U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF SOILS.

SOIL SURVEY OF GREENVILLE COUNTY, SOUTH CAROLINA.

BY

W. I. WATKINS, IN CHARGE, J. M. SNYDER,
AND HOWARD C. SMITH.

[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 Representatative 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 GREENVILLE COUNTY, SOUTH CAROLINA.

By W. I. WATKINS, in Charge, J. M. SNYDER, and HOWARD C. SMITH.

DESCRIPTION OF THE AREA.

Greenville County is situated in the northwestern part of the State. It has an area of 790 square miles, or 505,600 acres. The Saluda River forms the western boundary and separates the county from Anderson and Pickens Counties. The crest of the Saluda Mountains, a part of the Blue Ridge, forms the northern boundary and State line. Spartanburg and Laurens Counties lie to the east and south. The county is wedge-shaped, having a length of about 48 miles and a width of 17 miles, except in the extreme northern part, where the width is about 33 miles.

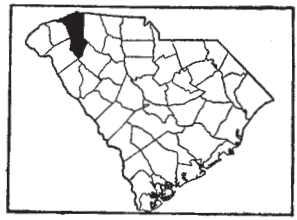

FIG. 9.—Sketch map showing location of the Greenville County area, South Carolina.

The county has two physiographic divisions—the Appalachian Mountains and the Piedmont Plateau.

Greenville County lies on the inner border of the Piedmont Plateau and includes a narrow fringe of the southeastern part of the Blue Ridge Plateau along its extreme northern border. The northern county line coincides with the Blue Ridge divide, but as that divide is in the extreme southeastern part of the plateau, only a narrow fringe of the plateau is included within the county boundaries. The part included consists of a series of mountainous spurs that project southward from the main plateau mass into the northern border of the Piedmont. These are ridgelike spurs converted into such by the valleys of several branches of the Saluda River which have worked their headwaters back from the Piedmont Plateau into the southern part of the Blue Ridge Plateau. The latter region, along the watershed, i. e., along the north county line, lies 1,000 to 2,000 feet above the general upland level of the Piedmont Plateau at its northern border. The ridges or spurs of the Blue Ridge occurring within Greenville County range up to 10 miles or more in length and merge at their southern ends into the adjacent Piedmont topography.

The Piedmont Plateau section of the county is typical, in topographic features, of that region throughout a large part of its extent. It consists of a thoroughly but not very deeply dissected southeasterly sloping plateau lying at a general level of about 1,000 feet along its northern side and about 600 or 700 feet (estimated) in the southern part of the county. The dissection reaches a maximum adjacent to the large rivers and a minimum along the smooth watershed ridges.

As a whole, i. e., excepting belts along the large streams, the topography ranges from undulating to rolling. Along the large streams it is best described as moderately hilly.

Paris Mountain, lying about 6 miles north of Greenville, is an outlier of the Blue Ridge Plateau.

The boundary between the Piedmont and Blue Ridge Plateaus, where not modified in its essentials by a number of spurs from the latter projecting into the former, is an abrupt one. The country rises quickly from the Piedmont to the latter, the highest part of the Blue Ridge, certain mountainous peaks and ridges standing on and rising well above the general plateau level.

The elevations of some of the mountains are: Hogback Mountain, 3,226 feet; Glassy Rock Mountain, 2,542 feet; Old Indian Mountain, 2,400 feet; Caesars Head, 3,218 feet; Cleveland Heights, 3,200 feet; and Cold Branch Mountain, 3,424 feet. The elevation at Tigerville is 1,000 feet, and Greenville has about the same altitude.

As a rule the streams have a rapid fall and contain numerous shoals. The valleys or bottoms are much narrower in the southern part of the county, where the streams have cut rather deep narrow trenches, than in the northern part. The streams are fed by springs, and most of the small branches flow throughout the year. Several dams have been constructed across the larger streams to develop electric power for operating mills and other industrial plants. Five are located on the Saluda River, two on Reedy River, and one each on Rock Creek and Enoree River. Many dams have been built in the smaller streams to develop water power for operating flour mills, grist mills, and sawmills.

Greenville County was known as Greenville Territory prior to 1777, with the present Spartanburg and Greenville County line forming the old territorial boundary. In 1777 the territory was ceded to the State by the Cherokee Indians.

Settlers began to arrive about 1760 and established themselves in various parts of the county. One of the earliest settlements was at Gowensville. Most of the settlers came from eastern South Carolina, North Carolina, and Virginia. The present white inhabitants are mainly descendants of the early settlers. In 1910 the population of the county was 68,377, of which 77 per cent was rural. The 1920 census gives the population of the county as 88,498. The rural population, which includes towns of less than 2,500 inhabitants, constitutes about 74 per cent of the total. However, more than half of the inhabitants live in Greenville and the surrounding villages. The mountainous part of the county has an area of about 100 square miles and is rather sparsely settled. It is estimated that the density of population in the Piedmont region, outside of the industrial section around Greenville, would be about 50 persons per square mile. An idea of the distribution of the population may be obtained from the number and location of houses on the soil map. The county will support a much larger population. The largest increase in rural population took place between 1900 and 1910.

Greenville, the county seat, is situated near the center of the county. It was founded in 1797 under the name of Pleasantburg, but the name was later changed to Greenville. It has a population of 23,127 and is the third largest city in the State. The villages surrounding the city have a population of 25,000, giving Greenville a potential population

of 48,000. The city is located near the center of the cotton-mill district of the South. Greenville has 585,212 ring spindles out of a total of 751,860 in the county. Besides the cotton mills, the city has oil mills, a packing plant, and many other industries and distributing houses. Furman University and the Greenville Woman's College are located here.

Greer, the second largest city, with a population of 2,293, is situated in the east-central part of the county. Greer, Fountain Inn, Simpsonville, Piedmont, and Fork Shoals all have cotton mills. Other small towns are Travellers Rest, Taylors, and Mauldin. In addition there are other small trading points and numerous stores throughout the rural districts of the county.

Greenville County is well supplied with railroad facilities, especially in the Piedmont section. The main line of the Southern Railway crosses the central part of the county, passing through Greer and Greenville. The Columbia branch of the Southern extends from Greenville south through Piedmont. The Piedmont & Northern Electric Railroad parallels this branch to Greenville, then the main line east through Greer. The Charleston & Western Carolina line extends south through Simpsonville and Fountain Inn. The Greenville & Northern Railway extends north into the mountains.

Greenville County has an extensive and excellent system of graded roads. These are surfaced with material containing the proper proportions of sand, clay, and gravel, which when packed gives a road capable of being traveled at any time during the year. It stands heavy traffic fairly well, but has a tendency to develop holes. These roads radiate from Greenville to all parts of the county. Cross roads connect all main points. Other secondary roads are not so well kept. There are several miles of concrete and tarvia roads near Greenville, and more are being constructed.

Greenville and the surrounding mill towns furnish a market for all of the cotton and other farm products grown in the county.

Schools and churches are well distributed through the county. Most of the schools are consolidated and employ two or more teachers.

CLIMATE.

The climate of Greenville County is characterized by an abundance of rainfall and a large proportion of sunny days. The climatic records of the Weather Bureau station at Greenville cover a period of 37 years and are fairly representative of the Piedmont Plateau section of the county.

The mean annual temperature is 59.1° F. The mean temperature for the winter months is 41.2° F., with a minimum of −5° F. and a maximum of 82° F. The snowfall is usually light and seldom stays on the ground more than 2 or 3 days. The mean summer temperature is 75.7° F., with a minimum of 40° F. and maximum of 106° F. The summer days are usually clear and warm and the nights are cool. In the mountain range across the northern end of the county the temperatures are lower and the nights are cooler, and this section is popular as a summer resort.

The mean annual rainfall is 51.96 inches, with a total of 42.66 inches for the driest year (1899) and 77.83 inches for the wettest year (1901). The average from April to September, inclusive, is 26.88 inches. This

is usually well distributed and sufficient for needs of the crops. The rainfall is several inches more than in some of the counties to the south, owing, it is thought, to the influence of the mountains. The spring rains are generally heavy downpours, but the winter rains are usually light and steady.

