U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF SOILS.

SOIL SURVEY OF SPARTANBURG COUNTY, SOUTH CAROLINA.

BY

W. J. LATIMER, IN CHARGE, E. B. DEETER, S. O. PERKINS, W. EDWARD HEARN, AND CORNELIUS VAN DUYNE.

[Advance Sheets—Field Operations of the Bureau of Soils, 1921.]

WASHINGTON:
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[PUBLIC RESOLUTION—No. 9.]

JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-Sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided,* That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]

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SOIL SURVEY OF SPARTANBURG COUNTY, SOUTH CAROLINA.

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DESCRIPTION OF THE AREA.

Spartanburg County is situated in the northwestern part of South Carolina, adjacent to the North Carolina State line. The area has the form of an irregular pentagon, with sides averaging 20 miles each. It measures 40 miles from its northern base to its southern point and 28 miles in its greatest width east and west. The county contains 819 square miles, or 524,160 acres.

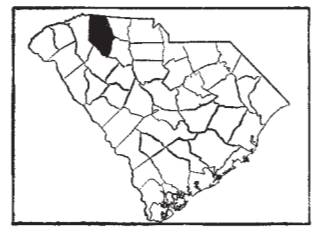

FIG. 17.—Sketch map showing location of the Spartanburg County area, South Carolina.

The county lies in the Piedmont Plateau, its northwestern corner touching the foothills at the base of the Blue Ridge Mountains. The surface slopes gradually to the southeast, with the direction of the main drainage. The plateau has been dissected by numerous streams, which have reduced the surface to a series of low, smooth ridges, somewhat flattened on top, where the original level of the plateau has been preserved, and broken along the edges. The hillsides are fairly smooth, although in places they are steep. The topography of the interstream area is gently undulating to rolling, becoming hilly toward the streams. The only outstanding features of the area that do not conform to the general relief are in the northwestern part of the county. They include the high ground near the base of the Blue Ridge, the adjacent foothills, and the three high hills (Windmill Hill, Collins Mountain, and Little Mountain) about 10 miles from and parallel to the base of Hog Back Mountain, a spur of the Blue Ridge Mountains. These elevations stand about 200 feet above the general level of the plateau. In the southeastern part of the area, Rich Hill, a narrow ridge about 3 miles long, stands well above the surrounding country. The highest point in the county 1,250 feet above sea level, is on the slope of Bird Mountain, which has its crest in Greenville County and is a spur of the Blue Ridge Mountains. The surrounding foothills and the three outstanding hills mentioned above, range from 1,100 to 1,200 feet above sea level. The general level of the plateau throughout the northern third of the county is about 1,000 feet, the elevation at Spartanburg is 875 feet, and that of the lower part of the county ranges from 500 to 750 feet above sea level. The stream level ranges from 100 to 200 feet below the general elevation of the ridge tops.

The area is drained by three stream systems, the Pacolet, the Tiger, and the Enoree Rivers. The Pacolet River and its tributaries, the North, South, and Lawson Forks, drain the northern and eastern parts of the county. The Tiger River, through its main tributaries, North, Middle, and South Forks, drains the central third. The Enoree River marks the southwestern boundary and drains a narrow belt within the county through a number of short branches. These streams all flow in a southeasterly direction. They ramify nearly all parts of the upland, furnishing water for stock on nearly all the farms. Practically all the upland is thoroughly drained. The main streams have all reached temporary base level; some of the smaller streams are still cutting back into the upland. The bottom land has been filled in to some extent by wash from the upland, with the result that stretches of poorly drained or marshy ground have been formed. In places the current is fairly rapid, and waterfalls have been formed where the streams have cut down to a hard rock obstruction. These are utilized extensively for the development of hydroelectric power.

In 1755 a large part of upper South Carolina was ceded by the Cherokee Indians to Governor Glen.[1] The territory gained by this treaty was formed into Ninety-six District, which existed under that name until after the Revolutionary War.[2] In 1785 Spartanburg County was formed from a part of Ninety-six District. It remains as originally formed, with the exception that the northeastern corner was taken to form a part of Cherokee County in 1897.

The earliest settlements within the present area of Spartanburg County were made on the Pacolet River and the forks of Tiger River, between 1750 and 1760. The population did not increase much until after the expulsion of the Indians from the upper part of South Carolina in 1761. The immigrants that settled this region during the next decade moved from north to south and were entirely different from the settlers of the eastern part of the Province of South Carolina. They were largely Scotch-Irish coming direct from northern Ireland or from Pennsylvania, Maryland, Virginia, and North Carolina. A few English came from Virginia and from the eastern part of South Carolina. New settlers came during the period from 1785 to 1800, which terminated the era of settlement, as only a few settlers have come in since that time, mainly from adjacent territory.

The early settlements were made upon the main streams for the reason that the land was extremely fertile and the streams furnished a means of transportation in an otherwise inaccessible region. The settlements gradually pushed back into the upland as roads were developed. But it was not until the advent of the railroads that the country away from the streams began to develop. The railroad from Columbia to Spartanburg was completed in 1856. What is now the main line of the Southern Railway was completed through the county in 1873. Other roads were built later.

The manufacture of cotton goods began in a small way in 1830, but was slow in developing until after the Civil War. From 1880 to 1890 many cotton mills were built, and since that time the development of the mill industry has been steady. Local water power has been

[1] See Ramsey's History of South Carolina. Also Landrum's Colonial and Revolutionary History of Upper South Carolina and History of Spartanburg County for further historic information.

[2] Part of Ninety-six District was divided into counties in 1783, and the remainder was divided into three counties (Spartanburg, Union, and Laurens) in 1785.

used to operate most of the plants. The cotton mills attracted a number of native white people from the farms of this county and a large number from the adjacent counties, especially from the mountains of North Carolina.

The population of Spartanburg County, as given by the 1920 census, is 94,265, of which somewhat more than one-fourth is negro. According to the 1920 census, the rural population, including towns of less than 2,500 inhabitants, constitutes 76 per cent of the total. It is well distributed over the county, with the north-central part somewhat more thickly settled than other parts. The negroes are confined largely to the southern half of the county. The inhabitants of the rural section are largely descendants of the early settlers.

Spartanburg, the county seat, located near the geographic center of the county, is the largest and most important town, with a population of 22,638 in 1920. It is an educational, manufacturing, and railroad center.

Woodruff with 2,396 population, Cowpens with 1,284, Chesnee with 600, Inman with 694, Landrum with 980, and Enoree are raiload towns that have small cotton mills and oil mills and are the centers of thriving agricultural communities. Clifton, Converse, Glendale, Pacolet, and Tucapau are small cotton-mill towns.

The manufacture of cotton cloth is the largest industry in the county. There are 27 cotton mills, operating 860,460 spindles and 20,660 looms, that consume 144,000 bales of cotton annually, and employ about 10,000 operatives. There are 14 cottonseed-oil mills, 2 fertilizer factories, and a number of smaller industries.

The county is well supplied with transportation facilities. The main line of the Southern Railway from Washington to Atlanta passes northeast and southwest through the center of the county.

The Southern Railway (Asheville and Columbia Division) passes northwest and southeast through the county. The Charleston & Western Carolina Railway extends from Spartanburg southwest to Augusta, Ga. The Carolina, Clinchfield & Ohio Railway extends north from Spartanburg to Elkhorn, Ky., giving direct connection with the coal fields of Kentucky and West Virginia. The Piedmont & Northern (electric) parallels the Southern to Greenville.

The public roads over most of the county are fairly good, considering the character of the subsoil (red clay). The native or clay roads when worked are good in dry weather, but are poor in winter or in wet seasons. A number of surfaced (sand-clay) roads radiate from Spartanburg to nearly all parts of the county, and are being rapidly extended. The National Highway (improved) extends from Cowpens on the Cherokee County line to Greer on the Greenville County line; the Appalachian Highway enters from Union County near Glenn Springs and passes into North Carolina west of Landrum; and the Spartan Highway runs from Enoree on the Laurens County line to Chesnee in the northeastern part of the county. These three highways, comprising a total of 121 miles, are to be maintained by the State. Telephone and rural-mail service reach practically all parts of the county.

Spartanburg is the principal market for the sale of cotton, cottonseed, and other farm products and also for the purchase of supplies. The large warehouses connected with Camp Wadsworth have been

acquired by the farmers for storing cotton; this increases the importance of Spartanburg as a cotton market. The smaller towns are convenient local markets for cotton and cottonseed. Spartanburg and the cotton-mill towns are excellent markets for vegetables, poultry, and dairy products.

CLIMATE.

Spartanburg County has mild and healthful climate. The winters, while cold, are not as rigorous as in the mountain section to the northwest. The summers are hot, but not as sultry as in the Coastal Plain region of the State. The elevation, ranging from 500 to 1,200 feet above sea level, insures an atmosphere that is bracing at all seasons of the year. The mean annual temperature is 60.3° F. A temperature of −4° F. is the lowest on record, and 106° F. is the highest. Zero weather is rare, and cold spells are usually of short duration. Periods with summer temperatures of 100° F. are not unusual, but such extremely hot weather does not last long. The average temperature for the winter months, December, January, and February, is 42.4° F.; and for the summer months, June, July, and August, 77.8° F.

The table below, giving the normal monthly, seasonal, and annual temperature and precipitation, is compiled from the records of the Weather Bureau at Spartanburg:

Normal monthly, seasonal, and annual temperature and precipitation at Spartanburg.

[Elevation, 875 feet.]

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1895).	Total amount for the wettest year (1901).	Snow, average depth.
	° F.	° F.	° F.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
December	41.9	78	−1	4.24	2.35	10.23	1.0
January	42.4	79	0	3.81	6.30	3.06	1.2
February	42.8	79	−4	4.58	1.75	2.80	1.6
Winter	42.4	79	−4	12.63	10.40	16.09	3.8
March	51.1	95	11	4.88	4.02	7.19	.2
April	60.1	96	21	3.08	4.96	7.29	T.
May	69.4	101	31	4.09	4.17	9.47	.0
Spring	60.2	101	11	12.05	13.15	23.95	.2
June	76.0	105	42	4.68	2.20	6.56	.0
July	80.0	105	46	4.69	2.90	3.49	.0
August	77.5	103	50	5.53	6.18	15.66	.0
Summer	77.8	105	42	14.90	11.28	25.71	.0
September	72.0	106	36	3.28	.34	5.81	.0
October	61.1	97	22	2.87	.39	1.01	.0
November	50.7	88	16	1.83	3.00	.96	.1
Fall	61.3	106	16	7.98	3.73	7.78	.1
Year	60.3	106	−4	47.56	38.56	73.53	4.1

The average annual precipitation of 47.56 inches is well distributed throughout the year. The heaviest rainfall for any three-month period (14.90 inches) comes in the summer, when it is needed by the

growing crops; and the lightest for a three-month period (7.98 inches) comes in the fall, the time of harvest. The snowfall is comparatively light, amounting to only a few inches each winter.

The average date of the last killing frost in spring is March 30, and of the first in fall November 1, giving an average growing season of seven months. The latest killing frost recorded in spring occurred on April 16, and the earliest in fall on October 12.

The climatic conditions are well suited to the practice of general farming, orcharding, poultry raising, stock raising, and dairying.

AGRICULTURE.

This region is described by the early travelers and historians as forested with large hardwood trees that grew wide apart, the open spaces being carpeted with grasses and in places with a legume. These open woods areas were interspersed with areas of prairie. Thick canebrakes bordered all the streams, reaching well back into the valleys and onto the upland. The early settlers selected their land according to the abundance or height of the cane, as this was considered indicative of fertile land. Because of these plants the region was eminently suited to stock raising, and the first settlers were mainly cattlemen. Their inclosures were termed "cowpens," a name associated with this section from the earliest times. The cattlemen planted only small patches of corn and other grains for home use, as the isolated location of the country precluded the marketing of farm products. The settlers who came during the decade following 1761, mainly farmers from the older settled States to the north, brought their household effects, horses, cattle, and hogs, and were in a way equipped to commence farming operations. They grew flax, tobacco, corn, wheat, and oats, and raised cattle and hogs.

The region was far from markets. Charleston, the nearest market, was 100 miles away, and only selected products could be shipped with profit. Those most in demand in Charleston were skins, tallow, butter, flour, hemp, and bacon. Consequently there soon developed a system of farming in which the farms were self-sustaining, practically everything needed was raised and manufactured at home, and the lighter products were taken to market in exchange for salt and implements and other necessaries. Cotton was introduced in 1802 and was grown in a small way at first for spinning into cloth at home. It soon became the chief export, and brought changes that eventually revolutionized the agriculture of the region. Cotton growing, however, increased slowly until about 1850, when the advent of the railroad stimulated its production. The Civil War brought great changes in economic conditions, and under the new conditions the renting or share-crop system was evolved. Owing to the necessity for a cash crop, cotton soon became the leading crop and subsistence crops were subordinated. By 1880 the transportation facilities were such that food and supplies could be brought from other sections cheap enough to compete with the home-grown products. The result was the development of the "one-crop" system, with cotton not only the main cash crop but practically the only crop that received any attention. This condition has not materially changed. Within the last 10 years, however, there has been a tendency upon the part of the lead-

ing farmers to grow more corn, oats, cowpeas, and forage crops to furnish feed for work stock.

The farmers of the northern part of the county recovered soon after the Civil War, as many of them were small farmers who had not owned slaves. These were the last to succumb to the one-crop system, and many of them still continue to grow subsistence crops.

During the Civil War many farms, especially in the southern part of the county, because of neglect were seriously injured by erosion, and the clean cultivation attendant upon the one-crop system has increased the tendency to erode. The adoption of terracing about 1890 has done much to check erosion.

The following table gives the acreage and production of the leading crops in 1889, 1909, and 1919, as reported by the Bureau of the Census:

Acreage and production of leading crops, 1889, 1909, and 1919.

