compelled to import from foreign countries. In 1867 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 restrict cotton-growing in other countries. The high prices resulting from the blockade of the South added 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.

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 the market and consequently upon the prices realized for the product of the United States. The United States has increased more rapidly than the population of the United States, though since 1898 but a little more rapidly.

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 1865 and but a little greater than the crop of 1859. The average price received for this crop reduced to a gold basis was 21.4 cents, which was more than was received for any crop between 1848 and 1864.

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 assumption 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 profoundness 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 profitability of cotton production in some sections and the scarcity of labor in those sections was largely responsible for the migration 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,
was the more extensive use of fertilizers. The price of South Carolina, Arkansas, Georgia, and Alabama. South Carolina, North Carolina, Arkansas, and Alabama. Breaking up of plantations and renting to the freedman farms classified by acres of improved land for 1870 continuing and operating the large plantations led to the breaking up where the farms were small. The difficulties of reorganization and the small farmers along the northern border of the Cotton Belt and in Arkansas and Texas, where slavery had not restrictions when in debt to the landlord or merchant that depend upon raising cotton, and he was so bound by legal the freedman, since the freedman wanted to be independent in many cases to secure adequate control of the labor by the planter, and 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 existence 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 50 acres | 50 to 100 acres | 100 to 499 acres | 500 and over
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<td>71,098</td>
<td>47,973</td>
<td>9,210</td>
<td>6,980</td>
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<td>35,368</td>
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<td>13,989</td>
<td>1,607</td>
<td>61</td>
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<td>84,829</td>
<td>17,507</td>
<td>12,278</td>
<td>13,644</td>
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<td>27,192</td>
<td>16,698</td>
<td>3,607</td>
<td>86,847</td>
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<tr>
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<td>34,330</td>
<td>22,180</td>
<td>13,660</td>
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<tr>
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<td>378,220</td>
<td>182,984</td>
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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.

1879-1892, A PERIOD OF EXPANSION.

1879-1888, Prices Falling—Production doubled between 1879 and 1888, while prices fell from 11.6 cents to 5.3 cents per pound, the lowest in the history of cotton (figs. 65, 66). 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 Waskalasaka 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 irrigation on sandy soils and of improvements in methods of production 1899-1912, Prices Rising—From 1899 to 1909 the total acreage in cotton increased 15 per cent and it continued to in¬crease up to 1912. 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 in¬creased in many of the States (see fig. 45). The cotton crop of 1914 amounted to 20,000,000 bales, which was four times the amount produced in 1866. 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. 95). The immediate result of the ravages of the weevil in the communities where conditions are most favorable for its operations is the destruction 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 debits, owners lose their lands and homesteads, and a period of poverty and distress among all classes of agri-cultural people follows. After the panic caused by the first destruction of crops the farm and farm practices are reorganized, and the farmers continue to grow cotton (see figs. 63, 64) by using methods which bring to the crop to early maturity and destroy as many weevils as possible. Fortunately, however, the boll weevil is not equally de¬structive 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

\[ \text{Cotton Production in the United States} \]

\[ \text{Average for} \quad 1899-1912 \]

\[ \text{Acreage in Acreage} \]

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

\[ \text{The production of cotton increased but little in the first five years after the Civil War, the crop of 1866 being but little greater than that of 1866. The crop of 1870, however, was larger than the crop of 1860. That this was above the normal crop for this period is evident from the fact that production did not again reach this point until 1879. By 1879 conditions in the South had become fairly stable again and the crop of that year was the largest that had ever been produced (figs. 6a, 6b). All of the States except Alabama and Louisiana produced more cotton in 1879 than in 1869 (fig. 76).} \]
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 together with the high temperature especially in the western parts of the State, prevents the weevils from doing great injury to the crop, and consequently that State has maintained its normal production of cotton. In Texas the low rainfall during spring and summer, together with the high temperature especially in the western part of the State, prevents the weevils from doing great injury to the crop, and consequently that State has maintained its normal production of cotton. In Texas the low rainfall during spring and summer, to- ther with the high temperature especially in the western part of the State, prevents the weevils from doing great injury to the crop, and consequently that State has maintained its normal production of cotton. In Texas the low rainfall during spring and summer, to- ther with the high temperature especially in the western part of the State, prevents the weevils 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 been 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 1890 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 (lgs. 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. Consequ-ently, the result of using fertilizers in the Eastern States was not only to improve the yields of the land ordinarily planted in cotton, but to extend the area (lgs. 79, 77). Through the use of fertilizers the production of cotton has been greatly increased in a tie 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 mil- lions of dollars in 1879, 20 millions in 1889, 25 millions in 1899, and 1916 the area planted in the Salt River Valley amounted to 9,000 acres.