The average date of the last killing frost in the spring is April 3, and of the first killing frost in the fall, November 2. This gives an average growing season of about 7 months. The latest killing frost on record in the spring is April 24, and the earliest in the fall is October 11.

The records of the Weather Bureau station at Hendersonville, N. C., are probably more representative of climatic conditions in the mountains. The average rainfall is about 3 inches more, and the growing season is from 4 to 6 weeks shorter. The average temperatures are lower throughout the year.

The following table gives the normal monthly, seasonal, and annual temperature and precipitation at Greenville:

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

[Elevation, 1,039 feet.]

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1899).	Total amount for the wettest year (1901).	Snow, average depth.
	°F.	°F.	°F.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
December	41.2	75	3	4.71	3.84	9.22	1.2
January	41.0	82	4	3.43	5.78	4.95	1.4
February	41.4	80	−5	5.25	7.43	3.30	2.3
Winter	41.2	82	−5	13.39	17.05	17.47	4.9
March	50.6	91	13	5.39	7.51	8.68	.3
April	58.5	92	22	3.65	4.63	7.13	T.
May	67.7	100	27	3.56	0.80	7.48	.0
Spring	58.9	100	13	12.60	12.94	23.29	.3
June	74.4	100	42	5.09	2.31	7.99	.0
July	77.1	106	40	5.73	1.64	4.51	.0
August	75.7	101	50	5.06	2.82	15.72	.0
Summer	75.7	106	40	15.88	6.77	28.22	.0
September	70.9	100	32	3.79	2.30	7.35	.0
October	60.3	94	25	3.20	2.03	0.82	T.
November	50.0	84	14	3.10	1.57	0.68	T.
Fall	60.4	100	14	10.09	5.90	8.85	T.
Year	59.1	106	−5	51.96	42.66	77.83	5.2

AGRICULTURE.

According to the best information obtainable, the land now included in Greenville County once supported a luxuriant growth of wild grasses and in places wild peas, except that the areas bordering the streams were heavily forested. Later on, the forest growth spread over most of the county. During the decade following 1791 many farmers, mainly from the older-settled States to the north, came here. They produced flax, tobacco, corn, wheat, and oats, and raised cattle

and hogs. These products were used principally at home, and only the lighter products were transported to market. Cotton was introduced soon after 1800, but its increase was gradual until the cotton gin came into use and the county was supplied with railroad transportation.

The following table, compiled from the census reports of 1880, 1890, 1900, 1910, and 1920, gives the acreage and yield of the five leading crops and shows the trend of agricultural development in the county during the last 40 years:

Acreage and production of leading crops of Greenville County, in 1879, 1889, 1899, 1909, and 1919.

Year.	Corn.		Oats.		Wheat.		Sweet potatoes.		Cotton.	
	Area.	Production.	Area.	Production.	Area.	Production.	Area.	Production.	Area.	Production.
	Acres.	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Bales.*
1879	52,599	582,156	9,282	62,673	11,605	62,132	448	34,132	45,572	17,064
1889	53,528	668,355	15,473	125,117	9,704	58,222	1,353	128,706	66,020	28,485
1899	63,549	621,380	4,889	34,540	13,128	77,480	870	61,462	69,713	26,535
1909	57,181	641,765	8,960	113,036	5,064	34,404	1,473	137,619	72,474	30,279
1919	58,072	708,141	3,905	55,947	4,964	36,034	1,780	195,267	79,035	51,189

Cotton is the principal cash crop in the greater part of the county; practically none is grown in the mountain districts. The acreage of cotton, according to the census reports, has steadily increased during the last 40 years. The average yield was between 185 and 190 pounds of lint cotton per acre in 1879, 1889, and 1899; 209 pounds in 1909; and 324 pounds in 1919. Naturally the yields vary somewhat from year to year according to climatic conditions, but where the gradual increase in yield per acre is so consistent it is probable that much of it is due to better cultural practices, such as the use of better varieties, improved methods of handling, and the extensive use of commercial fertilizer. Fertilizer is used at an average rate of about 400 pounds per acre, applications ranging from 300 to 500 pounds. It is usually applied at the time of planting, but some farmers give two or more applications during the growing season. Yields ranging from one-fourth to 1 bale per acre are reported.

Cleveland, one of the big boll group, is the principal variety; other varieties are Simpkin's Prolific, Cook's Vandiver, and King's Improved (early). Some upland long-staple cotton is grown, the Columbia and Webber being the most important varieties. There is a growing tendency to produce feed, foodstuffs, and meat, and to depend on cotton for the cash needs only. The advent of the boll weevil in 1920 and 1921, and the consequent decrease in acreage and yields of cotton, has emphasized the need of greater diversification of crops.

Corn ranks second in importance as an income crop. It is grown both for sale and for home consumption. The greater part of the crop is grown in the northern third of the county, the river bottoms being planted almost exclusively to corn. The acreage has increased gradually since 1879, and the average yield has been about 11 to 12 bushels per acre. According to information obtained from the farmers the average for the upland is about 10 to 15 bushels, and for the

bottom land about 25 to 30 bushels. However, in the more favorable years yields of 25 bushels on upland and 50 on bottom land are not uncommon.

Corn is receiving more attention than formerly and undoubtedly will receive more in the future. Rather better yields have been obtained in recent years, owing, it is believed, in part at least, to the change in the method of applying fertilizer. The applications are now made at two or three different times, the first at planting and the others as side applications during the growth of the crop, the last just before laying by. Clover is used to a large extent to improve the land before corn and cotton are planted and has been found to give good results. Clover turned under seems to give best results on the soils having the shallow sandy surface soils, such as the red sandy soils.

The principal variety of single-ear corn grown is Baldwin's Red Cob. Two varieties of the prolific type are Marlborough Prolific and Hastings Prolific. The principal yellow varieties are Lowman's Yellow and Golden Dent. A different variety is grown in the river bottoms in the northern part of the county, the name of which was not determined. The corn is white and has a large cob.

Most of the corn is used for feeding work stock and fattening hogs; some of it is ground into meal for making bread; and a small part is sold for cash or traded for merchandise at the stores.

Wheat is not sown extensively. The acreage is variable, but has averaged about 10,000 acres since 1880. The average yield per acre is about 7 to 12 bushels. Most of the crop is used at the various custom mills in the county, but some is sold. Bluestem and Leap Prolific are the principal varieties grown. Wheat does better on the heavier soils.

Oats are grown chiefly for feeding on the farm, and the acreage varies considerably from year to year. The average yields in the years reported by the census have ranged from 6.6 bushels to 14.3 bushels per acre. The low average is undoubtedly due to late sowing and the use of the poorer lands for oats.

Rye is grown to a small extent. Most of the rye sown is used as a cover crop for winter pasture and is turned under in the spring. It is being given more attention as a winter cover crop. It prevents washing, keeps the ground in good tilth, and at the same time adds organic matter.

Cowpeas are grown to considerable extent but are used mainly on the farm. Sweet potatoes were grown on 1,780 acres in 1919, with an average yield of 110 bushels per acre. In the same year potatoes were grown on 440 acres, with a yield of 65 bushels per acre.

Crimson clover is being given considerable attention and is used principally as a green-manure crop, very little being cut. Some bur clover also is grown. Sudan grass is grown in small quantities for feed, but the tops and leaves of corn supply the bulk of the forage produced within the county. Alfalfa is grown upon a few acres, mainly on the Cecil clay loam and heavier areas of the Cecil sandy clay loam. Three to four cuttings are obtained during the year. As a rule the weeds gradually gain control of the crop, necessitating the breaking up of the land and reseeding about every four years. Large quantities of timothy and clover hay and mill feeds are shipped in.

About 46,000 gallons of sirup were made in 1919 from sorghum, which occupied an area of 1,082 acres. The sirup is used principally on the farm or sold in near-by towns.