Crop	1889		1909		1919	
	Area.	Production.	Area.	Production.	Area.	Production.
	Acres.	*Bales.*	*Acres.*	*Bales.*	*Acres.*	*Bales.*
Cotton	87,662	35,418	99,855	45,038	134,235	75,344
		Bushels.		*Bushels.*		*Bushels.*
Corn	68,993	684,330	62,890	856,605	70,648	1,101,030
Oats	7,718	48,020	9,898	115,963	3,510	44,454
Wheat	18,693	95,970	8,296	56,775	9,511	58,041

The above table shows a steady increase in the cotton acreage and yield, a slight net gain in corn, a variable acreage in oats, and a decline in wheat. The acreage of cereals has not varied greatly since 1900 and does not show a tendency to keep pace with the acreage increase of cotton. Some of the minor crops show a more rapid increase than the cereals.

Spartanburg County is one of the leading cotton counties of the State. The United States Census reports a production of 75,344 bales in 1919. The average production was 65,000 bales until the stimulation caused by the high price of cotton. Cotton occupies practically half the acreage planted to all crops. The average yield—about one-half bale per acre—is the same as the average for the State.[3] Short-staple cotton is grown almost entirely, the Cleveland Big Boll being the leading variety. The entire crop is used by the cotton mills of the county. The estimated value of the 1919 cotton crop was $14,000,000, and the value of the seed $3,000,000.

Corn is the next crop of importance. In 1919, 70,648 acres were in corn, yielding 1,101,030 bushels. It is grown more extensively by the owners of farms than by tenants. On the better farms enough corn is grown to supply home needs, but many farmers do not produce sufficient corn for their own needs and are forced to buy. The grain is used to feed work stock and to a small extent is ground for food. The fodder is used for roughage. White dent varieties are

[3] Attention is called to the fact the cotton-boll weevil has invaded the county since 1919 and has no doubt reduced the yield per acre below the figures given. Definite statistics of acreage for the years subsequent to the census are not available. According to estimates issued by the census the total production has fallen off in recent years.

most commonly grown. The average yield is about 16 bushels per acre.

Oats were grown in 1919 on 3,510 acres, and yielded 44,454 bushels, or an average yield of about 13 bushels per acre. Oats are sown broadcast or drilled during late fall. Sometimes they are sown between cotton rows. Rust-proof varieties are grown. Practically all the crop is fed in the bundle to work stock.

Wheat at one time was a very important crop, but the production has decreased in the last 20 years, owing to the importation of flour from the Western States. During the years of the recent war, wheat growing was revived to a considerable extent. In 1919 wheat occupied 9,511 acres, producing 58,041 bushels, or an average yield of 6 bushels per acre. The crop is sown broadcast or in drills. Bearded varieties are grown, but little attention is given to specific varieties. Most of the grain is ground into flour at the local mills.

In 1919 cowpeas were grown for seed on 2,199 acres, producing 10,591 bushels. Cowpeas are also sown broadcast following wheat, oats, or rye, and cut for hay. Sometimes they are sown broadcast between the corn rows at the last working, and often they are planted in the corn rows between the stalks. When planted in rows the seed is always gathered. Sorgo and cowpeas are sown broadcast and cut for hay on some farms. The Whippoorwill, New Era, and Unknown cowpeas are the principal varieties. Velvet beans and soybeans are grown only in a small way.

The 23,421 acres in hay and forage crops in 1919 are divided as follows: Annual legumes (mainly cowpeas), 1,550 acres, yielding 1,218 tons; grains cut green, 1,236 acres, yielding 672 tons; all tame or cultivated grasses, 1,278 acres, yielding 1,587 tons; wild grasses, 57 acres, yielding 45 tons; coarse forage, 19,300 acres, yielding 9,162 tons. The tame grasses include clover, alfalfa, and a mixture of grasses in which orchard grass predominates. The grains cut green include rye, barley, and corn. These crops, together with the cowpea hay and corn fodder, furnish all the roughage grown on the farms. This is usually not sufficient to feed the stock and some hay is shipped in. There is a fair acreage in pasture, most of it on bottom land, but there is some upland pasture in the hollows around the heads of streams. The bottom-land pasturage in places consists of native grasses, in other places it is composed chiefly of shrubs and underbrush. In poorly drained places there is a growth of bulrushes. The upland pastures are usually Bermuda grass. Crab grass or joint grass volunteers in fallow fields or in fields where crops are abandoned in the summer. Broom sedge takes possession of abandoned fields.

According to the 1920 census, potatoes were grown in 1919 on 412 acres, yielding 21,534 bushels; and sweet potatoes on 1,615 acres, yielding 137,398 bushels. These crops are grown in small patches and in gardens for home use and for the local markets. Yellow "yam" varieties of sweet potatoes and Irish Cobbler potatoes are the leading varieties. In 1919 there were 229 acres in vegetables, which are grown almost exclusively in the home gardens. In some cases a small surplus is produced for market. Practically all the vegetables common to this section are grown, but the principal kinds are cabbage, collards, turnips, beans, peas, tomatoes, beets, squash, onions, and okra.

Sorgo was grown in 1919 on 1,090 acres and produced 37,124 gallons of sirup or "molasses." Peanuts were grown on 57 acres, yielding 953 bushels. Watermelons and muskmelons are grown on most farms for home use and for local markets.

The 1920 census reports 64,067 peach trees of bearing age, which yielded 17,692 bushels, 30,552 apple trees, yielding 19,748 bushels, 5,641 pear trees, yielding 3,224 bushels, 6,795 cherry trees, yielding 1,754 bushels, 2,330 plum trees, yielding 1,356 bushels, 625 fig trees, yielding 5,925 pounds, 899 pecan trees, yielding 6,130 pounds, and 8,936 grapevines, yielding 110,669 pounds. These are confined largely to home orchards. A few small commercial peach orchards have been planted in the vicinity of Gramling. Strawberries were grown on 49 acres and yielded 24,979 quarts in 1919.

There were 17,387 cattle in the county on January 1, 1920. Of this number 10,437 were dairy cows, 5,522 were other dairy cattle, and 1,428 were beef cattle. The dairy cows are mainly Jerseys and Jersey grades, though several of the dairy herds are purebred Holstein cattle. Most of the beef cattle are scrubs. Some steps have been taken toward improving the stock by the introduction of purebred sires.

Hogs are kept on nearly every farm. In January, 1920, there were 17,185 hogs in the county. Some Berkshire, Poland China, and Duroc-Jersey, or grades are found, but most of the hogs are scrub stock.

In 1920 there were about 216,000 chickens in the county, and a few ducks and turkeys. Little attention is paid to breeds. Plymouth Rock and Rhode Island Red are the leading breeds. Eggs, frying-size chickens, and hens are the chief poultry products disposed of on the local markets. The supply is barely sufficient to meet the demand.

The livestock industry is of minor importance and little attention is given to any branch of it. Hogs are raised for home use; on some farms there is a surplus for market. The beef cattle are sold on the hoof, only a few being butchered on the farm. The dairy products on the average farm are consumed at home; in some cases butter is sold. Where dairying is practiced as a business the products are marketed as whole milk or cream. The dairies are located near Spartanburg. Poultry products are used at home and the surplus sold.

The following table gives the value of farm products in 1919, as reported by the 1920 census:

Value of farm products in 1919.

Products by classes.	Value.	Products by classes.	Value.
Cereals	$2,409,228	Dairy products (exclusive of home use)	$745,912
Other grains and seeds	46,541	Poultry and eggs	576,052
Hay and forage	371,688	Wool	170
Vegetables	733,459	Honey and wax	8,750
Fruits and nuts	118,787		
Cotton	13,260,544		
All other crops	2,616,411	Total value	21,530,542
Animals sold or slaughtered	[1] 643,000		

[1] Not reported by the census; estimated.

According to the 1920 census, there are 8,260 farms[3] in Spartanburg County, occupying 83.4 per cent of the total area. The improved land constitutes 60.7 per cent of the total area in farms.

The average value of all farm property is reported as $6,616 per farm, of which 75.3 per cent is in land, 14.6 per cent in buildings, 3.2 per cent in implements, and 6.9 per cent in domestic animals.

Most of the farms produce enough feed for the stock kept. Much of the meat and molasses, and all the vegetables, milk, and butter for home use are produced upon the farms. On some farms corn for meal and wheat for flour are produced. There are many farmers, however, especially tenants, who purchase all food supplies and much of the stock feed. In 1919, 28.8 per cent of the farms reported an expenditure of $196,113 for feed. Most of this feed is brought in from western States and consists of corn, oats, hay, bran, and mixed feeds.

The topography has little influence upon the distribution of crops. The broken areas along the stream edges are not used as extensively for farming as the smoother and less broken interstream regions and ridges. The level bottom land is used for corn and pasture almost exclusively. The farmers recognize in a general way that some soils are better suited to certain crops, but do not follow the natural adaptations in practice. Certain soils, such as the Cecil sandy clay loam, clay loam, and sandy loam, and the Davidson clay loam are known to be adapted to cotton and are in great demand for this crop, but cotton is grown upon all the upland soils. The Congaree or first-bottom soils are considered the best soils for corn. This bottom land is known to be productive when planted to other cereals and also to cotton, but the danger of overflow is so great that it is not used for other crops than corn.

The methods followed in the past, including clean cultivation and continued cropping without the return of organic matter to the soil, have resulted in almost complete exhaustion of the humus supply. Only upon a few farms and on special patches has the use of manure and the turning under of stubble or cover crops been sufficient to maintain an adequate supply of organic matter. On dairy farms the cornstalks are cut off and used for silage. On a few farms the stalks are cut and shocked in the field, as practiced in the Corn Belt. But more commonly the stalks are topped, the blades pulled, and the ears gathered from the standing stalks. The cotton is picked by hand and the stalks are left until the following spring, when they are knocked down by hand or cut with a cotton-stalk chopper. The cotton is ginned at local ginning plants, of which there are many in the county. The cotton seed is sold to the local oil mills. Occasionally the seed is composted and returned to the land. Wheat and oats are usually sown broadcast, except on some of the larger and better equipped plantations, where they are drilled in. The oats are cut and fed in the bundle. Cowpeas are usually cut for hay, but in some cases the pods are picked and threshed.

The equipment on the average farm is fairly good, upon the best farms it is good, while upon the poorer farms and those operated by tenants it is hardly adequate even for the system of farming followed,

[3] The census enumerates each tenancy as a farm.

which does not require a large outlay in tools. The dwellings on the better class farms are one or two story structures, usually painted, and the outbuildings are substantial and sufficient for the type of farming followed. The buildings range downward to the cabin and log outbuildings of the renter. The machinery and tools on the average farm consist of 2-horse wagons, mowing machines, disk plows, disk harrows, cutaway harrows, spike and spring tooth harrows, turning plows, middlebusters, spike-tooth cultivators, cotton and corn planters, plow stocks, and shovel, bull tongue, and sweep assortments. The better farms also have sulky plows, riding cultivators, corn planters, grain drills, manure spreaders, hayrakes, reapers, and tractors. This equipment ranges downward to the poorer farms that have 1-horse wagons, 1-horse plows, cradles, scythes, hoes, and rakes. Practically all the farms have the necessary implements for the cultivation of cotton and corn.

Mules are the standard work stock of the farms. Horses are used mainly for driving and are worked during the busy seasons. In January, 1920, there were 9,802 mules and 2,580 horses on the farms of the county. Most of the mules and horses are brought in from Missouri and Kentucky. As a rule they are good stock.

The cultivation of the land for the main crops, cotton and corn, differs considerably from that practiced in parts of the cotton belt of this State lying south of this county. The land is broken in the early spring and is harrowed several times before planting time. Planting and cultivation are level or nearly so. A few planters cling to the former custom of planting cotton on a bed and corn in a trench, but this has been generally abandoned, except in wet seasons and upon some soils. On wet land cotton is planted on beds and on sandy land corn is planted in shallow trenches. Cotton is "laid by" with the rows slightly elevated, owing to the action of the sweeps. Spring-tooth cultivators are used for corn, and the hoe cultivator is used to some extent. The hand hoe is used to a very limited extent on corn, but is necessary to chop and thin cotton.

No systematic rotation of crops is in general use. Where such a large acreage is in one crop (cotton), it is difficult to practice rotations. Cotton or corn is planted upon fields for indefinite periods. In some cases change is made from cotton to corn and vice versa after several seasons. Upon the better farms alternation of the two crops is more frequent. Wheat and oats are usually followed by cowpeas, but it is difficult under the present system of farming to run these crops between cotton or corn. More changes of crops occur on the owner-operated farms than on the rented farms. The rented farms produce little but cotton, and consequently no rotation is possible. The custom prevalent at one time of leaving the fields fallow every seven years is not generally practiced now.

Commercial fertilizers are used extensively for cotton and to a smaller extent for other crops. The census reports for the last three decades show a decided increase in the amount expended for fertilizer. In 1909, 5,511 farms reported the use of fertilizer, with an average expenditure of $73.70 per farm. In 1919, 7,990 farms reported an average expenditure for fertilizer of $214.50 per farm. During the years of the recent war, when certain elements were scarce and high, less fertilizer was used than formerly, but the high price of cot-

ton during the last few seasons stimulated the use of fertilizers. Complete fertilizers were formerly used, the common formulas ranging from 8–2–2 to 8–4–4.[4] During the years of scarcity of potash and high price of the other ingredients lower grades were used, 8–1–0, 10–2–0, and 8–2–0 being popular. The tendency now is to return to the better grades, and a 9–2–2 mixture is used extensively. Most of the fertilizers used are commercial mixtures. The small quantity mixed at home consists of acid phosphate, cottonseed meal, and kainit (when it can be obtained) in varying proportions suited to the needs of the farmer. Complete fertilizer is used at the rate of 250 to 800 pounds per acre for cotton and 250 to 500 pounds for corn. Acid phosphate and cottonseed meal are applied to corn in small quantities. Acid phosphate (14 to 16 per cent) or a blood-and-bone mixture is sometimes used for wheat. Nitrate of soda at the rate of 75 to 250 pounds per acre is applied to oats as a top dressing. In most cases no fertilizer is given this crop at the time of sowing.