Cotton Seed.—The utilization of the cotton seed has become a most important economic factor in the production of cotton (see Table VI). At first planters commonly consid-ered 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 for cultivating. Before the Civil War experiments were being made in feeding the seed to live stock and crushing it for oil. In 1879 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 cotton- seed oil industry has developed with remarkable rapidity. In 1879 there were 45 mills in operation, and in 1909 the number had increased to 875.

Increased demand for the various products of the crushed seed has greatly increased the value of the seed. The whole seed is usually used as fertilizer now, but some of the prod-ucts of the crushed seed are used as fertilizers or in the manufactu-re of fertilizers. In 1915 cottonseed meal con-struted 15.7 per cent (by weight) of all the fertilizers sold in the South. In 1913 oil mills paid farmers an average of $5.50 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 $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 $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 $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 $33.60 per ton for the seed.

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 posi-tions before the war. The prices steadily rising after 1898 again attracted the European manufacturers to action, to in-crease 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, Nyassa land, and the Anglo-Egyptian Sudan, and, aided by the higher prices of cotton, has markedly influenced the cotton production of these coun-tries in recent years. The United States, however, main-tains the position of the leading cotton-producing country in the world, and the great cotton-manufacturing estab-lishments of Europe are dependent upon this country for most of their raw cotton.
MARKETING AND DISTRIBUTION.

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 grading. 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 ginery may sell at once or hold it until some future date. He may sell directly to a mill buyer, or to 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 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 is produced in the inland districts of the cotton-growing States, and long staple, that is produced in the coastal plain districts of the Cotton Belt. Short staple cotton constitutes the bulk of the American crop, approximately 80 per cent in 1915, and is grown throughout the inland districts of the cotton-growing States. The fiber of these cottons averages 5/8 to 7/8 inches in length.

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 1/2 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 1/2 to 1 3/4 inches in length, are grown in many parts of the South, the production of many sections being recognized as characteristic differences in quality and strength of staple. In Arkansas and, to some extent, in Mississippi and Tennessee a good character of strong, heavy Upland cotton, 15/16 to 1 1/4 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 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 1/4 to 1 1/2 inch staple is also produced in the Imperial Valley of California.

Sea Island Cotton—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 stapled Arizona-Egyptian cotton is between that of the long-staple Upland and the Sea Island cotton, being 1 1/2 to 1 1/4 inches, and the fiber is very strong and fine.

GINNING.

Ginning is the first step in marketing the cotton crop. The producer loads his cotton to a ginner. If he does not own the ginery, he usually pays for the ginning and receives the cotton in the bale from the ginners. 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 be operated as cheaply as or 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 cotton and also Arizona-Egyptian usually are pressed into a 60-bin box 45 inches long and 27 inches wide, to a depth of about 43 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 bale 7 1/2 feet long and 2 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. These are some gin compresses, but most of the compressing is done at gins near the cotton ginning.
Ginners 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 ginners on plantations in the East, but as a rule they are small and relatively not very numerous. During the seasons of 1914-15 there were in actual operation 2,547 ginning stations in the Southern States where much cotton is grown or shipped to New England, where they are numerous; while in the East, where much cotton is consumed in the local mills, they are few.

Selling Cotton in the Seed.—In some sections of the Cotton Belt the 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 and 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 ginner is agreed upon. The capacity of the gins (fig. 84) enables the ginner to ginn 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.