Orcharding is not practiced extensively on a commercial scale. One peach orchard is situated 2 miles west of Greer and another 1½ miles southeast of White Oak Church. These orchards are fairly well cared for and give good returns in favorable years. Most of the apples are grown in the mountainous districts in the northern part of the county. These orchards are not so well cared for and the products are of an inferior size but good flavor. Most of the fruit finds a ready sale within the county. Plums and cherries are next in importance, and some quinces, figs, and a few grapes are grown. Some small vineyards, situated mostly in the central and northern parts of the county, are well kept. Both grapes and grape juice find a ready sale in the county, and grape growing has prospects of becoming a more important industry.

Pecans are grown in the county, but not on a large commercial scale. The product finds a ready sale in the county. Chestnuts, walnuts, and hickory nuts are native in the mountainous section.

Small fruits and berries, mainly strawberries and blackberries, do well. Truck gardening is receiving more attention. A large variety of vegetables can be grown. Truck gardening for local consumption is on the increase. Heretofore most of the truck products have been shipped in from more southern districts.

The total value of livestock and livestock products increased from $256,320 in 1899 to $797,138 in 1909, and was without doubt much higher in 1919, though a change in the census schedule makes a definite comparison impossible. Animals sold and slaughtered furnish the largest item under income from livestock, while dairy products and poultry follow in the order named.

According to the census, there were 3,198 horses in the county in January, 1920; 7,132 mules, 16,208 cattle, 15,580 hogs, 284 sheep, 263 goats, and 184,022 chickens. The cattle are mainly of the dairy strains and of inferior beef quality. However, beef cattle are gradually being introduced. Most of the hogs are of the better breeds.

The farmers recognize that the Congaree silt loam and the heavier areas of Congaree fine sandy loam are especially adapted to corn. The Cecil clay loam and Cecil sandy clay loam, locally known as "red clay lands," are the best for small grain. The sandy loams and sandy clay loams are the best cotton lands. It is well known that the lighter sandy soils give the best returns of sweet potatoes, peanuts, and early garden vegetables.

According to the census, the number of farms[1] has increased from 4,043 in 1880 to 6,762 in 1920. About three-fourths of the land area of the county is included in farms. The average size of farms in 1920 is given as 54.2 acres, of which about half is classed as improved land.

The expenditure for fertilizers in 1919 was $1,134,154, 6,323 farms reporting. On 2,006 farms the expenditure for feed was $148,700; and 1,514 farms reported the total cost of labor as $195,665. Most of the farm laborers are negroes.

The proportion of farms operated by tenants increased from 52.6 per cent to 60.8 per cent in the period from 1880 to 1910, but in 1920 the proportion of tenant-operated farms fell to 56.4 per cent.

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

A majority of the tenants are negroes. There are various systems of renting. Some rent for a definite quantity of lint cotton. Under one system the tenant furnishes the mules and half the fertilizer and receives two-thirds of the cotton and three-fourths of the corn. Under another system the landlord furnishes the land, mules, and half the fertilizer and receives half of the crop. This appears to be the plan most commonly practiced and most desirable from the standpoint of the landlord, as it allows him to exercise more control over the management of his land.

SOILS.

Greenville County lies within the Piedmont Plateau region and the Blue Ridge or Appalachian Mountains. The mountainous part occupies a high position and has an extremely rough and rugged topography. The Piedmont Plateau section occupies a high plateau which has been partly dissected by streams.

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

The soils of Greenville County are prevailingly low in organic matter. This area was in forest when reclaimed for agricultural purposes, and although the existence of prairies at an earlier time is reported, the effect of a grass vegetation apparently has entirely disappeared. Little opportunity exists for the accumulation of organic matter in the soil under forest conditions. In the wooded areas the surface layer of an inch or two contains some organic matter, but this soon disappears when the land is cleared and brought under cultivation.

There is no accumulation of carbonate of lime in the soils of this county, although the rocks from which these soils are derived contained lime. Leaching has been thorough and continuous, as the rainfall has been heavy and the drainage good to excessive. Under the climatic conditions the ground is not frozen for any length of time during the winter, and consequently leaching goes on throughout the year.

The prevailing rocks underlying the soils consist of granite, gneiss, and quartz-mica schist, with small areas of mica schist and small dikes of diorite or diabase. According to the United States Geological Survey, the Whiteside granite is the most extensive rock in the mountainous part of the county, with some areas of Carolina gneiss and Roan gneiss. These rocks appear to be similar to the granites and gneisses found throughout the county. The quartz-mica schist is generally brown in color and occupies a relatively small area in the central and southern parts of the county, chiefly along Reedy and Saluda Rivers and in the vicinity of Taylors, Paris Mountain, and Greenville. A small area of mica schist occurs along Rock Creek, southwest of Simpsonville. The principal areas of gneiss appear to lie in the central part, while granite forms the larger part of the rock in the northern and southern parts of the county. Diorite or diabase occur as narrow strips. The rock is dense, black, and very resistant to weathering. The principal areas of this rock lie at Mostellers Mill, Chick Springs, and about

1 mile east of Cleveland. The principal area of hornblende schist lies about 1 mile southeast of Caesars Head. These dark-colored rocks are not of much importance as a source of soil-forming material.

Upon disintegration and subsequent weathering these rock formations have given rise to soils of different characteristics. The differences in the color and texture of these soils are due in part to differences in the composition of the rocks, but to a greater extent to the degree of weathering and erosion and to the influence of vegetation and condition of drainage. Erosion has produced some of the heavier types by the more or less complete removal of the soil mantle, and has produced some of the sandier members by the slow but constant carrying away in suspension of the finer soil particles by rain water.

The soils of the county are grouped into series on the basis of origin, color, structure, and topography. The types of the several series are separated on the basis of texture of the surface soil. Eight soil series are represented by 14 soil types and one phase. In addition, three miscellaneous types of material, Rough stony land, Rock outcrop, and Meadow (Congaree material), are mapped.

The upland soils, which cover by far the greater part of the county, are of residual origin. They are classed in the Cecil, Madison, Appling, Worsham, Porters, and Ashe series.

The Cecil soils occupy by far the greater part of the county. They are confined to the Piedmont section. In these soils there are many variations in color, texture, and structure in the surface portion, but the subsoil is very uniform throughout the county. In the forested areas the first inch or two of material may carry enough organic matter to give it a loamy structure. This layer is abruptly underlain by a brownish-yellow friable sandy loam, or reddish-brown clay loam or sandy clay loam. The soil grades imperceptibly into a third layer —the subsoil—of red, firm, but brittle clay, which generally extends to a depth of several feet. In many places, however, the several layers are not distinct and the reddish-brown surface soil grades into the typical subsoil without any line of demarcation. The subsoil is characterized by its content of sharp quartz sand and occasional veins of quartz, and a small proportion of minute mica flakes. These soils are derived from granite and gneiss, which in many places contain enough of the dark-colored minerals to give the subsoil a deep-red color, particularly in the clay loam type. Five types and one phase are mapped in this county—the sandy loam, very coarse sandy loam, clay loam, sandy clay loam, with a hilly phase. and a gravelly sandy clay loam.

The Madison series includes types having brown surface soils, an upper subsoil of red clay, and a lower subsoil of friable micaceous clay. These soils differ from the Cecil soils in that they are more loamy in the surface soil, generally contain a large proportion of small particles of the parent rock, and contain a large quantity of small mica scales in the lower part, which give the lower subsoil a friable structure and slick, greasy feel. The parent rock commonly occurs within 3 feet of the surface, especially in the heavier types. The Madison gravelly sandy clay loam is mapped in this county.

In the Appling soils there are usually three distinct layers. The uppermost is a gray surface layer; the next, which usually appears at 4 to 6 inches, a yellow subsurface layer; and the third, the typical subsoil of yellowish-red or mottled yellow and red clay, which is firm but

brittle. In cultivated fields the surface soil is light gray to yellowish gray. These soils are derived from granite and gneiss. In some places the red color appears to have been leached out or oxidation has not been as complete. Only one type, the Appling sandy loam, is mapped in the present survey.

The Worsham series includes types with light-gray to gray surface soils and a pale-yellow or mottled yellow, gray, and white subsoil. These soils are derived from granite and gneiss and occupy poorly drained areas. In this county the sandy loam, the only type mapped, is associated with the Appling soils.