The available manure is applied to corn, to special patches of cotton, and to other crops grown in gardens and small patches. The quantity of manure produced on the average farm is small. Not enough stock is kept or enough feed raised to furnish manure in sufficient quantities to keep up the fertility of the land.

Very little lime is used. Ground phosphate rock is applied to a small acreage on some farms. Green manuring is practiced only on a relatively small acreage on a few plantations. A sod is rarely turned under. In many cases the cotton or corn stalks and the crab grass on the fields are burned before plowing, thereby destroying the little organic matter that would otherwise be incorporated with the soil.

Most of the farm labor is performed by the owner or renter and family. Negro laborers are in the majority; however, the negro population is confined largely to the southern part of the county, and the few farm laborers in the northern part are whites. In 1919 only 2,005 farms reported the hire of labor, with an average expenditure of $112.64 per farm. The price paid for labor has advanced rapidly in the last few years, but is beginning to show a tendency to return to normal. In 1910 the average paid was $12 per month with board and $15 to $18 without board. Day laborers at that time received 75 cents to $1 a day. In 1920 the average paid was $30 per month with board and $45 per month without board, while day laborers received on an average $2 to $2.25 a day with board and $2.50 to $3 a day without board. The former price of 50 cents per 100 pounds for picking cotton has advanced steadily with the price of cotton until last season (1920) $2 to $2.50 per 100 pounds was paid.

This region has never been one of large plantations like other counties of the Piedmont. During recent years most of the larger plantations have been subdivided, so that at present the farm lands are mainly in small holdings. The average size of farms given by the 1920 census is 49.4 acres, as against 82.2 acres in 1900. As the census considers each tenancy a farm, the average holding is considerably larger than the figures given. In 1920, 32.1 per cent of the farms were operated by the owners, 67.7 per cent by tenants, and 0.2 per

[4] Percentages, respectively, of phosphoric acid, nitrogen, and potash.

cent by managers. While the proportion of farms operated by tenants is lower than in some of the adjoining counties, it is slightly higher than the average for the State. About 42 per cent of the tenants are negroes. The terms of the leases vary. The consideration may be in terms of cash, a share of the crops, or a stipulated quantity of lint cotton. The large majority are share renters or croppers. The few cash tenants pay about 8 per cent of the value of the land. The terms of share tenants vary considerably, according to the financial condition of the tenant. Where the owner furnishes half of the fertilizer and half of the seed, he receives half of the lint cotton, half of the seed, and half of the other crops. Where the owner furnishes all the fertilizers and seed, he gets all the cottonseed. The terms of standing renters call for a stipulated quantity of lint cotton, according to the quality of the land or the proportion of fertilizer furnished by the owner, usually 1,000 to 2,000 pounds of lint cotton per 1-horse farm. The tenants work 1, 2, or 3 horse farms consisting of 30 acres per horse. The owners usually have active supervision over many of the tenants, especially the share croppers.

The value of farming land varies between wide limits; ranging from the low values of the broken and undeveloped land of the back districts to the maximum asked for highly developed land along the main highways and around the centers of population. The price of land also varies to some extent with the character of the soil. The best farm lands, in the most advantageous positions, are held for $150 to $250 an acre. Good land in the remote districts sells for $45 to $150 an acre. The rougher or undeveloped land sells for $10 to $45 an acre. According to the census reports the average assessed value of farm land for the county was, in 1900, $9.96 an acre; in 1910, $36.04 an acre; and in 1920, $100.85 an acre. The price of land has declined to some extent below the high level reached in the spring of 1920.

SOILS.

Spartanburg County lies in the Piedmont Plateau region of South Carolina. It occupies a high plateau which has been badly dissected and is exceptionally well drained.

The color of the soil ranges from gray and brown to red, the prevailing color being red or reddish brown. This is particularly noticeable when looking across the country from one hillside or ridge to the other. This red color is probably due to the oxidation of the iron salts contained in the rocks from which the soils are derived.

The soils of Spartanburg County are prevailingly low in organic matter. This region was forested until reclaimed for agriculture and there were no extensive prairie areas; consequently the conditions were not favorable for the accumulation of organic matter in the soil. In the wooded areas an upper layer, an inch or two thick, contains some organic matter, but this soon disappears when the land is cleared and brought under cultivation.

There is no free carbonate of lime accumulated in the soils of this county, although the original rocks from which these soils are derived contained some lime. Leaching has been active and continuous, as the rainfall is heavy and drainage has been good to excessive. Under the warm climate the soil does not remain frozen for any length of time, and consequently leaching goes on throughout the year.

The Cecil soils occupy by far the greater part of the county. Closely associated with these are the Louisa soils. In these soils there are in many places no definite soil horizons; that is, the soil grades imperceptibly into the subsoil, which usually extends to a depth of several feet. However, in some areas there is an inch or two of brown material, underlain by a yellowish or reddish-brown layer, which is in turn underlain by a heavy clay subsoil.

The Appling and Durham soils have three distinct layers or horizons—the gray surface layer, which is usually about 4 to 6 inches deep, the yellow subsurface layer and the typical subsoil. The Iredell soils have two, and in places three horizons—the surface soil and the heavy, waxy clay subsoil; and usually at about 20 to 30 inches the soft, disintegrated, yellowish-green diorite rock is encountered. There is very little variation in the 3-foot section of the Davidson clay loam. In cultivated areas the surface soil is a dark reddish brown, as contrasted to the maroon red of the subsoil. The Congaree types represent recently deposited materials which have not leached, oxidized, and weathered sufficiently to form any distinct soil horizons.

There is a close relationship between the soils of this county and the underlying rock formations from which they are derived. The principal rock formations are gneisses, which constitute the bedrock of fully three-fourths of the county. Mica schist and hornblende schist formations also appear in the gneiss areas. Small areas of granite are scattered over the county in isolated outcrops. Dikes of diabase rock are found in the southeastern part of the county. The most prominent of these is Rich Hill. Fair-sized areas of mica schist occur in the south-central part of the county. Closely associated with these rocks are small areas of black mica schist and so-called pumice stone. Small outcrops of quartz-mica schist are scattered over the area. Practically all these rocks are deeply weathered, and only in a few places does the bedrock outcrop. Some outcrops consist of hard resistant granite; others are black mica schist, which weathers into an impervious clay near the surface that protects the underlying rock. The lithological character of the rocks differs widely, and influences to some extent characteristics of the soils derived from them.

The soils fall into two natural groups, upland and bottom land. The upland group includes residual soils, i. e., those formed by the weathering in place of the rocks of the region. The bottom land represents the overflow land along the streams, which has been derived from material washed from the upland and deposited by the streams during periods of flood. The soils of the county are arranged first into soil series and then according to texture into types. Each series consists of soils that are similar in origin, mode of formation, color, and general characteristics. The series are divided into types which differ from each other in texture, that is, the relative proportion of gravel, sand, silt, and clay in the surface soil. The soil type is the unit of soil mapping.

The Cecil, Durham, Appling, Davidson, Iredell, Louisa, Porters, and Congaree series are represented in this county.

The types of the Cecil series have grayish-brown, brown to reddish-brown, and even red surface soils, and a red, stiff but brittle, clay subsoil. They are derived mainly from gneiss, granite, and schists. The Cecil sandy loam is derived mainly from gneiss and mica schist, and in a few places from granite. The sandy clay loam and clay loam are derived principally from gneiss, hornblende schist, and mica schist. The coarse sandy loam is derived mainly from coarse-grained granite. The gravelly sandy clay loam and gravelly sandy loam are derived from gneiss, quartzite, quartz, and mica schist.

The Appling types have gray to yellowish-gray surface soils, a yellow subsurface, and a yellowish-red to reddish-yellow or mottled light-red and yellow, stiff, but fairly brittle subsoil. They are derived principally from gneiss, but to some extent from granite. The sandy loam is the only type mapped in this county.

The types of the Durham series have gray to pale-yellow or yellowish-gray surface soils and a bright-yellow friable subsoil. These soils are derived from granite and gneiss, but are relatively low in iron-bearing materials. Only one type, the sandy loam, was mapped.

The Davidson series has dark reddish brown surface soils and a dark-red to maroon-red, smooth, but friable subsoil. The types are derived from diorite, diabase, and other dark-colored basic rocks. These rocks occur usually as intrusive dikes. The Davidson clay loam is mapped in this county.

The Iredell series is characterized by grayish-brown to yellow surface soils and a yellow to brownish or greenish-yellow plastic, waxy, clay subsoil. Usually at about 20 to 30 inches the partly disintegrated greenish-yellow parent rock is reached. These soils are derived from diorites and other plastic rocks, and to some extent from pumice stone. The Iredell fine sandy loam and the loam were mapped in the county.

The Louisa series has brown to reddish-brown surface soils and a red subsoil, which contains sufficient mica to produce a friable structure and a greasy, slick feel. These soils are derived from mica schist. They differ from the Cecil soils mainly in the high content of mica and friable structure of the subsoil. The sandy clay loam and the clay loam were mapped.

The Porters series has brown surface soils and a yellowish-brown to reddish-brown friable subsoil. These types are derived from gneiss. Only one type, the Porters loam, was mapped.

The Congaree series has brown to grayish-brown surface soils and a brown to light-brown subsoil. These soils consist of material brought down from the upland areas of the Cecil and other soils and deposited during times of overflow. Both the soil and subsoil contain a noticeable proportion of finely divided mica scales. These soils are developed in the first bottoms and are subject to frequent overflow. The fine sandy loam and silt loam represent the series in this county.

Meadow (Congaree material) represents first-bottom material that is so variable in texture that it can not be separated into types.

The soil types are described in detail in subsequent pages of this report. Their distribution is shown on the accompanying soil map. The table below gives the actual and relative extent of each type mapped.

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Cecil sandy clay loam	209,152	39.9	Congaree silt loam	3,008	0.6
Cecil sandy loam	168,832	32.2	Cecil coarse sandy loam	2,688	.5
Cecil clay loam	63,360	12.7	Cecil fine sandy loam	2,304	.4
Eroded phase	3,328		Davidson clay loam	1,728	.3
Meadow (Congaree material)	23,488	4.5	Durham sandy loam	1,280	.2
Cecil gravelly sandy clay loam	11,392	2.2	Iredell loam	896	.2
Appling sandy loam	9,216	1.8	Congaree fine sandy loam	768	.1
Iredell fine sandy loam	6,784	1.3	Porters loam	256	.1
Cecil gravelly sandy loam	5,696	1.1			
Louisa sandy clay loam	5,184	1.0	Total	524,160	
Louisa clay loam	4,800	.9			

CECIL GRAVELLY SANDY LOAM.

The Cecil gravelly sandy loam is essentially the same as the Cecil sandy loam, except that it contains a large quantity of white angular quartz fragments or gravel upon the surface and throughout the entire soil profile. This type is less deeply weathered than most of the Cecil soils, the parent rock being encountered locally at 4 to 6 feet below the surface. However, in most places it is weathered to a depth of 10 feet.

The type is derived from quartzite or from schist which contains quartz veins. The quartz is harder and weathers more slowly than the surrounding rocks, giving rise to a marked topography consisting of well-defined, low, elongated ridges, which stand 20 to 50 feet above the surrounding country, and in some cases as high as 100 feet. The run-off is rapid owing to the sloping surface, and the underdrainage is thorough because of the porous nature of the substratum. The gravel acts as a mulch to retain moisture.

The type is most largely developed in the northeastern corner of the county. Smaller areas are widely scattered over the county. Some areas occur around the bases of Little and Collins Mountains, at Windmill Hill, on a long narrow ridge 3 miles east of Spartanburg, 1 mile northeast of Cashville, 3 miles northwest of Reidville, 1 mile south of Cowpens, 1 mile east of Cannons Church, 2½ miles southwest of Cross Anchor, and south of Woodruff.

Most of this land is forested, and only relatively small areas are used for agriculture. The forest consists mainly of shortleaf pine and scrub oak. In some areas black or mountain pine is found; in other places there is a scattering of hardwood trees in which dogwood is plentiful. The soil is not important. The small areas planted are used largely for cotton, with patches in corn and other crops common to this section, and a few small peach orchards. The crop yields do not average quite as high as those on the sandy loam. The farming methods do not differ essentially from those followed on the sandy loam, except that less fertilizer is used, and because of the gravel cultivation is less efficient.

In general this land sells for $20 to $50 an acre, but a few of the smoother improved areas are held at somewhat higher prices.

Besides the methods recommended for the use and improvement of the Cecil sandy loam, which are all applicable to this land, orcharding might be profitably followed. This kind of soil is well suited to

the production of peaches and the other fruits of this section. The air drainage is good and the trees should bear good fruit with a minimum danger from frost.

The stony areas are usually rougher and are not used for farming. The stones are mainly of quartz, but in places they are composed of quartzite or granite. The stones from much of this soil could be piled into fences and the land utilized for crops. In its present state it is best suited for forestry and grazing. The price is very low, cut-over land selling for about $5 an acre. This land occupies small mountains or high hills, and in some cases the hillsides along streams. The most prominent developments of the stony areas are at Collins Mountain and Beddington Mountain on the Union County line. Small areas are located near Parris Bridge, north of Converse, southeast of Golightly School, south of Fair Forest Creek, along Island Creek 2 miles north of the mouth, and in the vicinity of White Stone Springs in the southeastern part of the county.

CECIL GRAVELLY SANDY CLAY LOAM.

The surface soil of the Cecil gravelly sandy clay loam, called "red gravelly land," in forested areas is a dark-brown to dark yellowish brown gravelly sandy loam, 3 or 4 inches deep, grading into a reddish-brown or yellowish-red gravelly sandy clay loam which extends to 6 or 8 inches below the surface. The subsoil proper consists of red friable clay containing some gravel. In places the subsoil contains a noticeable amount of mica but in all cases it is firm. In cleared areas the surface soil is a reddish-brown gravelly sandy clay loam to 6 or 8 inches in depth, resting upon the typical red clay subsoil. The surface of fallow fields is strewn with gravel, which consists of fragments of quartz, quartz-mica schist, and iron concretions. Weathering is not as deep in this soil as in other Cecil soils; in many places partly disintegrated rock comes within the 3-foot soil profile, while in other places at comparatively short distances it may be 20 to 25 feet to bedrock.