Oiled Mills.—In 1915 there were 844 seed-crushing oil mills well distributed throughout the Cotton Belt (fig. 84). 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 ginners. About 84 per cent of all the seed of the 1915 crop was crushed. The four principal 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 dehulling 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.

Storage capacity.

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Marketing and Distribution

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 rest 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.

Oiled Mills.—In 1915 there were 844 seed-crushing oil mills well distributed throughout the Cotton Belt (fig. 84). 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 ginners. About 84 per cent of all the seed of the 1915 crop was crushed. The four principal 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 dehulling 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 decay." The cotton warehouse is a place of shelter and protection from fire and theft, a place for charging and awarding 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.—For storing cotton there are many warehouse systems, both public and private. A public warehouse is a building 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 sold by merchants. The name is true of Tennessee, Mississippi, and Louisiana. In the Eastern States warehouses are usually accessible to farmers.

NUMBER, CHARACTER, AND CAPACITY OF WAREHOUSES.

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Marketing and Distribution

COTTON STANDARDS

The official cotton standards for the United States are set by the Secretary of Agriculture, in consultation with the cotton industry. The official standards are adopted by the cotton ginners and are followed by the cotton swellers and the cotton mills. The standards are based on the average quality of the cotton grown in the United States and are revised periodically to reflect changes in the quality of the cotton grown.

COTTON WAREHOUSES

In the United States, there are thousands of cotton warehouses. These warehouses are owned by private companies or by the Federal government. The warehouses are used to store cotton until it is ready to be sold or exported. The warehouses are located in almost every state in the United States, and they are scattered throughout the cotton-growing areas.

COTTON COMPRESSIONS

Cotton compresses are large warehouses used to store large quantities of cotton. The compresses are used to store cotton bales until they are ready to be shipped to the mill or exported. The compresses are usually located near the mills or at the seaports where the cotton is to be exported.
Future market trading is in contracts to deliver at some place where a number of men meet to buy and sell cotton by terms denoting grades of quality. Grading Sea Island and other long staple cottons. They boll is stopped by frost before it has had sufficient time to mature, the bolls not opening fully. These bolls are gathered and put through machinery which separates damaged by frost, the bolls not opening fully. These bolls which, while not compulsory, were readily adopted by a large portion of the cotton trade (see fig. 90). These sets of standards, which were the results of a preliminary study, the Department of Agriculture established to determine cotton grades. In December, 1914, after much preparation, 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 33 of the leading cotton markets, while others have been bought by cotton dealers in many other markets (fig. 89).

Boll 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 and cotton from the burs, after which the cotton is handled similarly to that picked by hand. The grade, staple, and quality of boll 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 ginned. The staple of boll 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 classified 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 small 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. Spot Market (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.

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 to accurately 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 and other grades of cotton delivered against future contracts upon markets which are not bona fide spot markets.

Futures market (fig. 92).—Figure 92 shows 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 which is delivered on the futures contracts 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 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 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.
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 planter 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 expenses of storage, insurance, and interest on money involved in estimating the profitability of holding. It may be that in some cases the buyer can hold at less expense than the planter 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. 97).

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 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" and "off" middling is given below. 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.

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 bolls bale 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 bolls bale 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 bolls bale 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. Bolles and Sinters 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 uncombed in burlap 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 200-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 56-foot box car. When this is compressed at the
COTTON

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. 95). 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 ordinary railroad compresses. Galveston is also well situated as a port for the ginning of cotton, and has excellent transportation facilities. New York, in addition to its location as a port and its excellent transportation facilities, has long been a center of exchange in the cotton trade; it is a point of origin 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 ordinary railroad compresses.

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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 1912 to one-half in 1915. During the season 1914-15, 6,500,000 bales were consumed, consisting of 5,755,521 bales of domestic Upland, 79,394 bales of Sea Island, 411,843 bales of Sweets, and 727,057 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. 95). 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 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 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 in a very limited extent for mixing with the American upland cotton in the manufacture of cheaper grades of goods. Linters are used in uphosteering and in the manufacture of mattresses, comforters, 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 gunnycotton, nitropowders, and writing papers.

Light and Heavy 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 1913 the export of cotton goods valued at $1,688,000 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 $44,517,000 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.