In the mountainous part of the county the types of the Porters series predominate. In virgin areas the upper layer of the Porters types, an inch or two thick, is a brown loam carrying considerable organic matter. The second layer is a yellowish-brown loam of a granular structure, and the typical subsoil is a reddish-brown friable clay loam. In cultivated fields the surface soils are brown. The Porters soils are derived from granite and gneiss, but they have not weathered as deeply or as thoroughly as the Cecil soils, and the depth to bedrock is generally less than 3 feet. Two types, the loam and stony loam, are mapped.

The surface soils of types of the Ashe series vary from gray to brownish gray. The subsoil is a yellow to brownish-yellow friable clay. The soils of this series are derived from granite and gneiss which have not weathered as completely as those giving rise to the Porters soils, and they generally occupy a higher position. One type, the Ashe loam, is shown on the map.

Most of the alluvial soils occur in narrow belts, the most extensive lying along the Saluda Rivers. Nearly all the bottom soils are formed from recent alluvium, though a few small areas of old alluvium occur as second bottoms, or terraces, along the Saluda Rivers. The alluvium consists of material washed from the soils of the Piedmont Plateau and Appalachian Mountains and deposited along the streams during periods of overflow. The deposits contain a noticeable amount of mica flakes and in many places vary greatly in texture and structure. The small areas of second-bottom, or terrace, soils have been classed in the Altavista series, and the first-bottom material as Congaree soils or as Meadow (Congaree material).

The Altavista series includes types with gray to brown surface soils and a yellow to brownish-yellow friable subsoil. These soils differ from the Congaree soils in elevation, being above ordinary stream overflow. The Altavista fine sandy loam is mapped.

The surface soils of types of the Congaree series are gray to reddish brown and the subsoil is light brown to reddish brown. These soils are subject to frequent overflow and more or less variable in texture. The frequent overflows are constantly changing the soils by removing some of the former deposits and adding new deposits.

Meadow (Congaree material) is composed of the first-bottom soils that are so variable in texture that they could not be separated into the various Congaree types. These recently deposited materials have not been leached and oxidized, have not formed any distinct layers, and are merely recent geological formations.

The Rough stony land includes those areas that are extremely rough in topography and are distinctly stony in character. Practically all of it is unfit for cultivation.

The following table gives the actual and relative extent of the different types mapped:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Cecil sandy clay loam	166,336	38.4	Porters stony loam	5,056	1.0
Hilly phase	27,968		Madison gravelly sandy clay loam	4,416	.9
Cecil sandy loam	123,328	24.4	Congaree silt loam	3,328	.6
Porters loam	46,272	9.2	Cecil very coarse sandy loam	1,792	.4
Appling sandy loam	26,176	5.2	Cecil gravelly sandy clay loam	1,536	.3
Cecil clay loam	25,536	5.0	Rock outcrop	960	.2
Ashe loam	23,744	4.7	Altavista fine sandy loam	576	.1
Rough stony land	22,400	4.4	Worsham sandy loam	256	.1
Meadow (Congaree material)	18,816	3.7			
Congaree fine sandy loam	7,104	1.4	Total	505,600	

CECIL GRAVELLY SANDY CLAY LOAM.

The Cecil gravelly sandy clay loam differs from the Cecil sandy clay loam mainly in that it has from 10 to 40 per cent of small angular quartz gravel and particles of the parent rock. These are noticeable on the surface and are mixed with the soil, but they do not occur in sufficient quantities to interfere seriously with cultivation, except on a few of the knolls and ridges. Owing to the presence of the gravel, the surface soil has a somewhat redder or more uniform brown color than the sandy clay loam. The subsoil is almost identical with that of the sandy clay loam.

This type occurs in comparatively small areas in the north-central part of the county, particularly along South Tiger River northeast of Locust.

The topography varies from gently rolling to rolling or, in some places, broken. It is more rolling and broken than the typical sandy clay loam. The natural drainage is good and in places excessive, and terracing is essential to prevent erosion.

The Cecil gravelly sandy clay loam produces about the same crops and, under the same cultural methods and fertilizer treatment, the same yields, as the Cecil sandy clay loam.

CECIL VERY COARSE SANDY LOAM.

The surface soil of the Cecil very coarse sandy loam varies from a yellowish-gray to gray very coarse sandy loam, with a depth of 6 to 10 inches, grading below into a yellowish-brown to reddish-yellow or salmon-colored sandy clay loam extending to depths of 12 to 18 inches. The subsoil is light-red to yellowish-red brittle clay containing some very coarse quartz sand. The subsoil is not so red as that of the Cecil sandy loam, probably owing to a less advanced stage of weathering and oxidation. The type differs from the Cecil sandy loam mainly in texture. As a general rule the parent rock is closer to the surface and large stones of the parent rock occur locally on the surface.

This type is generally developed in slightly higher positions than the Cecil sandy loam, as the granite from which it is derived appears to have weathered less rapidly. Most of it occurs between Greenville and Greer. Other areas lie south of Fork Shoals and near the mouth of Mountain Creek.

The greater part of the type has an undulating to rolling surface, the more steeply sloping areas lying near the streams. Surface and internal drainage are both good, owing to the topography and the porous structure of the subsoil. In the more rolling places the surface drainage is slightly excessive and erosion is more or less active.

With respect to crops grown, general farm methods practiced, and yields obtained, this type does not differ materially from the Cecil sandy loam, and it requires about the same fertilization.

This soil should be improved by the addition of organic matter in the form of barnyard manure, green manure, or compost. Nitrogen may be added by the growing of legumes, such as cowpeas or clover. Strong terraces should be built to prevent washing.

CECIL SANDY LOAM.

The Cecil sandy loam, locally known as gray land, has in the cultivated fields a surface soil of yellowish-gray to light-brown sandy loam 6 to 8 inches deep. Generally there is a subsurface layer, 1 to 6 inches thick, of yellow or reddish-yellow heavy sandy loam to sandy clay loam. In forested areas the material of the first inch or two is light-brown or yellowish-brown sandy loam underlain by reddish-yellow or yellow sandy loam. Those areas having the lighter colored surface soils normally have a thick upper layer of reddish-yellow sandy loam. The depth to the typical red clay subsoil is about 12 or 14 inches. Where the surface soil is shallow it is brown to reddish brown and grades directly into the red clay subsoil at 6 to 8 inches. Such areas are locally known as red sandy lands, and are considered stronger than those with yellowish-gray or light-brown surface soil.

The subsoil is a bright-red, stiff, but brittle clay containing some quartz sand, a few small mica flakes, and occasional narrow veins of quartz rock. The subsoil generally extends to a depth of more than 3 feet; but in some areas the bedrock comes closer to the surface and the subsoil is lighter in color and more nearly resembles that of the Appling soils. Such conditions exist on the flatter and less well drained areas of the type, and are particularly noticeable about 1 mile north of Horse Creek School.

There is a noticeable difference in the general color of this type across the county. As developed in the northern end the surface has a redder cast; in the southern end it is predominantly gray. Throughout the type are spots which carry noticeable quantities of quartz gravel and fragments of the parent rock. A small area northeast of Paris Mountain near Little Texas School has a fine sandy loam surface soil.

The Cecil sandy loam is one of the most important soils of the county. It is well developed throughout the Piedmont section of the county, but is most extensive in the southern end. Some of the largest areas lie in the vicinity of Greer, Fountain Inn, and Wares Crossroads. Other representative bodies occur throughout the southern and central parts of the county.

The Cecil sandy loam occupies broad, flat, or undulating to gently rolling interstream areas. As the streams are approached the surface becomes more rolling, but the slopes are generally smooth. Where the country becomes more rolling and broken the sandy clay loam of the series is developed. As a whole the drainage of this type is well established and some of the more rolling areas are excessively drained.

Erosion is not as severe on this type as upon the Cecil sandy clay loam because the soil absorbs more of the rainfall. Only a few of the flatter areas require ditching, but the sloping areas should be terraced in order to prevent gullying.