In a number of areas the gravelly sandy loam mantle is slightly deeper than typical, and the soil has a yellowish-brown color, but the gravel content is the same as over the remainder of the type. This variation occurs in rather small areas, mainly in the northeast part of the county in the vicinity of Cowpens and Cherokee.

The typical areas of Cecil gravelly sandy clay loam are found chiefly upon hills bordering the Pacolet River from Clifton to Parris Bridge, and extending up each side of Island Creek to Mary Louise Mills. Smaller areas are scattered along the North Pacolet River to Fingerville. Fairly well developed areas are found north and east from Nesbitts Bridge on the Tiger River and in the vicinity of Hebron Church.

The type has an undulating to hilly topography and generally occupies broken country along streams. In places the surface is fairly smooth and in others it is broken by slight ridges of the same nature as the Cecil gravelly sandy loam. Erosion is not active, as the gravel protects the soil from washing, even upon the steepest slopes. The run-off is rapid and the underdrainage is good. Owing to the heavy character of the subsoil, this land holds moisture fairly well.

Much of the land of more broken surface is in forest consisting of shortleaf pine or a scattering of hardwood and pine. Extensive areas are under cultivation and are used for practically all the crops grown upon the Cecil soils. The methods used and the yields obtained are very similar to those on the sandy clay loam. The steepness of its topography is a drawback in growing grains and hay crops, and consequently the price ranges somewhat lower than for the other Cecil types. However, the more level and gently undulating areas are held at a relatively high price. Prices range from about $30 to $100 an acre, according to location, topography, and improvements.

The same general methods for improvement are recommended for this type as for the Cecil sandy clay loam. The land is well suited to cotton and much of it should be used for the production of this crop. Although erosion is not active the terraces should be kept up to prevent the loss of the finer soil by surface wash. Cover crops could be used advantageously for this purpose. Some of the steeper areas should be put in pasture of Bermuda grass, lespedeza, and other native grasses. Some of the land is well suited to orcharding and some form of horticulture should be fostered on every farm, as practically all the fruits grown in this section appear to thrive upon this type.

CECIL COARSE SANDY LOAM.

The surface soil of the Cecil coarse sandy loam in forested areas is a dark yellowish brown coarse sandy loam, fairly loose and open in structure, extending to 7 or 8 inches, where it grades into a reddish-yellow, heavy coarse sandy loam slightly more compact than the surface soil. The subsoil proper, appearing below 15 inches, consists of a red coarse sandy clay, fairly compact but friable. In places the substratum is yellowish red below 8 or 10 feet, or where it approaches the partly disintegrated parent rock. The coarse-grained particles in the soil consist of angular quartz grains and pieces of feldspar. In cleared areas the surface soil is a yellowish-brown, friable coarse sandy loam, 6 to 8 inches deep, having a gray color in fallow fields. The soil is generally deficient in organic matter.

In several areas lying 1½ miles north of Stone and southeast of Reidville the subsoil is not as red as the typical Cecil subsoil. In scattered spots in the vicinity of Woodruff the soil is shallow, the subsurface layer is reddish colored, the subsoil has the typical red color but contains a noticeable amount of mica, and the lower subsoil and substratum are less firm than typical. A number of areas too small to map are included with Louisa soils.

The Cecil coarse sandy loam is developed chiefly in the southwestern part of the county in scattered areas of one-fourth to 1 square mile extent. The largest areas lie around Shady Grove Church, one-half mile northeast of Van Patton Shoals, 2½ miles west of Woodruff, 3 miles northeast of Woodruff, 3 and 4 miles southeast of Reidville, 1 mile south of Collins Mountain, and in the vicinity of Hebron Church, and Nesbitts Bridge.

The surface varies from fairly level and undulating to hilly and steeply sloping. The run-off is not as large as on most of the Cecil soils, as owing to the porous nature of the soil and substratum a relatively large proportion of the rainfall sinks into the ground. Erosion

is not active, although terracing is practiced to prevent washing on the steeper slopes. This land is more retentive of moisture than would be expected from its coarse nature, and crops rarely suffer during ordinary dry spells. Where erosion once succeeds in cutting into the softer lower strata, gullying is very rapid.

About three-fourths of this type is cleared and under cultivation. The remaining forest occupies broken areas and places where the soil is shallow. Some of the forest is largely second-growth pine, usually upon abandoned fields. In other places it consists of cut-over hardwood with a scattering of pine and cedar.

Cotton is the principal crop. Smaller acreages of corn, oats, and cowpeas are grown. Rye, sorgo, crimson clover, and vetch are grown in small patches. Most of the farms have gardens and small orchards. Cotton yields from one-fourth to 1 bale per acre, with an average of about one-third bale. Where better methods and high-grade fertilizers are used the yields average around three-fourths bale. Corn yields 15 to 25 bushels, oats 15 to 35 bushels, and cowpeas 2 to 3 tons of hay per acre. Most of the cowpeas, however, are grown for seed. Crimson clover and vetch do fairly well. Crops upon this soil may suffer from severe drought, but usually make good yields even in the wettest years.

This type is located fairly well for farming, being situated near railway shipping points. The price ranges from $40 to $100 an acre.

The Cecil coarse sandy loam is well suited to the production of cotton but not to grain crops. Cowpeas and vetch succeed, but the other legumes do not thrive. The type is fairly well suited to the growing of fruit, especially peaches, and some line of horticulture could be followed to advantage.

CECIL SANDY LOAM.

In virgin areas the Cecil sandy loam has a surface layer, an inch or two thick, of dark yellowish brown mellow sandy loam which contains a noticeable proportion of organic matter. Below this the material consists of 2 to 4 inches of yellow or pale yellowish brown light sandy loam, passing through orange-yellow into reddish-yellow or reddish-brown heavy sandy loam, which extends to a depth of 8 to 12 inches below the surface. A subsurface layer of red or mixed yellowish and red or orange-red sandy clay loam, about 2 or 3 inches thick, lies between the soil and subsoil. The subsoil consists of red, compact, but friable clay, with a noticeable content of medium and coarse sand. The substratum is essentially the same as the subsoil, becoming slightly more compact to a depth of 4 to 6 feet, then becoming gradually lighter upon approach to the unweathered parent rock. In cleared areas the soil is yellowish-brown sandy loam 6 inches deep, passing into an orange-yellow sandy loam, which passes abruptly into a reddish-yellow heavy sandy loam.

The Cecil sandy loam is fairly uniform in color and structure, varying mainly in the depth of the soil mantle above the red subsoil. The latter appears at depths ranging from 6 to 15 inches and averaging about 12 inches. A few stony areas of this soil have been shown on the map by stone symbols. In general the partly decomposed bedrock is 20 to 30 feet below the surface, in many places it lies as deep

as 50 feet. It rarely appears within the 3-foot soil profile. In some places a few unweathered bowlders of granite are scattered over the surface. Over the mica schist areas small fragments of this rock and of quartz are present, and in places, as in the vicinity of Cherokee, small iron concretions are common. In places a quantity of white angular quartz gravel is found in spots on low rounded knolls or upon low ridges. Where this soil is derived from mica schist, as it is in the vicinity of Woodruff, the substratum is filled with mica and is more friable than elsewhere.

The type is developed most extensively in the interstream areas, where the plateau has suffered less from erosion. It has a fairly level to gently undulating to hilly topography. In places it occupies the uneroded somewhat flattened ridge tops and on some divides it is the only soil extending down the hillsides and slopes to the edge of the stream bottoms.

The topography and position of the type insures excellent drainage. Streams and minor drainage ways ramify nearly all parts of the upland, reaching well back into the body of this soil. Although the drainage is thorough, the soil holds moisture well, especially in the few inches of loamy material immediately above the subsoil. This layer is moist when other parts of the section are dry. Erosion is active in the more broken areas, where cleared, but does not do very much damage, as all the cultivated areas have been terraced.

The Cecil sandy loam is second in extent in the county, coming next to the Cecil sandy clay loam. It is extensively developed over the south-central part of the county and covers comparatively large areas in the northwestern part. The largest areas are in the southeastern part, south of Cowpens, east of the Pacolet River to the mouth of Richland Creek and to White Stone Station, east of Rich Hill to Foster Mill, up Fair Forest Creek to Foster Chapel, east of Wards Creek and north of a line from Walnut Grove to Glenn Springs. Important areas are found around Reidville and Woods Chapel, near Spartanburg and north to Sigsbee, south from Woodruff and around Hobbysville. Smaller areas occur in other parts of the county.

Practically all of this land has been farmed at some time. At present about 65 to 70 per cent is under cultivation. The forest growth consists entirely of second growth, and is largely shortleaf pine with a scattering of oak and hardwoods. The few remaining trees appear to support the tradition that this land at one time supported a sturdy growth of hardwoods. As the area under cultivation indicates, this is an important farming soil. It includes some of the best farms of the county. It is used mainly for tilled crops, very little being devoted to pasture. Cotton and corn are the leading crops, occupying an acreage larger than all other crops combined. Oats, wheat, and cowpeas are grown on fairly large acreages.

The minor crops are rye, clover, sorgo, peanuts, and sweet potatoes, which are usually planted only in small patches. There is probably more fruit grown in home orchards on this soil than upon any other type in the county. Peaches, pears, plums, and summer varieties of apples predominate. Practically all the vegetables common to this region are grown in gardens.

The yields range between wide limits, varying according to season, condition of land, kind and amount of fertilizer, and cultural methods. Cotton yields one-fourth to 1 bale or more per acre, with an average

of about three-fourths bale. Corn yields 20 to 45 bushels per acre, oats average about 20 bushels, and wheat about 10 to 15 bushels. Alfalfa does fairly well the first few years where properly handled, but after that time it begins to fail, and is superseded by native grasses and weeds. Crimson clover, cowpeas, and vetch give good yields of hay. Sweet potatoes yield about 100 to 150 bushels per acre, and potatoes 75 to 125 bushels per acre. With special care and fertilization the yields of both these crops run 25 to 50 bushels per acre higher. Peanuts average about 30 to 50 bushels per acre.

This soil is usually plowed 6 to 8 inches deep, as there is little danger of turning up the clay subsoil. Then it is usually disked to make a smooth seed bed. Nearly all crops are planted and cultivated level, except on some farms and in certain seasons corn is planted in a furrow and cotton on a slightly elevated bed. Not much manure is used, but nearly all the available manure is applied to the best patches on this soil. Commercial fertilizer (complete) is used in varying quantities—from 200 to 800 pounds per acre for cotton, and smaller quantities for other crops. The mixtures in common use analyze 9–2–2, 8–3–3, 10–2–2, 8–4–4, and 9–2–0. On many farms fertilizer is used only for cotton. Cottonseed meal is applied to corn land at the rate of 200 pounds per acre, and nitrate of soda is sometimes used at the rate of 75 to 150 pounds per acre as top dressing for corn and small grains. Manure is used in gardens, cornfields, and special patches. Lime is applied to a small extent.

The Cecil sandy loam is deficient in organic matter, as is the case with the other upland soils of the county upon which clean cultivation has been practiced, no rotation followed, and no sod turned under. Organic matter can be supplied by growing more legumes, turning under cover crops, and increasing the supply of manure by keeping more stock.

Increasing the numbers of livestock would be the most feasible method of building up the land, as this would necessitate the growing of more stock feed, especially cowpeas, alfalfa, clover, and vetch. Turning under the stubble from these crops, together with the manure, would build up this soil more quickly than any other method. Where organic matter is incorporated with the soil small quantities of lime are beneficial, 500 pounds of burnt lime or 1,000 pounds of ground limestone per acre. For the best results on this land complete fertilizer should be used; but by following the increased-stock program the quantity of fertilizer may be lessened and the nitrogenous element practically eliminated.

The Cecil soils do not require large quantities of potash. Acid phosphate should be used with grains, about 250 to 500 pounds per acre preceding corn, wheat, or oats. Under the present system large quantities of commercial fertilizer must be used to maintain the yields.

This land is well suited to the production of the general farm crops, including cotton, and to stock raising, dairying, and orcharding. It is especially adapted to sweet potatoes, bright tobacco, and peanuts, and to such legumes as cowpeas, crimson clover, and vetch. Where limed, inoculated, and properly cultivated to form a mellow

and firm seed bed, alfalfa should make a good stand and furnish excellent hay for at least three years.

CECIL FINE SANDY LOAM.

The surface soil of Cecil fine sandy loam in forested areas is a yellowish-brown mellow fine sandy loam with the surface few inches darkened by organic matter. At 6 to 8 inches below the surface the soil passes into a reddish-yellow sandy clay loam, only slightly compact, which extends for 3 or 4 inches as an intergrade between soil and subsoil. The subsoil consists of red clay, fairly compact, with a tendency to roll up on the auger and containing a noticeable proportion of fine sand. The subsoil is not as deep a red as commonly found in the Cecil soils. The materials giving this type have an average depth of 5 to 6 feet. In some places the underlying rock has weathered to depths of 10 to 15 feet; in others it comes within 2 feet of the surface.

The type is fairly uniform throughout the area. In cleared areas the soil is yellowish-brown, the surface having a decidedly gray appearance in fallow fields. Reddish spots appear where the mantle of soil is thin or where the surface layer has been removed by erosion.

This type is confined to the southeastern part of the county, along the Union County line, mainly south of Fair Forest Creek. The most typical areas lie between Dutchman Creek and the Union County line, and 2 miles north of Glenn Springs. Much of the type has an undulating to rolling topography, becoming broken and hilly near the streams. In these broken areas the surface is steep and erosion is active. Both surface and internal drainage are well established, but aëration is not as thorough as in other Cecil types.

The Cecil fine sandy loam is not extensive, but is fairly important in the section where it is developed. About two-thirds of it is cleared and under cultivation. Only the broken or eroded areas are in forest. The growth consists of old-field pine with a scattering of hardwoods, including in some places a few blackjack oaks.