About 90 to 95 per cent of this type is under cultivation; the remainder supports a growth of hardwoods and pine. This soil is highly prized, is easy to till, warms up early in the spring, and is adapted to a wide variety of crops. It is one of the good truck soils of the Piedmont Plateau. Every crop in the county is grown upon it.

Cotton and corn are the principal crops. Cotton yields from one-fourth to 1 bale per acre, depending largely upon the quantity of fertilizer applied. The average application is from 300 to 500 pounds per acre, of mixtures analyzing 9–2–2 or 8–3–3.[2] Corn yields from 15 to 30 bushels per acre. Sweet potatoes yield from 100 to 300 bushels per acre when fertilized. The yields of wheat and oats are usually lower than those on the heavier types. Peanuts, cowpeas, and crimson clover do well. Garden vegetables mature early and give good results. The peanut could be extensively grown on this type. Peaches and summer varieties of apples can be successfully grown.

The price of the Cecil sandy loam varies greatly, ranging from $50 to $200 an acre, depending upon improvements, location with respect to roads, and distance from shipping points. The higher prices obtain in the vicinity of Greenville.

The Cecil sandy loam responds readily to fertilizers, to applications of barnyard manure, and the turning under of green-manure crops. One of the requirements of this soil is organic matter. This can be supplied by turning under cowpeas, crimson clover, or barnyard manure. When this soil is filled with organic matter, large quantities of commercial fertilizer can be profitably used. In many cases it would be well to use from 300 to 800 pounds of an 8–4–3 mixture for cotton and a lighter application for corn. For general crops the soil does not require much potash, except in growing Irish potatoes and tobacco. However, a high-grade fertilizer should be used for garden vegetables, unless the soil is heavily manured.

CECIL SANDY CLAY LOAM.

The surface soil of the Cecil sandy clay loam is a light-brown to reddish-brown sandy loam to sandy clay loam having a depth of about 4 to 8 inches. The subsoil is a red, stiff, but brittle clay containing a noticeable quantity of quartz sand and a small quantity of finely divided mica. Upon a few of the steeper slopes along the larger streams and near the mountains the content of mica in the lower subsoil is greater than elsewhere. This condition is marked in areas along Reedy River south of Fork Shoals, and in some areas along the Saluda River.

The soil of this type in many places is intermediate in color, texture, and structure between the gray to brown sandy loam and the red clay land. Throughout the central and northern parts of the county the surface soil is prevailingly reddish in color and generally fairly uniform in texture, a typical sandy clay loam. In the southern part of the county, and also on some of the more rolling areas in

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

other parts of the county, the areas mapped as Cecil sandy clay loam are composed of spots of Cecil sandy loam and spots of Cecil clay loam so intimately associated that they could not be separated. In other places the type occupies a zone of gradation between the Cecil sandy loam and the Cecil clay loam, and the boundaries are necessarily rather arbitrary. Locally there are fragments of quartz and parent rock scattered over the surface, and in spots the parent rock comes within 3 feet of the surface. Such variations occur chiefly on the slopes to the larger streams. The sandy spots included in this type in the southern part of the county have a grayer or lighter colored surface soil than the typical soil.

This is the most extensive soil type in the county. It is developed more or less throughout the Piedmont section, but has its greatest development in the central, eastern, and northeastern parts of the county. Some of the more typical areas lie in the vicinity of Travellers Rest, Locust, Gowensville, northwest of Batesville, and south of Greenville. Other areas are mapped in the extreme southern corner of the county and in the section east of Simpsonville. Some of this type extends up into the mountains, occupying the lower slopes along the rivers. The largest area of this kind is near Venus.

The topography varies from undulating or gently rolling within the stream divides to rolling and slightly hilly along the stream courses. Nearly all the type has a surface favorable for agriculture. All of it has excellent surface drainage, and on the more rolling parts the drainage is excessive, the rapid run-off resulting in serious erosion. Practically all the cultivated areas are terraced to prevent washing and gullying. Broad terraces that can be cultivated are recommended. About 80 or 90 per cent of the type is under cultivation; the remainder supports a growth of oak, hickory, and poplar, and a second growth of loblolly pine.

Cotton is the principal crop on this soil. The yields vary from one-fourth to 1 bale per acre, depending on the care, amount of fertilizer used, and character of the soil. Yields of one-half to 1 bale are not uncommon on typical areas. Fertilizer is commonly used at the rate of 300 to 500 pounds per acre where these yields are obtained. This type does not require as heavy applications as the sandy loam type. The most common fertilizer is one having 8 to 10 per cent phosphoric acid, 2 per cent nitrogen, and 2 per cent potassium. A heavier application per acre of an 8–4–3 mixture would be more profitable. A fertilizer recommended for farm mixing consists of 500 pounds of 7 per cent cottonseed meal, 166 pounds of nitrate of soda, and 1,334 pounds of 16 per cent acid phosphate. Corn is probably the second crop in importance. It yields about 25 bushels per acre. An average application of fertilizer for corn is about 300 to 350 pounds per acre. Crimson and bur clovers are grown to a considerable extent, but are used mostly as green-manure crops. Some alfalfa was seen on this type; it does very well but tends to "run out" in a few years The production of wheat and oats in the county comes largely from this soil, wheat yields about 12 bushels per acre.

The price of this land varies widely, ranging from about $40 to $125 an acre, the farms having the more typical soil, better locations, improvements, and topography bringing the higher prices. One of the most important factors in determining value is the topography and degree of erosion.

The Cecil sandy clay loam is naturally a strong and productive soil. It can be built up to a high state of productiveness and easily maintained there by a proper crop rotation and small application of fertilizer. The surface soil contains enough sand to render most of it friable and more easily tilled than the Cecil clay loam. It responds readily to deep plowing and thorough preparation of the seed bed. The growing and turning under of cowpeas, soy beans, and clover will improve the structure, increase the water-holding capacity, and add considerable nitrogen, in which this soil is deficient. When this soil is well supplied with nitrogen, phosphorus will be the essential element of commercial fertilizer needed, as the subsoil and the rock from which the soil was derived contain a relatively high percentage of potash.

Cecil sandy clay loam, hilly phase.—The Cecil sandy clay loam, hilly phase, differs from the typical soil mainly in topography, as it occupies steep hillsides, low hills, and areas with a generally rough broken topography. Erosion is very active, and many deep gullies and ravines have been formed. All the phase is excessively drained and requires heavy terracing to prevent serious erosion. There is considerable variation in the texture and color of the surface soil. This is due largely to erosion. The subsoil is generally a bright-red, stiff, brittle clay, but locally it passes into a friable slightly micaceous clay or into the soft disintegrated parent rock. There is a high mica content in the lower subsoil in places. Small spots of gravel are numerous in this phase.

The greater part of the hilly phase occurs near the Saluda River and in a belt adjoining the mountain types. Owing to the rough topography, farming operations are carried on with considerable difficulty, and with less profit than on the typical soil. A large part of the land is in forest, in which oak, hickory, pine, and poplar are the principal trees. Much of it should be left in forest or used for the production of apples and other fruits. Good pasture has been obtained in a few places when the land has been seeded.

CECIL CLAY LOAM.

The Cecil clay loam, commonly known as "red clay land," is the heaviest soil in the county. The surface soil is a brownish-red to red clay loam, and this is underlain at a depth of 4 to 10 inches by heavy, stiff but brittle red clay extending to a depth of 36 inches or more. The subsoil when wet is sticky and plastic but when dry it becomes brittle. Some quartz sand and veins of quartz rock occur in the subsoil. Minute mica flakes also are present in the subsoil, locally in sufficient quantities in the lower subsoil to give the material the slightly greasy feel characteristic of the Louisa soils. In some localities, where the parent rock is within 3 or 4 feet of the surface, yellow mottling appears in the lower part of the 3-foot section. Small quartz gravel, and rock fragments occur on the surface in places; these are indicated with the proper symbols on the map. Other areas have a covering of dark-brown sandy loam, from 2 to 4 inches thick, and in places the soil approaches the sandy clay loam in character. The virgin surface soil in forested areas is dark colored, owing to the presence of organic matter.