Cotton is the most important crop, corn is next, with oats and cowpeas following. A number of farmsteads are located upon this land, with the attendant gardens, orchards, and small patches of sorgo, potatoes, sweet potatoes, and forage. The yields do not run high unless crops are heavily fertilized. Cotton yields from one-fourth to 1 bale per acre, averaging about one-half bale. Corn yields 10 to 30 bushels per acre, the lower yields being on unfertilized land. Oats range from 15 to 40 bushels per acre. Wheat averages about 10 bushels. Cowpeas yield about 2 to 3 tons per acre.

The Cecil fine sandy loam is easily tilled and responds readily to fertilization. The same general crop methods, fertilizer applications, and cultural methods are practiced on this land as on the Cecil sandy loam. The selling price is lower than would ordinarily be expected for this class of soil, but most of it lies a long distance from markets or towns. The price ranges from $20 to $40 an acre, with a few of the more favorably located and improved areas selling as high as $100 an acre.

The methods recommended for the improvement of the Cecil sandy loam apply to this soil. Legumes should be more freely used to build up the soil and lessen the need of nitrogen fertilizers.

CECIL SANDY CLAY LOAM.

The soil of the Cecil sandy clay loam in forested areas has about one-half to 1 inch of the surface soil discolored by organic matter. Below this the soil consists of a yellowish-brown mellow sandy loam, about 3 inches deep, which passes imperceptibly into a reddish-brown, mellow sandy clay loam extending to a depth of 6 or 8 inches. The subsoil is a red, compact, friable clay containing some angular quartz sand. The subsoil becomes more compact with depth. The substratum is essentially the same as the subsoil, except that it is slightly more friable and contains more mica. In places below a depth of 6 to 10 feet it becomes less compact but it retains its red color to the depth of perfect weathering, 25 to 40 feet below the surface. In many places the complete weathering extends only to about 10 feet. Locally the substratum has yellow mottlings caused by partly decayed yellow schist or hornblende schist.

In cleared fields the soil is usually a mellow yellowish-brown to reddish-brown heavy sandy loam to sandy clay loam to about 6 or 7 inches, where it grades into the typical red subsoil. The depth of the sandy loam or sandy clay loam mantle varies considerably even in the same field. Some fields consist of small spots of sandy loam and clay loam, which give a general spotted appearance to plowed fields. This land is locally spoken of as "red sandy land," "shallow sandy land," or even "red clay land," according to the varying amounts of sand in the surface soil. It represents patches of sandy loam and clay loam too small to be separated on the map.

Small fragments of the parent rock, together with iron concretions and quartz gravel, are occasionally found. In the general region of the Pacolet River, from near Cowpens to Cherokee and north to McMillans Mill, small fragments of iron or limonite are scattered over the surface and throughout the soil profile. In the northern part of the county this type is less eroded than in other parts of the county. This difference is due in part to the general smoothness of the surface of this section and in part to the fact that the soil has been under cultivation a much shorter time. Also many of the steeper slopes of this region are covered with gravel and mapped as another soil type, while many of the steeper slopes of the central and southern parts of the county are Cecil sandy clay loam. The sand particles in the soil of the northern part of the county are in general less angular and range in size from medium to fine, instead of medium to coarse as in the lower end of the county.

The topography varies from fairly level and gently undulating to broken and hilly. Most of the type is strongly rolling to hilly. It occupies the broken country along streams and extends back over the divides in many places, forming much of the interstream region. The drainage is largely disposed of through surface channels, which ramify all parts of the type as dry or nearly dry drainage ways, and unite into streams. This land is more retentive of moisture and consequently more drought resistant than most types, but the run-off is sufficient and crops do not suffer from excess moisture during rainy seasons.

The Cecil sandy clay loam occurs in nearly all parts of the county. North and west of a general line from Cowpens to Foster Mill, thence

to Foster Chapel, to Moore, and along the Tiger River to the Union County line the type covers a large proportion of the area.

Owing to its large extent the Cecil sandy clay loam is the most important soil in the county. About 60 or 70 per cent of it is cleared and under cultivation. The existing forest consists almost entirely of second-growth shortleaf or old-field pine, with a few scattered white oaks and a smaller number of other hardwood trees. Cotton is the most important crop, occupying an acreage fully as large as all other crops combined. Corn is planted on an acreage equivalent to that of the other remaining crops. Oats, wheat, and cowpeas are next in importance. Rye, sorgo, and clover are grown only in small patches. Alfalfa is found in fair-sized fields on a few farms. Potatoes and sweet potatoes are grown in small patches. Practically all the vegetables common to the region are produced in the gardens on this soil. On many farms there are home orchards of peaches, pears, plums, and apples.

Cotton returns one-half to 1 bale per acre, the yield varying with fertilization and cultivation. Some of this land is considered the best cotton land in the county, the yields here averaging well over 1 bale per acre. Corn yields 25 to 50 bushels per acre, and oats 20 to 30 bushels. Wheat gives fairly good yields. Alfalfa produces 2 to 4 tons of hay per acre, and cowpeas 2½ to 3 tons. The higher yields are usually obtained upon the more level areas, where better farming methods are practiced. The yields hold up better on this land in extreme seasons than on the other types. The soil withstands drought better than the sandy loam or clay loam, and generally gives better yields in extremely wet seasons than the Cecil clay loam or the Appling sandy loam.

The Cecil sandy clay loam is handled practically the same as the sandy loam. The principal difference is in plowing, which is shallower than on the sandy loam, rarely deeper than 6 inches, thus avoiding any disturbance of the subsoil. Practically all the land is terraced to prevent erosion.

Commercial fertilizers are used in about the same quantities as upon the other upland soils. A mixture analyzing 8–2–2 seems to be the most popular. It is used at the rate of 200 to 600 pounds per acre for cotton.

The selling price of this land varies between wide limits. Some undeveloped areas in remote sections sell for $15 to $25 an acre, but the ordinary price is $75 to $100 an acre, and many of the better improved farms, with desirable locations, bring $150 or more an acre.

This land, like most of the upland, is deficient in organic matter, which must be supplied before the best results can be obtained. Plowing should be gradually deepened, but unless cover crops are turned under or manure used, only a little of the subsoil should be brought to the surface at one time. The subsoil is often too moist to plow when the surface soil is in the proper condition. Where cover crops are turned under lime should be applied occasionally, at the rate of about 1,000 pounds of burnt lime per acre. Erosion is active on the sloping areas, and care should be taken to keep terraces in good repair. Shallow gullies can be filled in plowing. Where larger

gullies have been formed the land should be sodded to Bermuda grass and used for pasture.

The Cecil sandy clay loam produces satisfactory yields of practically all the crops grown in this region. It is well suited to cotton, and fairly well suited to cereals. Legumes, such as cowpeas, velvet beans, vetch, crimson clover, and bur clover, succeed. Alfalfa has been grown in a sufficient number of places to demonstrate that it can be successfully grown upon this land if the seed bed is properly prepared. The stand does not last as long as in some parts of the country, but the yields are satisfactory for two or three years.

CECIL CLAY LOAM.

In forest areas the Cecil clay loam, locally known as "red clay land," has a surface layer of one-half to 1 inch of dark material, composed of finely divided organic matter mixed with the soil. Below this is a layer of dark reddish brown mellow loam, heavy sandy loam, or light clay loam, about 2 inches thick, passing into a reddish-brown friable clay loam, only slightly compact, extending to a depth of 5 or 6 inches. The subsoil consists of red brittle clay, compact and friable when dry, and plastic when wet, which becomes more compact with depth. It contains a considerable proportion of angular quartz sand grains, of medium and coarse grades, and particles of finely divided mica, the quantity increasing in the deep subsoil. Weathering has taken place to a great depth, in many places from 40 to 50 feet. The substratum to depths of 5 or 10 feet is essentially the same as the subsoil. Only a few partly weathered fragments of the parent rock are found upon the surface.

In cleared fields the surface is dark reddish brown to dark red, about 5 to 6 inches deep, passing rather abruptly into the typical red clay subsoil.

The type is fairly uniform in character, notwithstanding it is derived from several different rock formations. The greater part of the type is derived from gneiss and schist. Several areas, especially those south of Glenn Springs, appear to be derived from a soft yellow schist. The areas lying west from New Pisgah Church toward Greer are derived from hornblende schist. Both of these variations have a slightly deeper red color than the rest of the type. The areas derived from mica schist in the northern part of the county, are less deeply weathered and have more fragments of the parent rock upon the surface. Particles of mica schist, quartz, and iron concretions are prominent in the soil of these areas.

The Cecil clay loam is less extensive than the sandy clay loam or sandy loam. It occurs in comparatively small detached areas. The largest of these lies near the Union County line from Fair Forest Creek south to the headwaters of Sugar Creek and Wiley Fork of Dutchman Creek. Other areas are located northwest of Inman, in the vicinity of New Pisgah Church, south of New Prospect, northeast of Brannons Store, and north of Roston Mill. A belt extends from the Greenville County line, north from Appalache Mills to Friendship School, along North Tiger River to Travelers Rest Church. Another area extends from Spartan Academy across Middle Tiger River, and across the divide and South Tiger River to a point 2 miles

southeast from Reidville. Other small areas are scattered in different parts of the county.

The surface of the Cecil clay loam is gently undulating to rolling, and rarely hilly, as it occurs along streams. Even here the topography is more subdued than over most of the other Cecil soils in a similar position. The drainage is thorough. Most of the rainfall is removed by run-off, the downward movement of water being retarded to some extent by the compact subsoil. Erosion is fairly active on the steeper slopes.

The original forest of hardwood has long ago disappeared, and the remaining forest is second growth consisting largely of shortleaf pine and white oak, with a scattering of cedar, dogwood, and other hardwoods. This is an important agricultural type, and about 65 to 70 per cent of it is cleared and under cultivation. Cotton is the principal crop, occupying an acreage far in excess of that of all other crops combined. Corn, oats, wheat, and cowpeas are grown, and sorgo, clover, and forage crops are planted in small patches. Small vegetable gardens are found upon most farms. There are a few small orchards of peach, plum, and apple trees. Much of the land is farmed by tenants, which accounts for the large acreage in cotton and the shortage of other crops, gardens, and orchards. Cotton yields one-third to 1 bale per acre, according to season, fertilizer, and cultural methods. Corn yields 20 to 45 bushels per acre. Oats and wheat give fairly good yields, although little attention is given to these crops. Cowpeas cut 1 to 3 tons of hay per acre.

The soil is naturally strong and does not require as heavy fertilization as the other Cecil soils. The general methods of planting and cultivation are the same as upon the other Cecil soils. This soil is heavy and more power is required in farming it than the lighter soils, consequently most of the plowing is shallow. The farmers in general recognize that this land can not be plowed as soon after a rain or worked as early in the spring as the sandier soils.

Before the introduction of commercial fertilizers the Cecil clay loam was the most desirable land in the county, but since that time the sandier lands that are more easily worked have been the most popular with both owners and tenants, especially the latter.

Plowing is rarely deeper than 6 inches and often only 4 inches. Several harrowings are required to break up the clods, and obtain anything like a proper seed bed. It is difficult to work all this land when it has exactly the right moisture content, and therefore much plowing and cultivating is done when it is too wet or too dry. Level cultivation is used.

From 200 to 400 pounds of a 9–2–2 fertilizer is used for cotton. Applications for corn are somewhat lighter than for cotton. In some cases 75 to 150 pounds of nitrate of soda is used as a top dressing for wheat and oats. Very little livestock, aside from the work stock, is kept. The small quantity of manure available usually is applied to either cotton or corn.

Land of this type has advanced in price during the last few years, owing to its desirability for cotton production. The price ranges from $60 to $150 an acre, according to location and improvements.

The system of farming, which is continual clean cultivation, has reduced the supply of organic matter in the soil almost to the point

of depletion. This condition increases the tendency already inherent in heavy soils to run together during wet seasons and to clod when plowed. The condition can be remedied and the soil improved by turning under cover crops or manure, Legumes should be more widely grown, as they furnish hay and also accumulate nitrogen in the soil. The depth of plowing should be increased and this can be done more rapidly where organic matter is turned under.

This land, besides being adapted to cotton, is the best small-grain soil in the county, and should give satisfactory yields of oats and wheat. It is only fairly well adapted to corn, because the soil is difficult to cultivate. This land is well suited to bur clover, and gives fairly good yields of cowpeas. It is difficult to get a stand of alfalfa, but when once established the sod lasts from three to five years. Alfalfa not only furnishes good hay, but acts as a soil renovator. Alfalfa should be attempted only on land that is in a high state of cultivation and has been inoculated and limed. Lime should be used at the rate of 1 to 2 tons of burnt lime per acre before seeding. From 500 to 1,000 pounds of lime per acre would be beneficial to this soil where any form of cover crops is to be turned under or any legume planted. If the foregoing practices are followed this heavy soil will produce satisfactory crops, with the use of a mimimum amount of fertilizer. Acid phosphate (300 to 500 pounds per acre) can be used advantageously with all grain crops. Small quantities of 8–2–0 or 9–2–2 fertilizer are used profitably on cotton. Where manure is applied no commercial fertilizer need be used with corn.

Cecil clay loam, eroded phase.—The eroded phase of the Cecil clay loam is the same as the typical soil, except that it occupies the steeper and more sloping hillsides and broken to hilly lands near streams, which have suffered from erosion to the extent that they have numerous gullies and spots where the surface soil has been removed and the clay subsoil exposed. Erosion has reached various stages, and in places deep gullies have been formed. Most of the phase is unfit for cultivation. A few small fields are included where the surface soil is still intact; they are rarely larger than 10 acres. Some of these spots are cultivated, but much of the phase is covered with second-growth forest consisting largely of old-field pine, or has grown up in plum thickets, sassafras, and brambles.

The phase is developed extensively along the lower reaches of Tiger River around the mouth of Cane Creek, reaching well back toward Dutchman and Hebron. Smaller areas are scattered over the southern half of the county. This phase is most extensive upon the old plantations along the Tiger River, which from neglect after the Civil War became badly eroded. Erosion has been checked by the use of terraces.