The Cecil clay loam is developed throughout the Piedmont section of the county. It is most extensive along Grove Creek near Piedmont, in and just north of Greenville, and along the Tiger River in the vicinity of Mostellers Mill. It is closely associated with the Cecil sandy clay loam and in some places with the sandy loam. The boundaries between the clay loam and the sandy clay loam are rather arbitrary.

The topography of the Cecil clay loam varies from gently undulating to rolling. The area just north of Greenville is comparatively flat, while all the other areas are undulating to rolling, the more rolling surface being developed near the streams. The drainage is everywhere good, and in some places excessive, causing severe erosion.

This is a naturally fertile soil, the strongest in the county, but difficult to handle. It must not be plowed when either too wet or dry, as it clods. It is a good soil for cotton and corn, yielding better than the lighter soils with less fertilization. It also produces good yields of wheat, oats, and alfalfa. Redtop, clover, and orchard grass do well.

The Cecil clay loam is practically all in cultivation. The price varies according to topography, improvements, and location, ranging from $50 to $150 an acre.

The soil can be much improved by the addition of organic matter in the form of barnyard and green manures. These improve the physical condition of the soil and also add nitrogen and other plant food. The application of lime also would improve the physical properties of this heavy-textured soil, through flocculation of the fine soil particles. Winter cover crops should be grown to prevent surface washing. Terracing should be employed to control erosion. The rougher areas probably would be more profitable if seeded and used as pasture. Heavy applications of phosphoric acid and nitrogen give profitable returns on this soil. Potash is not as essential as the other elements of plant food, as the soil is naturally high in potash.

MADISON GRAVELLY SANDY CLAY LOAM.

The Madison gravelly sandy clay loam is locally known as "red gravelly land." The surface soil varies from a light-brown to reddish-brown sandy clay loam, with a depth of 5 or 10 inches. A few stones and many small angular fragments of brown to reddish-brown quartz-mica schist are scattered over the surface and through the soil. The subsoil is a bright-red, stiff, but friable clay carrying more mica than the Cecil subsoil. At about 20 to 24 inches it usually grades into a light-red, friable, micaceous clay, which may extend to a depth of 36 inches or grade into the soft disintegrated rock. A few small and large fragments of the rock are encountered locally in the subsoil. Some spots of gravelly sandy loam, too small to be separated, are included with this type. In places, particularly upon the top of some of the knolls, the brown surface soil rests directly upon the parent rock; in other places the parent rock is reached at varying depths within the 3-foot section.

This type is confined mainly to the central part of the county between Conestee, Greenville, Travellers Rest, and Greer. Other areas are scattered throughout the county, and many patches too small to be mapped were included with the surrounding types.

The topography of the Madison gravelly sandy clay loam is rather hilly, as it is developed on knolls and ridges that are slightly higher than the surrounding Cecil soils. All the type is exceptionally well drained, owing to the rolling and sloping character of its surface and its friable structure. One of the characteristics of this soil is the absence of serious erosion, which is probably due chiefly to the rock fragments on the surface. These fragments interfere to some extent with cultivation, but not seriously.

Cotton and corn are the principal crops. Small grains also do well. The best rye seen in Greenville County was on this soil. The yields obtained, and the methods of cultivation and fertilization are about the same as on the Cecil sandy clay loam. This Madison soil can be improved by the methods used on the Cecil sandy clay loam.

APPLING SANDY LOAM.

In cultivated fields the surface soil of the Appling sandy loam is a gray or yellowish-gray loamy sand or light sandy loam, with a depth of 6 or 8 inches. The subsurface layer, extending to a depth of about 12 to 18 inches, is a yellow or reddish-yellow sandy loam to sandy clay loam. The subsoil is a yellowish-red, or mottled yellow and red, or in some places a light reddish brown, stiff, but fairly brittle clay, which normally extends to a depth of 3 feet or more. In a few places the disintegrated rock is reached within the 3-foot section. In forested areas the gray surface color extends to a depth of 1 to 3 inches.

Spots of this soil contain considerable coarse sand and fine gravel, but these were included with the type because of their small extent. Along the Augusta Road southwest of Conestee the surface soil is dark gray to grayish brown and has somewhat the appearance of the Cecil sandy loam. Small patches here and there have a distinctly yellow clay subsoil; these occur mainly in the flatter or the lower lying areas. On the other hand, there are slight ridges and knolls which have a red subsoil. Such spots could not be shown on a map of the scale used in the present survey.

The Appling sandy loam occurs in the Piedmont section of the county. The principal areas are east of Greenville, southwest of Conestee, and east of Simpsonville. The topography is generally undulating to gently rolling, although some areas are slightly hilly. The surface drainage is good, but the internal drainage does not appear to be as free as in the Cecil sandy loam. Many seepy places or wet-weather springs are associated with the type; most of these places, however, where of sufficient extent to be separated, are mapped as Worsham sandy loam.

The crops grown are the same as on Cecil sandy loam and they receive practically the same treatment. The Appling sandy loam is said to be two or three days later in warming up or drying out than the Cecil soil. As mapped in Greenville County, it is said to be less retentive of fertilizers. Crops do best in dry years, when good yields of cotton, corn, and cowpeas are obtained.

This soil is deficient in organic matter and nitrogen; these can be added by the methods recommended for Cecil sandy loam. The type is adapted to bright tobacco, peanuts, and garden vegetables.

WORSHAM SANDY LOAM.

The Worsham sandy loam has a surface soil of gray to dark-gray sandy loam, varying in depth from 4 to 8 inches. This is typically underlain to a depth of about 12 inches by a gray or light-drab sandy loam containing very little of the finer soil materials. The subsoil varies widely in color. In the typical section it is a gray or drab, slightly plastic, heavy clay, with yellow, drab, or bluish mottlings, the lower part being somewhat lighter in color than the upper part. In places it is an almost white to light-gray clay with few mottlings of yellow or brown, while in others it is a distinctly dark, sticky clay. The surface soil, although predominantly a sandy loam, approximates a silt loam in one or two small areas.

This type occurs in very small scattered bodies in the Piedmont section. Most of it lies along the Augusta Road south of Greenville, where it is closely associated with the Appling sandy loam. Many of the areas are situated within areas of Appling sandy loam, at the head of or along small indistinct drainage ways.

The topography is nearly flat to undulating, generally with a gentle slope toward small streams. The type as a whole is poorly drained and seepy, and contains numerous wet-weather springs. It lies at the base of the slopes and receives the seepage waters of the higher lying areas.

Only a very little of the Worsham sandy loam is in cultivation. It gives low yields of corn and cotton. Most of the land is used as pasture. It furnishes good summer grazing for cattle.

Organic matter seems to be more abundant in this soil than in the majority of the soils in Greenville County. Drainage by open ditches or tiling would greatly improve the type.

PORTERS STONY LOAM.

The Porters stony loam has a brown loam surface soil and a reddish-brown, friable clay loam subsoil. It differs from the Porters loam mainly in having more bowlders on the surface and through the soil.

The type has a rougher surface than the loam and is more thoroughly dissected by small streams. It normally is developed at a higher elevation than the loam, and occurs chiefly on narrow ridges extending out from the main mountains, on the steep sides of the mountains, and on small detached mountains. This type is valued chiefly for its timber, which is the same as found on the loam. Practically none of it is cultivated, although some of it could probably be used for apple orchards or pasture. It is best suited to forestry.

PORTERS LOAM.

The surface soil of the Porters loam is a brown loam to heavy sandy loam, 4 to 10 inches deep. This surface layer grades gradually into a subsoil of reddish-brown friable clay loam, containing quartz grains and mica flakes. Generally the parent rock is encountered within the 3-foot section and in places it is only 2 feet below the surface. Rock fragments and bowlders are scattered over the surface and through the soil. The Porters loam is intermediate between the Ashe loam and the Cecil sandy loam in color of soil section, weathering having reached a more advanced stage than in the Ashe soils but not

so complete as in the Cecil soils. The surface contains a considerable quantity of organic matter, but this is rapidly depleted under cultivation.

As mapped in Greenville County, the Porters loam occurs in the mountains, occupying a position between the Piedmont Plateau and the escarpment of the mountains proper. It extends back into the mountains in strips along the larger streams, and it borders the mountains from the northeast corner of the county to the Saluda River. The largest single area lies near the confluence of the several forks of the Saluda River. One isolated area, known as Paris Mountain, is mapped 5 miles north of Greenville.

The topography is hilly to rough and mountainous. Some of the hills have long slopes; the slopes of others are too steep to allow cultivation. The crests of the ridges are narrow, becoming less pronounced as one approaches the heads of the smaller streams. The drainage is generally excessive. When cleared and cultivated, the soil erodes readily and gullies are formed rapidly, making extensive terracing necessary. Many small streams have cut back from the larger streams and have dissected the type thoroughly. These small streams are bordered by very narrow strips of bottom, which with gentle slopes along them are cultivated. Where wide enough such bottom-land areas are mapped with the Congaree soils. The ridge tops and gentle stream slopes are practically the only parts of the Porters loam cultivated.

Corn, the principal crop, ordinarily yields 15 to 20 bushels per acre. Rather light applications of fertilizer are used. Cotton is not grown on this type to any extent, as most of it lies within a belt having a shorter season than cotton demands. Cowpeas are grown successfully. Some small apple orchards are on this type, and more of it could undoubtedly be used profitably for orcharding where located close to a marketing point. The chief value of the land however, lies in its forest of pine, hemlock, and oak and other hardwoods. Much of the type should not be cultivated but used for timber production.

The Porters loam should be managed in the same way as the hilly phase of the Cecil sandy clay loam. Terraces should be of a type that will allow cultivation.

ASHE LOAM.

The Ashe loam is a yellowish-brown to grayish-brown, heavy sandy loam or loam, 6 to 10 inches deep. The subsoil is a yellow to light-buff friable clay loam. As mapped in Greenville County, the parent bedrock or large bowlders are encountered in most areas within the 3-foot section. The lower part of the subsoil normally contains small mica flakes, which are especially abundant just above the parent rock. Large bowlders and smaller rock fragments are scattered over the surface, and these must be removed before cultivation is practicable. The type is best developed in small flat areas on the mountain tops.

The Ashe loam is confined to the mountains in the northern part of the county, most of it being located on the top of the Saluda Mountains. Here weathering and oxidation have not reached the advanced stage found farther south, and consequently the color of the soil is lighter.

The topography is mountainous; the crests of the ridges and saddles of the gaps are smooth to rolling, but the sides are steep. The drainage is good to excessive, and careful terracing is necessary to prevent severe erosion in the fields.

Very little of the Ashe loam is in cultivation. The principal crop is corn, with yields of 15 to 20 bushels. Light applications of commercial fertilizers are used upon this soil. Apples are grown to a considerable extent on this soil in North Carolina, but only a few small orchards were observed on the type in Greenville County, and most of these were poorly kept, needing pruning and spraying. The land is very cheap because of its location. The distance from shipping points and the poor roads make the marketing of products difficult, and in the case of perishable products like fruit almost impossible.

Practically all this type has to be cleared of timber and stone before cultivation. The organic matter originally present is rapidly depleted and severe washing takes place, making strong terraces necessary. The smoother parts of the type in favorable situations can be used for the production of apples and where more remote or inaccessible for pasturage; the rougher and more stony areas should remain in forest. The type supports a good growth of hardwoods.

ALTAVISTA FINE SANDY LOAM.

The surface soil of the Altavista fine sandy loam is a light-brown to grayish-brown fine sandy loam or loamy fine sand, with a depth of 8 to 15 inches. The subsoil to a depth of 36 inches or more is a yellow or brownish-yellow fine sandy loam of a mellow, friable structure. Both soil and subsoil contain a noticeable amount of small mica flakes.

Included with this type are spots of dark-brown and of reddish-brown fine sandy loam or loam, and narrow strips of gray loamy fine sand occur near the outer edge of these areas. Bordering the hills or upland some outwash or colluvial deposits of Cecil or Porters material occur. Some of the areas along South Saluda River have slightly darker surface soils and a more loamy texture. These spots and the colluvial deposits have the appearance of the Wickham soils, which are not mapped in this survey.

The Altavista fine sandy loam occurs on the second bottoms or low terraces of the Saluda River and its main branches. The surface is level to very gently sloping. The natural surface drainage is good and, owing to the open structure of the subsoil, the internal drainage is excellent. Most of the type lies above ordinary overflow, and crops are seldom damaged.

All the Altavista fine sandy loam is under cultivation. Corn is the principal crop. Some garden vegetables and apples are produced. The soil is easy to cultivate, but the yield of corn is low except where fertilizer or manure is applied.

This soil can be greatly improved by adding barnyard manure and by growing and turning under cowpeas or soy beans. It is suited to the production of sweet potatoes, watermelons, and truck crops. The land is usually sold with the adjoining upland and bottom types.

CONGAREE FINE SANDY LOAM.

The surface soil of Congaree fine sandy loam is a grayish-brown to light-brown, mellow fine sandy loam, ranging in depth from 8 to 20 inches. The subsoil is a light-brown to brownish-yellow fine sandy loam or loam. Both the soil and subsoil have a rather large content of very fine mica particles, which give them a slightly greasy feel.

Owing to the frequent overflows and the constant shifting of the soil materials, this type includes a number of variations in color, texture, and structure. In places a light-colored fine sand covers the surface to a depth of a few inches, and in some instances deposits of similar material extend to a depth of 3 feet. Other spots have a brown silt loam or loam surface soil, underlain by brown silt loam or clay loam. Several small areas of fine sand occur along the Saluda River in the southern part of the county. These areas have a surface soil of brown to light-brown fine sand, about 14 inches deep, and a subsoil of yellow fine sand.

The Congaree fine sandy loam occurs in narrow to moderately broad strips along the larger creeks and particularly along the upper reaches of the Saluda River and its main branches. The surface is practically level, with a slight slope in the direction of the stream flow. The areas are subject to frequent overflows, but otherwise are fairly well drained. Some slight depressions require artificial drainage, for which open ditches are used. Shallow stream channels, which are occupied during overflow, occur throughout the type, but are not so numerous nor so pronounced as in Meadow.

The Congaree fine sandy loam is all in cultivation and used for the production of corn. It is one of the principal agricultural soils in the mountainous part of the county. Yields of 20 to 30 bushels per acre are obtained. Commercial fertilizer is seldom used.

The Congaree fine sandy loam is usually sold in conjunction with the surrounding upland, but has a much higher value than the upland, especially in the mountains. Its value and dependability can be greatly increased by cleaning out and straightening the stream channels.

CONGAREE SILT LOAM.

The Congaree silt loam is a brown or reddish-brown friable silt loam, gradually becoming heavier with depth. At about 8 to 12 inches it normally changes to a brown heavy silt loam, which grades at about 24 inches into a silty clay loam or friable clay.

In some of the more poorly drained situations the surface soil and subsoil are grayer in color, and locally the lower subsoil is mottled with light brown and rusty brown. The type has a lighter texture near the streams, owing to the deposition of the heavier sand particles at the point where the velocity of the currents is checked when the streams overflow. The heavier areas are farthest from the watercourses. Small sandy areas are associated with this type. Small mica flakes occur throughout the 3-foot soil section, but are more abundant in the lower part.

The Congaree silt loam is confined chiefly to the wider bottom lands along the larger streams. The largest and most important areas are along North, Middle, and South Saluda Rivers above their junction. Small areas are mapped in other parts of the county, and many are included with Meadow (Congaree material).

The topography is flat, with a slight fall in the direction of the stream course. Slightly elevated, narrow, natural levees occur in places along the larger streams. The drainage is good, except in a few spots, at the mouths of short gullies, which can easily be drained by ditching. As a whole the type is seldom overflowed, and then only for short periods.