The eroded phase of the Cecil clay loam in its present state is of little value for crop production. The pine forest that naturally takes possession of this land when thrown out of cultivation becomes valuable in a comparatively short time.

APPLING SANDY LOAM.

The virgin soil of the Appling sandy loam has a surface layer of one-half to 1 inch of dark-gray to almost black loamy material consisting largely of sand and organic matter. This is underlain by 2

to 4 inches of dark-yellow light sandy loam, which passes into a layer of 5 or 6 inches of yellow, medium heavy, but mellow sandy loam. In cleared areas the soil is a dark-yellow to grayish-yellow light sandy loam or loamy sand 3 or 4 inches deep, passing into a a pale-yellow, medium heavy, mellow sandy loam. The subsoil is encountered at 10 or 12 inches below the surface and consists of a yellow to orange-yellow, compact, fairly tough clay, becoming mottled or streaked with red below 20 to 24 inches. In places, usually upon the breaks, where drainage conditions are better, the subsoil ranges from orange yellow to reddish yellow mottled with yellow and red or streaked with red below 20 inches. The subsoil, while tough under ordinary moisture conditions, is hard and brittle when dry, and plastic when wet. A few fragments of rock appear on the surface or in the soil profile.

The type has a fairly level to gently undulating topography and occupies the somewhat flattened ridges or divides of interstream regions. In a few small areas it has a rolling, steeply sloping, or broken surface. It is known locally as "flatwood." Owing to the compact nature of the subsoil the internal movement of water is somewhat slow. This, together with the level surface, gives rise to rather imperfect drainage, and during wet seasons water stands on the surface in many places, and nearly everywhere the soil remains water-soaked for some time after rains. This condition results in crops being "drowned" in wet seasons, to the extent that production is considerably lessened.

In places the soil occupies narrow strips along the edges of streams and around stream heads. These areas are not typical but represent changed conditions resulting from better drainage where streams have cut back into poorly drained areas. Erosion has been active so that bedrock or partly decayed rock comes close to the surface and gives rise to varied coloring in the subsoil. These areas also receive seepage water from the higher ground, which prevents a more thorough oxidation in the subsoil. In places the subsoil has a bluish color and in other places it is displaced by partly decayed rock, but generally it is yellow, mottled with red and drab. Most of these nontypical areas are small and unimportant and really represent areas of the Wilkes or Worsham soils too small to map.

The Appling sandy loam is only moderately extensive. It occurs in rounded, oval, or irregular-shaped areas upon the more level ridges of the upland which have not been dissected by stream erosion. Shallow, intermittent drainage ways reach back into all parts of the type and serve as outlets which only partly remove the drainage water in wet seasons.

The largest areas lie near Woods Chapel, situated near the western boundary, about 6 miles northeast of Spartanburg on the road to Chesnee and between this road and the Carlisle School. Other areas are in the vicinity of Sigsbee, northeast of Duncan. and scattered elsewhere over the county.

About 75 per cent of the Appling sandy loam is cleared and used for farming; the rest is in second-growth forest of shortleaf pine and scrub oak. It is not valued as highly for growing cotton as the Cecil soils and for this reason is less popular. Cotton, corn, oats, and cowpeas are the leading crops. Rye, sorgo, and sweet potatoes are grown

upon small patches. The vegetables common to this section are grown in home gardens. A few scattered fruit trees are found around the farmsteads, peaches predominating.

The yields of cotton vary widely according to season and fertilization, ranging from one-third to 1 bale per acre, with the average falling below one-half bale. In good seasons three-fourths to 1 bale per acre is expected; in wet seasons one-eighth to one-fourth bale is harvested. Corn in an average season yields 15 to 40 bushels per acre, while in wet seasons it yields only 10 to 20 bushels. Oats yield about 15 to 30 bushels, and cowpeas 2½ to 3 tons of hay per acre. The methods of cultivation affect the yields considerably. When cotton is planted level the yields are poor in wet seasons but good in dry seasons, and when planted upon beds the yields are fairly good in wet years but only fair in dry years. Corn, if planted in a trench or furrow, makes good yields in dry weather and poor in wet: if planted level or on beds, the reverse is true.

Plowing is usually fairly deep, 7 to 8 inches. It requires only light draft to plow this land, and sometimes disking alone is all that is necessary. Little or no organic matter is turned under. Lime is not in general use. Few legumes except cowpeas are grown, and these only to a small extent. Complete fertilizer mixtures are used, 10–2–2 to 8–4–4 being the most popular formulas. These are applied at the rate of 400 to 800 pounds per acre. The small supply of stable manure is used for corn.

This land sells for $25 to $100 an acre, according to location and improvements. The rougher or more broken lands along streams as a rule are not improved. Separately this type sells for a low price, but usually it forms part of farms in which other soils predominate. Some of the more level areas are situated in desirable sections and these bring a higher price than their productiveness would seem to warrant.

The Appling sandy loam, like most of the upland, is deficient in organic matter. This can be supplied by growing and turning under cover crops or incorporating manure. The soil is prevailingly so acid that clover will not grow and sorrel volunteers in fallow fields. Where crimson clover or other legumes are to be grown 1,000 to 2,000 pounds of burnt lime per acre should be applied. The cultural methods should be governed largely by the seasons; in dry seasons moisture should be conserved and during wet seasons evaporation should be aided in every possible way. This soil has been used successfully in some sections of North Carolina for the production of bright tobacco.

DURHAM SANDY LOAM.

The soil of the Durham sandy loam, in wooded areas, has an upper layer, about 2 inches thick, of dark yellowish brown sandy loam containing some organic matter. Below this the soil is a yellow or grayish-yellow light sandy loam, 8 to 10 inches deep, where it passes into a gradation zone, 2 inches thick, of yellow heavy sandy loam or light sandy clay loam slightly compact and friable. The subsoil consists of bright-yellow to deep-yellow or orange-yellow, compact, friable sandy clay which extends to a depth of 25 to 30 inches. Below this the subsoil and substratum consist of compact, dull-yellow to orange-

yellow, friable sandy clay faintly mottled with red, which extends to 10 feet or more. The sand content is predominantly medium to coarse. In cleared fields the surface soil is a dark grayish yellow sandy loam, 3 to 6 inches deep, passing into a pale-yellow sandy loam, which extends to 8 or 10 inches. The surface in fallow fields has a white appearance from the sand that remains on the surface after the fine material has been washed off of the soil by rain.

The topography is fairly level to gently undulating. The friable character of the subsoil and substratum insures good drainage and aëration. The type occupies the smooth caps of broad low ridges in the center of the interstream regions. Dry drainage ways reach back into this land, but these have only shallow channels.

The Durham sandy loam is commonly associated with the Appling sandy loam and Cecil sandy loam. The type is developed principally in the north-central part of the county, in areas lying east and west of Sigsbee, 1½ miles south and 2¼ miles southwest of Cherokee, 2½ miles southwest of Chesnee, and at Brannons Store.

The Durham sandy loam is not important, and only a small acreage is cleared. The forest which covers more than half the type consists of shortleaf pine, with a scattering of blackjack oak. Where the pine has been removed the growth is almost entirely blackjack oak. As indicated by the forest growth, this soil is not strong, probably because of the depth of the sand over the subsoil. The type is the lightest soil in the county, and the organic content is low even in forested areas.

The chief crops are cotton and corn, which, unless heavily fertilized, give light yields. Corn yields 8 to 20 bushels per acre according to treatment. Cotton ranges from from one-fourth to three-fourths bale per acre according to season and fertilization. Crops often suffer from drought in dry seasons, and the fertilizer leaches out in rainy weather. These two factors make this type of lower agricultural value than the Appling. The cultural methods are much the same as used on the Appling sandy loam.

Since the agricultural value of land in this county is regulated largely by its cotton-producing power, this type of land is not considered desirable and is left in forest. The price ranges from $30 to $100 an acre, about half that of the associated Cecil soils. The necessity of using large quantities of high-grade fertilizer to grow satisfactory crops is another factor that reduces the price of this land.

This soil is adapted to such crops as sweet potatoes, peanuts, cowpeas, soybeans, velvet beans, vetch, rye, crimson clover, and tobacco. It is used in many sections of North Carolina for the production of high-grade bright tobacco. Like nearly all the upland soils of the county, this type is deficient in organic matter. The supply of this constituent can easily be replenished by turning under cover crops. When this is done and fertilizer is used judiciously, the type is capable of producing fair crops of cotton, corn, and the other staple crops of the region. The soil is suited to garden crops, and the growing of truck crops should prove successful where transportation facilities are available. It is also fairly well suited to the production of peaches.

DAVIDSON CLAY LOAM.

In forested areas the surface material of the Davidson clay loam to a depth of 3 to 5 inches is a dark reddish brown or dark-red mellow clay loam, passing downward into a layer, 3 or 4 inches thick, of dark reddish brown, firm, but only slightly compact clay loam. The subsoil consists of a deep-red or maroon-red compact clay.

In cleared areas in a high state of cultivation the surface soil consists of 5 to 8 inches of dark reddish brown, mellow clay loam, underlain by the typical subsoil. The soil is termed "push land," from its tendency to push away from the plow rather than to turn as most soils do. This peculiarity is due to the failure of the material to scour properly.

The type is free from stone, except for small spots, in which appear blocky fragments of the parent trap rock.

The Davidson clay loam is developed mainly upon well-defined ridges that stand 20 to 100 feet above the surrounding country. The surface of the ridge tops is nearly level to gently undulating; the slopes in most places are fairly steep. There are practically no streams traversing the areas of this soil, but the surface drainage is good and the internal drainage excellent. The subsoil is, nevertheless, quite retentive of moisture. Erosion is negligible over much of the soil, and even upon steep hillsides it is not severe, though some fields are terraced.

The largest and most typical area of this soil is on Rich Hill in the southeastern part of the county. This ridge is about one-half mile wide and 3½ miles long, stands 100 to 250 feet above the surrounding country, and has steep but smooth slopes and a somewhat flattened top. Another area lies southwest of Pauline on a round hill, with gently sloping sides. Other areas occupy similar hills 2 miles east of Woodruff, 2 miles south of Reidville, and 1½ miles north of Kilgore. An area 3 miles southeast of Woodruff is developed upon a slight elevation following the Buncombe Road for about 1 mile. A number of small areas lie north and northeast of Cross Anchor, and other small areas are scattered over the southeastern part of the county.

The Davidson clay loam, although not extensive as compared with the main Cecil soils, is one of the most important soils in the county. Practically all the type is cleared and farmed. Cotton is the dominant crop, with corn and cowpeas of secondary importance. Oats, wheat, clover, and sorgo are confined to small patches, and vegetables are grown only for home use. The yield of cotton averages about 1 bale per acre, the range being from one-half to 1½ bales. Corn yields 30 to 50 bushels per acre with an average of about 35 bushels. Small grains though not grown largely appear to thrive. Cowpeas cut 3 to 4½ tons of hay per acre.

As most of this land is used for cotton each year, there is little chance for rotations or even change of crops. The cultural methods followed are much the same as upon the Cecil clay loam, with the exception that plowing is slightly deeper on the Davidson. The soil pushes from the plow and therefore is more difficult to handle than the Cecil clay loam. It holds moisture and has a strong tendency to clod if plowed when wet, but if plowed when in the right moisture condition, it forms a mellow seed bed that needs but little subsequent harrowing.

Fertilizers are used about as on the Cecil soils, with possibly less range in the quantities, 400 to 600 pounds of standard fertilizer being generally used for cotton. Little attention is given to fertilizing other crops.

The Davidson clay loam is one of the most highly valued soils in the county. Its selling price has ranged well over $100 an acre for many years, and in 1921 it was still higher, showing the effects of inflation due to the World War.

This land is the strongest upland soil in the county. Besides being well suited to cotton, it is adapted to a wide range of crops, including corn, wheat, oats, cowpeas, clover, and other leguminous crops. This type is probably the best in the county for alfalfa, a crop that has been grown successfully upon it in other parts of the State.

In its present condition much of this type is in need of organic matter, particularly to improve the structure and thus make plowing and cultivation easier. Lime also can be used to improve the physical properties of the soil.

IREDELL FINE SANDY LOAM.

The soil of the Iredell fine sandy loam in forested areas is a dark-gray mellow fine sandy loam, which extends to 6 or 7 inches before passing into a subsurface layer 3 or 4 inches thick of yellow fine sandy clay loam somewhat compact and friable. The subsoil proper extends from 8 or 10 inches below the surface to about 2 or 2½ feet, and consists of a yellow or brownish-yellow plastic clay which is more or less impervious to water. The deep subsoil and substratum is composed of partly disintegrated greenish-yellow to dark-gray rock containing a considerable proportion of fine mica particles. Unweathered bedrock is encountered 3 to 6 feet below the surface. Gravel scattered on the surface consists of small fragments of trap rock and schist and some iron concretions. In cleared areas the surface soil is a grayish-yellow fine sandy loam.

In places the soil is a dark greenish yellow and the subsoil is yellow with an olive-green shade. Fragments of a greenish rock are scattered over the surface of these areas. The areas of this description are usually small, occurring on slight ridges in the region from Pacolet west to Roebuck. Small areas in which the soil is a sandy loam are located southeast of Woodruff. In all of these variations the structure of the subsoil is typical.

A shallow variation is developed in fairly large areas north from Pacolet and northwest from Foster Mill. These areas occupy rather high hills surrounded by Cecil soils on the lower slopes. The soil is a dark greenish yellow, mellow, fine sandy loam to sandy loam about 5 inches deep, passing into a yellow clay loam, fairly compact though friable which extends to 7 or 8 inches below the surface. The subsoil is a yellow, faintly mottled with brownish red, compact, sticky clay, extending to 18 or 20 inches where it passes into a layer of micaceous clay loam 3 or 4 inches thick, which in turn passes into partly disintegrated dark-gray to greenish gneiss. The unweathered bedrock below 36 to 40 inches checks the downward movement of water and causes seepage water to come to the surface in the lower areas. The second growth upon this variation consists almost entirely of old-field pine.