Corn is practically the only crop grown on this soil. The yields vary from 20 to 70 bushels per acre. Barnyard manure and compost are the chief fertilizers, very little commercial fertilizer being used. The Congaree silt loam is a naturally fertile soil, and its productiveness should be maintained and increased by the application of compost and barnyard manure, and by growing and turning under such legumes as cowpeas and clover.

MEADOW (CONGAREE MATERIAL).

The term Meadow (Congaree material) is applied to alluvial areas so variable in texture, color, and structure that no type name could be given to the material. Meadow comprises narrow sand bars or flats, spots of Congaree fine sandy loam, Congaree silt loam, and areas that are partly under water during the winter and spring months.

A strip about 2 miles long, mapped along Reedy River in the northern part of Greenville, has a soil profile resembling the Worsham soils, but was included with Meadow because of its position.

Meadow (Congaree material) is confined to relatively narrow strips in the first bottoms along streams. It lies a few feet above the normal water level, and part of it is wet or saturated throughout the winter and spring. All of this type is subject to frequent overflows and is subject to textural changes at such times. It is cut up by numerous shallow stream channels and washes.

Much of this material is naturally fertile, but its low position and imperfect drainage render a large proportion of it unfit for farming. Some small areas are cultivated and good yields are obtained when the crop is not destroyed by overflows. Corn is practically the only crop planted. If the type were protected from overflow and drained, much of it would be valuable farming land. The natural vegetation consists of water oak, elm, willow, birch, some ash, and alder. Reeds and water-loving grasses and sedges are the vegetation on some areas. The principal use of the land is for summer pastures.

ROUGH STONY LAND.

Rough stony land includes the thoroughly dissected mountain slopes which are too steep, rough, or stony to be of agricultural value. Numerous less hilly arable areas, 5 to 20 acres in extent, are included. These were not separated because of their almost inaccessible situation. The slopes often rise 500 to 1,000 feet in a distance of one-half mile to 1½ miles, and are marked by many massive rock outcrops and large bowlders. One outstanding feature of Rough stony land is that it is practically all developed on the southern escarpment separating the Piedmont Plateau proper from the Appalachian Mountains.

Rough stony land extends across the northern end of the county in a northeast and southwest direction, in a belt averaging about 1 mile in width. One small area is mapped on Paris Mountain, 5 miles north of Greenville. The chief value of this land lies in its forest.

ROCK OUTCROP.

Rock outcrop consists principally of bare, steep cliffs of granite, several hundred feet high. It occurs only on the escarpments of the mountains. The two most important areas are Glassy Rock Mountain and Caesars Head. The rock of these exposures, which is classed as Whiteside granite by the United States Geological Survey, would be a very good granite for building purposes.

SUMMARY.

Greenville County is situated in the northwestern part of the State. It has an area of 790 square miles, or 505,600 acres. The greater part of the county lies within the Piedmont Plateau, but the northern part is occupied by the Saluda Mountains of the Appalachian Mountain system. The topography of the Piedmont Plateau varies from almost level to hilly, and of the mountainous part from hilly to mountainous. The Saluda, Reedy, Enoree, and Tiger Rivers are the main streams. Drainage is well established throughout the county.

The principal city is Greenville, the county seat. The combined population of Greenville and the surrounding mill villages is about 48,000. Other important towns are Greer, Piedmont, Simpsonville, and Fountain Inn.

Three railroads radiate from Greenville, besides the main line of the Southern Railway, which is double-tracked through the county. The Piedmont & Northern Electric Railroad also passes through the county.

The climate is mild, and favorable to the production of a large variety of crops. The summers are warmer and longer in the Piedmont than in the mountains. The summer season in the mountains is usually too short and cool for the production of cotton. The mountains have a delightful summer climate. The mean temperature for the winter months in the Piedmont region is 41.2° F., and for the summer months, 75.7° F. The annual rainfall of 51.96 inches is well distributed throughout the year. The rainfall has never fallen below 42 inches since records have been kept.

Most of the land in the Piedmont is under cultivation, but only a small proportion of the mountain area is cultivated.

Cotton is the chief cash crop in the Piedmont, and corn in the mountainous section. Other field crops grown are wheat, oats, corn, cowpeas, potatoes, and sweet potatoes. Some apples, peaches, and grapes are grown.

Commercial fertilizers are used extensively; clover and rye are grown to turn under; and manure and compost are used to a large extent. Definite rotations of crops are not in common use.

The soils of the county—14 types and one phase—have been grouped in 8 soil series. In addition to these definite types, the map shows 3 miscellaneous types of material, mainly nonagricultural.

The most important types are the Cecil sandy loam, Cecil sandy clay loam, Cecil clay loam, Appling sandy loam, Congaree silt loam, and Congaree fine sandy loam. The Cecil clay loam is naturally the most fertile of the Cecil soils, but because of the difficulty in handling it, the Cecil sandy loam and Cecil sandy clay loam are preferred.

Cotton is the principal crop grown on the Cecil and Appling soils. Corn is the secondary crop. The Congaree soils are used exclusively for corn. The Ashe loam and Porters loam are of considerable extent, but only a small part of their area is under cultivation. Their chief value lies in the forest. Meadow (Congaree material) is poorly drained and subject to overflow. Most of it is used as summer pastures.

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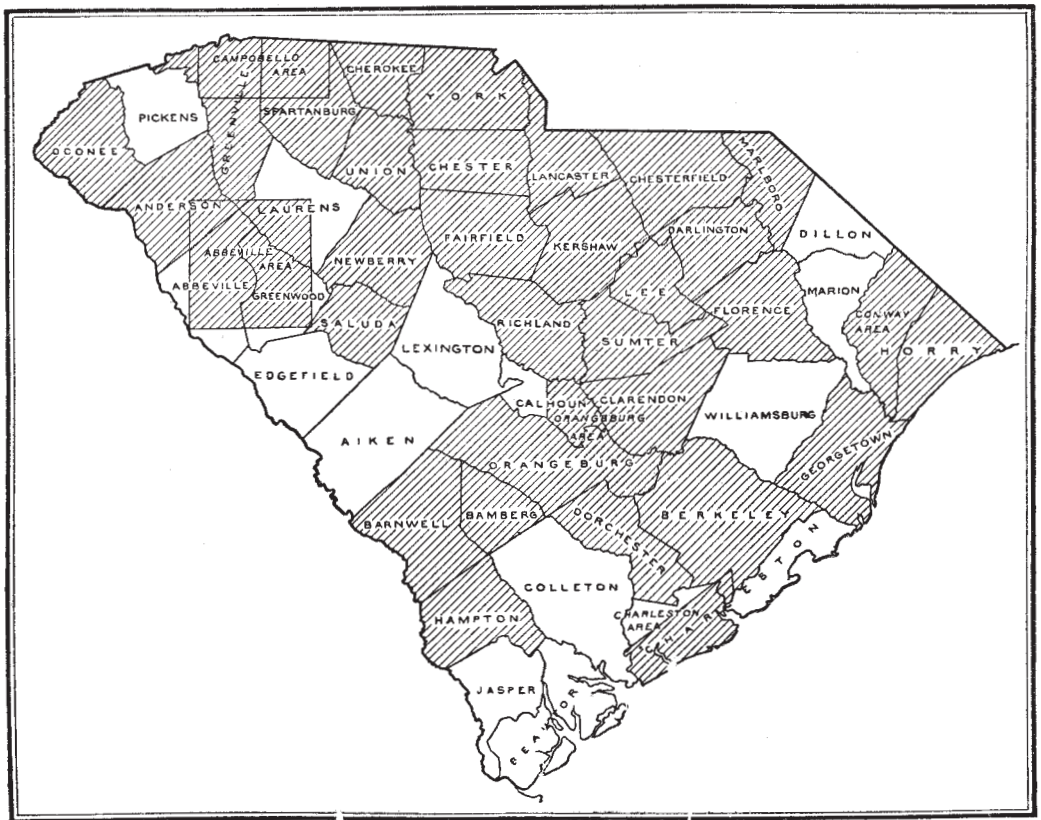

Areas surveyed in South Carolina, shown by

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