The Iredell fine sandy loam is developed throughout the southeastern part of the county north of Tiger River. It commonly occupies hills and ridges 20 to 50 feet above the surrounding country. The largest area, about 1 mile wide and 5 miles long, lies around Dutchman. In this area the surface is fairly level to undulating, but is cut by ravines or stream heads on the slopes. In general the areas of this type are topographic units occupying knolls with gently sloping sides and fairly flat tops.

Less than half of this land is used for farming; the rest is in shortleaf pine and blackjack oak, the latter species dominanting. The downward movement of water is arrested by the impervious subsoil, and the water table is held close to the surface. In wet seasons crops "drown out" and in dry seasons, owing to the shallow storage basin for moisture, they suffer from drought. Consequently crops give low yields, except in favorable seasons. Cotton has a tendency to "rust" and corn to "french." Cotton and corn are the leading crops; possibly corn has the larger acreage. Oats and wheat are grown upon a small acreage. Cowpeas are grown in the corn rows for seed. Almost no other crops are grown. A considerable area is in pasture, which furnishes fair grazing. Corn yields 10 to 25 bushels per acre, according to season. Cotton yields one-fourth to one-half bale, and oats 15 to 35 bushels per acre.

Plowing is shallow in order to avoid disturbing the plastic clay subsoil. No cover crops are grown, and no organic matter, other than the crop residues, is turned under. Very little fertilizer is used, owing to the uncertainty of crops. Erosion is active upon the steeper slopes.

The Iredell fine sandy loam is known locally as "blackjack land," and is held in very low esteem. The selling price varies from $20 to $35 an acre, with some of the broken land selling for less.

The type rarely comprises more than a narrow strip on any farm, except in the large area at Dutchman. On most farms it can be used for pasture. It is probably better suited to corn and oats than to other crops, and it would be more productive of these crops if organic matter were incorporated with the soil to increase its moisture-holding capacity. Lime should be used, if leguminous crops are to be grown; the land in its natural state is not well suited to legumes.

Although cotton makes fair yields in good seasons, the type is not particularly adapted to this crop. Kainit has been found to reduce rust in cotton and the "frenching" of corn, and this form of potash should be given preference.

IREDELL LOAM.

The surface soil of the Iredell loam in wooded areas is a black loam, 2 to 3 inches deep, passing into a dark-yellow or dark greenish yellow heavy loam. The subsoil, beginning at 5 to 7 inches below the surface, is a greenish-yellow plastic clay to 24 inches, where it passes into partly decomposed parent rock, greenish in color and containing a noticeable proportion of mica. The surface soil contains a few scattered fragments of dark-colored diabasic rock, and numerous rounded iron concretions about the size of buckshot. The soil in cultivated fields is dark grayish brown. This soil differs from the fine sandy loam in that it generally occupies more level country, is darker in the surface layer. and contains more iron concretions and

fewer platy fragments of schistose rock. The parent rock is apparently less siliceous than that from which the fine sandy loam is derived.

The compact, waxy nature of the subsoil prevents downward percolation of water and thus retards weathering. The surface is nearly level to gently undulating, and drainage is imperfectly established. Practically all the rainfall must pass off through surface channels, and drainage ways ramify all parts of the upland. The soil is normally acid. Upon the breaks, where there is better drainage and aëration, the surface soil has a brownish cast and the subsoil is brownish yellow or reddish brown but retains the structure of the typical Iredell subsoil. Erosion is not active. The Iredell loam is confined to the southeastern part of the county. The largest areas lie 1½ miles north and 2½ miles northeast of Dutchman.

About half of the area of this type is cleared and cultivated. The rest is in forest, consisting mainly of oak, hickory, dogwood, and cedar. The growth is heavier than upon the fine sandy loam, and post oak takes the place of blackjack oak. Cotton, corn, oats, wheat, and cowpeas are the only field crops. The yields are controlled largely by the season. In wet seasons the surface becomes soggy and crops are sometimes a total failure. Even in moderately wet seasons the yields are commonly about one-fourth normal production, regardless of quantity of fertilizer used. In dry seasons the moisture from the shallow soil is soon evaporated and crops suffer from drought.

Cotton has a tendency to rust and corn to "french" in unfavorable seasons. Cotton yields one-third to two-thirds bale per acre, with an average of about one-half bale. Corn yields 20 to 40 bushels per acre. Oats and wheat give fairly good yields in favorable years.

This land is difficult to handle because of the shallow soil and intractable subsoil. Plowing is usually shallow. Cotton is planted on beds and corn in hills. Fertilizers are used, but not as liberally as on other upland soils, because there is too much danger of a short crop, from unfavorable seasons. The Iredell loam sells for $20 to $45 an acre.

This land, although dark in color, does not contain enough organic matter. Cover crops should be turned under and the upper subsoil gradually incorporated with the soil. Burnt lime should be applied at the rate of 1 ton per acre every three or four years. If these methods are followed, the acidity will be corrected, the physical condition improved, and the moisture-storing capacity increased. Plowing in the late fall and winter would subject the subsoil turned up to the action of freezing and thawing and hasten its weathering. Following these treatments fair yields of cotton, corn, and small grains may be expected. Kainit should be used to prevent "rust" of cotton and "frenching" of corn. Applications of about 400 pounds per acre have proved satisfactory in most other counties of the State. Cowpeas give fairly good results and should be grown more extensively.

LOUISA SANDY CLAY LOAM.

The surface soil of the Louisa sandy clay loam in forested areas consists of a layer of dark reddish brown mellow sandy loam, 3 to 5 inches thick, underlain by a reddish-brown to red sandy clay loam to a depth of 8 or 10 inches. Both these layers contain some mica, and

in cleared fields the mica is particularly noticeable. The soil under cultivation becomes a reddish-brown heavy sandy loam or sandy clay loam passing into the subsoil at 6 to 8 inches below the surface. The subsoil consists of red friable clay, fairly firm and compact, with a noticeable content of mica, to 15 to 20 inches. Below this the mica material increases in content, the structure is less dense, and a greasy, slick feel develops. Between depths of 30 inches and 4 feet the material is a red micaceous clay loam or loam, not very compact, fluffy when dry and sticky when wet, and below 4 feet the substratum is so filled with mica that it has a golden-yellow to reddish color.

The topography is undulating to gently rolling, becoming strongly rolling along the streams. Both surface and internal drainage are thorough. Surface channels carry off most of the rainfall. Erosion is active; once it succeeds in cutting into the loose substratum, gullying is rapid. Deep gullies are numerous in the broken areas. This type is situated in the region of early settlement, and gullying gained headway before the practice of terracing was introduced. Since then erosion has been kept in check in this section of the county.

The Louisa sandy clay loam occurs mainly in the south-central part of the county around the forks of the Tiger River. The largest areas lie south and east of Moore. The sandy clay loam commonly occupies the more level ridge tops, with the clay loam in the broken areas, but in many places the former soil extends down the hillsides to the edge of the bottoms.

About one-half of this type is cleared and under cultivation. The forest consists of second-growth shortleaf pine. Cotton is the leading crop; the other crops common to this section are grown in about the same proportion as upon the Cecil sandy clay loam. Much of this land is operated by tenants and is less well farmed than most of the upland soils. Cotton yields one-third to 1 bale per acre, with an average of about one-half bale. Corn yields 15 to 40 bushels, oats 20 to 35 bushels, and cowpeas about 2 to 3 tons of hay per acre. The cultural methods are the same as on the Cecil sandy clay loam.

Owing to the location of this soil in isolated districts, the price is relatively low, ranging from $20 to $65 an acre. The type is known locally as "isinglass land" or "red sandy land."

In general the steps for improving this type are the same as for the Cecil sandy clay loam. In handling the Louisa more care should be taken to guard against erosion than upon the other upland soils, as it is more likely to suffer severely when gullies are once started.

The following table gives the results of mechanical analyses of samples of the soil, subsurface, and subsoil of this type:

Mechanical analyses of Louisa sandy clay loam.

Number.	Description.	Depth.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Inches.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
243636....	Soil.....	0–5	1.2	5.2	11.5	31.0	16.6	25.4	9.2
243637....	Subsurface	5–8	4.9	16.0	6.4	15.4	7.8	27.7	21.9
243638....	Subsoil....	8–30	1.4	7.6	5.2	13.9	4.5	19.6	47.6
243639....	Subsoil....	30–40	1.9	12.8	7.8	24.8	6.2	18.6	27.8
243640....	Subsoil....	40+	1.9	29.2	10.8	27.5	5.5	12.9	12.0

LOUISA CLAY LOAM.

The surface soil of the Louisa clay loam under virgin forest conditions is a dark-brown or dark reddish brown micaceous loam to sandy loam, 3 to 4 inches deep. The subsoil is a red, rather compact clay carrying a noticeable amount of mica, and passing at 10 or 12 inches into a less compact red micaceous clay loam. At 3 or 4 feet and deeper the substratum is yellowish red or reddish yellow for a few feet, passing into a greenish or grayish-yellow, micaceous, well-weathered material, which is very fluffy when dry, becomes soft and mushy when wet, and smooth or slick when moist. In places this condition does not develop within 10 feet of the surface. The surface soil in cultivated fields is a reddish-brown loam or light clay loam, containing considerable mica, and 5 or 6 inches deep. The surface soil is inclined to be fluffy when dry, extremely slick when damp, and mushy when wet. The type, like the sandy clay loam, is known as "isinglass land."

The topography is generally rolling to broken. In places the type occurs upon flattened ridges or as small fairly smooth areas within the body of another type. The drainage is well established, and most of the rainfall passes off through surface channels. Erosion is active, and when a small ravine is cut into the loose substratum, gullying is rapid. Large gullies or ravines are scattered over the type, mainly in the more broken areas near the larger streams. The lower slopes are in most places gentle.

The Louisa clay loam is closely associated with the Louisa sandy clay loam. The largest areas are near the forks of Tiger River and Ferguson Creek. The type is not extensive and therefore not important. About one-half is cleared and used for crops; the rest is covered with a growth of shortleaf pine or old-field pine. Practically all of this land has been under cultivation at some time during the past 150 years. Much of it has become eroded, abandoned, and taken by forest since the Civil War. The soil is farmed largely by tenants and therefore cotton occupies the largest acreage. Some corn, oats, cowpeas, and wheat are grown. Other crops are grown only in patches or home gardens. This soil has practically the same productive powers as the Cecil clay loam, but it receives less attention and consequently the yields are slightly lower. It is considered good land for cotton. The soil is easy to till, as it falls into a mellow seed bed. It is deficient in organic matter. It is handled in about the same way as the Cecil clay loam.

The Louisa clay loam, owing to isolated location and poor roads, is held at comparatively low prices. It sells for $25 to $50 an acre.

PORTERS LOAM.

The soil of the Porters loam in forested areas is a dark-brown or dark yellowish brown to dark reddish brown mellow loam, passing at 5 to 8 inches into a subsoil of brown to reddish-brown friable clay loam to clay. In places the deep subsoil changes to a yellowish-brown color. Both soil and subsoil carry small fragments of the parent rock, and in many places the unweathered rock lies near the surface.

The type occupies low mountains or spur ridges extending out from the base of the Blue Ridge Mountains. The topography is fairly steep, but the slopes are for the most part smooth. Drainage is well

established, most of the rainfall passing off rapidly through intermittent drainage ways. No streams reach back into the type, but a number of streams head at the base of the mountains. The type is mapped in the extreme northwest corner of the county, where it adjoins an extensive area in Greenville County.

Very little of the Porters loam is used for crops. Forest, consisting of shortleaf pine, black pine, chestnut, oaks, and hickory, covers most of the type. Land of this type offers some opportunity for fruit growing, but it can probably be used most advantageously for forestry.

CONGAREE FINE SANDY LOAM.

The surface soil of the Congaree fine sandy loam consists of 12 or 15 inches of brown to yellowish-brown, mellow, light fine sandy loam. The soil passes very gradually into the subsoil, which is a yellowish-brown, heavy fine sandy loam, slightly more compact than the soil. The substratum to depths of 4 or 5 feet consists of beds of gravel, sand, and heavier materials. The surface soil is sandier near the streams and heavier toward the upland. Both the soil and subsoil carry a large proportion of finely divided mica scales.

The topography is level to gently undulating. Slight ridges, paralleling the direction of the stream, and the intervening depressions produce the undulating surface. The type lies 15 to 20 feet above stream level and is subject to occasional overflows. Drainage between overflows is good.

This type occurs upon the high bottoms of some of the larger streams, where the wash is received from adjacent uplands and the current is too strong for the deposit of silt. It is not extensive. The largest areas are along the Pacolet River, from the railroad bridge to the mouth of Buck Creek and up Buck Creek for 2 miles. Scattered areas are found along the Enoree River below Van Patton Shoals and upon the Tiger River at the Horseshoe Bend. The bottoms are from one-eighth to one-half mile wide.

Most of this land is cleared and under cultivation. The remaining trees consist mostly of birch, tulip poplar, sweet gum, sycamore, and willow. Corn is the principal crop. Sorgo, cowpeas, and oats also are grown. The returns from these crops are good. Sorgo makes a heavy growth. Cowpeas and crab grass give large yields of hay. There is some danger of loss by floods, but with the relatively high position of the type the fields are seldom flooded for long periods and a total loss of crops is extremely rare. This type, while not so strong as the silt loam, is valued more highly for farming. It sells for $60 to $100 an acre.

The Congaree fine sandy loam in places is deficient in organic matter, and fertilizers are sometimes used. The type, besides being well suited to corn and sorgo, is adapted to such legumes as cowpeas and vetch, and to watermelons and muskmelons. It is also fairly well suited to the production of oats and rye.

CONGAREE SILT LOAM.

The surface soil of the Congaree silt loam is a dark reddish brown mellow silt loam in forested areas, and is somewhat lighter reddish brown in cultivated fields. The soil passes gradually, at 8 to 12

inches, into the subsoil, which is a brown silt loam to silty clay loam, a little lighter in color and slightly more compact in structure than the soil. In the larger bottoms of the North Pacolet and South Pacolet Rivers the material below 30 inches is more or less mottled or bluish in color and usually a silty clay loam in texture. Both soil and subsoil have a noticeable content of finely divided mica.

In the outer or upland side of the bottoms there is usually a depression lying 1 to 3 feet below the general level of the bottom. Its width is variable according to the width of the bottom, but averages about 100 feet. Water usually stands in these areas, except in dry seasons. The surface soil here is darker than in the rest of the type and the subsoil is mottled even in the upper part. These areas were too small to separate upon the map.

The Congaree silt loam occupies first-bottom overflow land along the larger streams. It occurs along the North Pacolet River above Camps Bridge and upon the South Pacolet above New Prospect to the mouth of Spivy Creek. These bottoms range from one-fourth to one-half mile in width. The type also occurs in a few small detached areas along the Enoree River below Van Patton Shoals. The bottoms, which are mostly level, lie only 2 to 6 feet above the normal water level of the streams, and are subject to frequent overflows. The drainage over much of this type is fairly good; over the rest it is poor. Open ditches are required to remove the surplus water from the fields.

This type is not important, as it is used very little for farming. Possibly two-thirds of it is cleared, but only about one-eighth is used for cultivated crops; the rest, including the forested area, is in pasture. Birch, sweet gum, water oak, water maple, ash, sycamore, and willow are characteristic trees in this growth. Practically all this land was at one time under cultivation, and, according to tradition, produced fine crops. The filling-in process in the streams, attendant upon the clearing of large areas of upland, has made some areas swampy, and others have been washed badly by floods. Corn is about the only crop grown. It gives yields ranging from 40 to 70 bushels per acre. Sometimes the crop is damaged by overflow, and in some seasons it is completely destroyed. The land makes good pastures, the native grasses, with lespedeza, furnishing grazing for long seasons.

Land of this type is held at $20 to $50 an acre, with a few choice areas reaching $100.

Along the North and South Pacolet Rivers the drainage is rather poor and the water table must be lowered by dredging the main stream before the best results can be expected from cultivated crops. If this is done, the type should produce heavy crops of corn, sorgo, and forage. The soil is adapted to grass, and the production of hay crops should prove profitable. The type is naturally one of the strongest soils in the county, and where drainage is provided is well suited to the production of corn.

MEADOW (CONGAREE MATERIAL).

The areas classified as Meadow (Congaree material) consist of first-bottom soil which is so variable in texture that no satisfactory type separations could be made. The soil is dominantly brown to reddish

brown, and underlain by a material of slightly lighter color. In places the subsoil, owing to local drainage conditions, is mottled with rusty brown and drab. The texture variations range from sandy loam to silty clay loam. Along the stream edges sand and even gravel beds are found, and next to the upland a swale of heavier soil is commonly developed. Where lateral streams and ravines enter the bottoms there are fanlike deltas of outwash material. Sandy loam appears to be the dominant texture, with silt loam next. Most of the material has been washed from the areas of Cecil soils.

Meadow (Congaree material) is developed in the first bottoms along the smaller streams, where the currents are usually swift and cross-bedding is common. The material seems to have been originally all sandy loam, fine sandy loam, and silt loam, but the frequent inundations have laid down other material, filled in some places, and removed the surface material from others, altering the type considerably. Marsh land has formed in spots. The surface is nearly flat and lies only a few feet above stream level. In places the stream channels are not definite.

Practically all this land was at one time under cultivation and was considered the best land in the county. Destructive floods, following the clearing of the upland, have rendered much of it unfit for crops, and the danger from floods makes crop production unsafe on all of it. The drainage ditches have filled and much of the type has been allowed to grow up in brush and briers. Alder and willow are characteristic growths in the abandoned fields. The forest consists of sycamore, ash, pine, sweet gum, and birch. Most of the type is at present used for pasture, although a small part is in sod, with the brush kept down. Bulrush is common in open pastures in low places, ditches, and old corn rows. The small area under cultivation is used largely for corn, but a few small patches are planted to other crops. The yields of corn are fairly good, ranging from 30 to 60 bushels per acre, when not damaged or destroyed by floods. Patches of oats, sorgo, and hay give fairly good yields. Meadow (Congaree material) furnishes good pasturage where seeded to Bermuda grass. The pastures of native grasses are comparatively poor, on account of the growth of briers and brush.

Meadow (Congaree material) has a fairly large total area. Much of it could be reclaimed by deepening and straightening the channels of the streams, thus preventing or lessening the frequency of overflow; digging lateral ditches to remove the surplus water from the swales; and placing ditches along the edge of bottoms to intercept the run-off from the upland slopes. When reclaimed this soil should produce all the crops common to this section, with little loss from flood. Crops could be grown satisfactorily without the aid of fertilizers.

SUMMARY.

Spartanburg County is situated in the northwestern part of South Carolina. It has an area of 819 square miles. Physiographically the region is a plateau dissected by numerous streams. The low interstream ridges are nearly flat to undulating or rolling, becoming somewhat broken along the streams. A low spur from the Blue Ridge Range, in the northwest corner, and three detached high hills,

10 miles distant from the base of the mountain, are the only outstanding physiographic features. The general level of the plateau ranges from 1,000 feet above sea level in the northwestern part to 500 feet in the southeastern. The stream valleys are comparatively narrow and shallow, the bottoms lying from 100 to 200 feet below the general level of the upland.

The first settlements were made about 1765, upon the forks of the Tiger River, by Scotch-Irish. More recently many people have come from the mountains of North Carolina to the cotton-mill towns. The population of the county in 1920 was 94,265. Spartanburg is the county seat and largest town.

Agriculture and the manufacture of cotton cloth are the leading industries.

The county is well supplied with transportation facilities. Seven railroad lines radiate from Spartanburg.

Spartanburg is the principal market. The mill towns furnish excellent markets for garden and dairy products.

The climate of Spartanburg County is mild and healthful. The mean annual temperature, as recorded at Spartanburg, is 60.3° F., and the mean annual precipitation is 47.56 inches. The snowfall is light, amounting to only a few inches annually.

Cotton is the principal crop. It occupies an acreage larger than that of all other crops combined. In 1919 it occupied 134,235 acres. Corn, oats, and pea-vine hay are grown for feeding work stock. A considerable acreage of wheat is grown and made into flour in local mills. Vegetables, sweet potatoes, and sorgo are grown for home use. Clover, alfalfa, and rye are grown in a small way, mainly to feed cattle and work stock and for soil improvement.

Hogs are kept in small numbers on most farms. Chickens are found on nearly every farm. A few cattle are kept in the outlying districts. Dairying is developed only in the vicinity of Spartanburg.

Crop rotations are not in general use. Some farms alternate cotton and corn, but the larger area is kept in cotton indefinitely. This system, with its clean cultivation, long followed, has very generally depleted the soils of organic matter. Commercial fertilizer is depended upon to keep up fertility.

The farm buildings, while small, are substantial and adequate for the system of farming followed. The larger farms are equipped with improved implements, including tractors; the smaller farms and tenancies employ implements of the simplest kind.

In 1920, 67.7 per cent of the farms were operated by tenants, most of them upon the share basis. The average size of farms, rating each tenancy as a farm, is 49.4 acres. In the northern part of the county the holdings are smaller than in the southern part.

The price of farm land varies with the improvements, location, and type of soil. Improved land on the better types of soil sells for $100 to $250 an acre. In the more remote districts good land sells for $40 to $100 an acre, and unimproved poor land for $10 to $30.

The soils of Spartanburg County fall into two natural divisions, upland, residual soils, and first-bottom, alluvial soils. The residual soils are by far the most extensive and the most important. They are derived from the weathering in place of igneous and metamorphic rocks.

The residual soils are grouped in the Cecil, Appling, Durham, Louisa, and Porters series, derived from granites, gneiss, schists, and slates, and the Davidson and Iredell series, derived from diabasic or trap rocks.

The Cecil soils are the most extensive in the county, occupying 89 per cent of the upland. They have yellowish-brown to reddish-brown surface soils and red friable subsoils. The Cecil sandy loam is fairly important. It is well suited to cotton and to a wide range of crops common to the region. The Cecil sandy clay loam is the most extensive soil type in the area. It is used on a large scale for the production of cotton and other general crops. It is adapted to cotton, corn, small grains, clover, and alfalfa.

The Cecil clay loam has a fairly large total area. It is slightly stronger than the other Cecil soils, but is more difficult to handle. The Cecil fine sandy loam is confined to the southeastern part of the county and is fairly important considering its small area. The Cecil gravelly sandy clay loam occurs in the northeastern part of the county. It suffers less from erosion than the other types of the series. It is used mainly for growing cotton and oats. The Cecil gravelly sandy loam occupies relatively small, scattered areas. It is rough or hilly and is used very little for farming.

The soils of the Appling series have yellowish-brown surface soils and a rather heavy yellow to yellowish-red, mottled or streaked, subsoil. The sandy loam, the only type mapped, is used largely for growing cotton and to less extent for the truck crops. Crops are fair to good in dry seasons, but suffer in seasons of excessive rainfall.

The soils of the Durham series have yellowish-brown to pale-yellow soils and a bright-yellow friable subsoil, slightly mottled with red in the deep subsoil. The sandy loam, the only type represented, is not extensive and is used very little for farming. It is adapted to the production of bright tobacco, but not used for that purpose in this county.

The Davidson clay loam has a dark reddish brown or dark-red surface soil and a compact friable, maroon-red subsoil. It occupies a small total area in the southern part of the county. It is the strongest soil in the county, capable of producing heavy yields of practically all the crops grown in this section. It is used largely for growing cotton.

The Iredell soils have dark-gray to dark yellowish brown to almost black soils, underlain at shallow depths by a yellow, heavy, plastic, impervious clay. Partly disintegrated rock is reached at 2 to 2½ feet, and bedrock at 3 to 5 feet. These soils are developed in small areas in the southeastern part of the county. The fine sandy loam is one of the poorer soils of the county. It is used to a small extent for growing cotton, corn, and oats. The Iredell loam is a somewhat better type. It is used in the production of the same crops as the fine sandy loam.

The Louisa soils have dark reddish brown soils and a red micaceous subsoil. The sandy clay loam, which occupies country of comparatively smooth topography, is used for the same general crops as the Cecil sandy clay loam. The Louisa clay loam occupies hillsides and is very subject to erosion. Cotton is the chief crop. These soils are located in the south-central part of the county, cover a small area, and are not important.

The Porters loam has a dark-brown to reddish-brown surface soil and a reddish-brown to yellowish-brown subsoil. It occupies a small area of rough mountain land in the northwest corner of the county. It supports a mountain forest and is not used for agriculture.

The Congaree soils occupy the first bottoms or flood plains. They have dark yellowish brown to dark reddish brown soils and a reddish-brown to yellowish-brown subsoil, somewhat mottled with drab in poorly drained places. The fine sandy loam occupies high bottoms and is a light soil used mostly for corn. The silt loam occupies lower bottoms and is used for corn and pasture.

Meadow (Congaree material) includes land of varied texture. It occupies low bottoms and is used for pasture. Reclaimed areas would become valuable farming lands.

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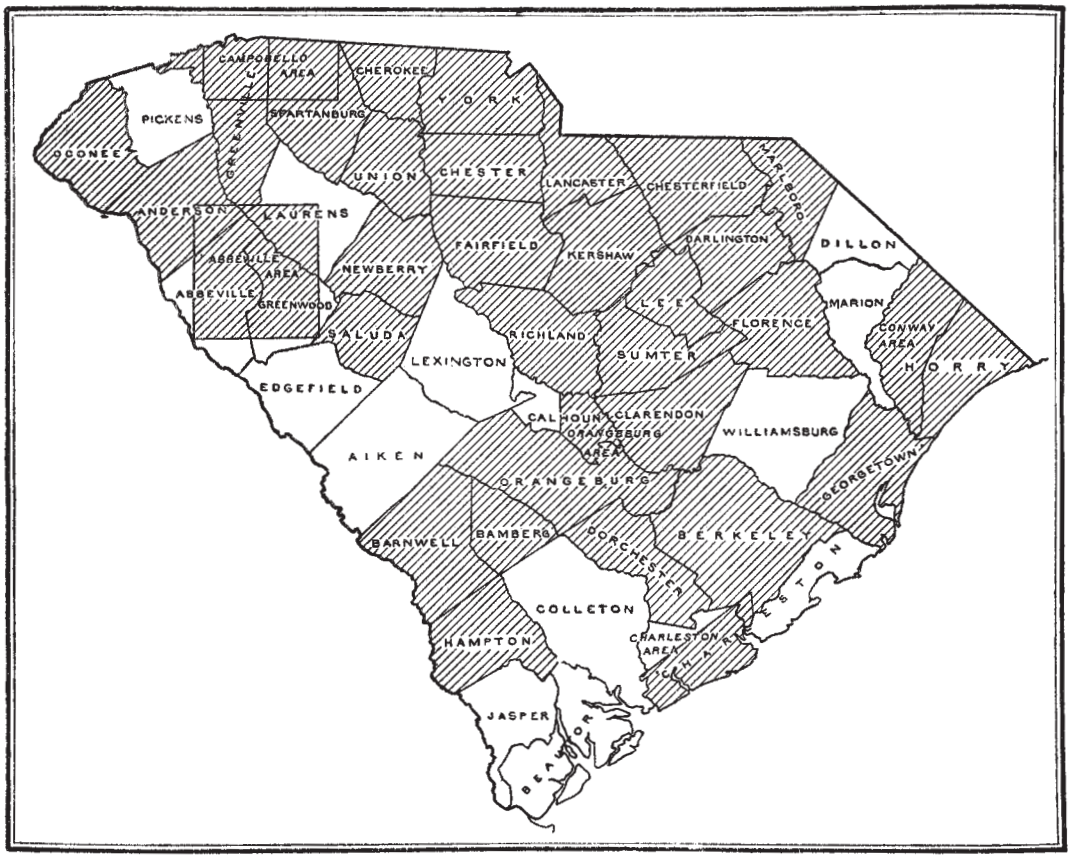

Areas surveyed in South Carolina, shown by shading.

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Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410;

(2) fax: (202) 690-7442; or

(3) email: program.intake@usda.gov.

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