



Issued March 4, 1916.

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE,  
W. A. GRAHAM, COMMISSIONER; B. W. KILGORE, STATE CHEMIST  
AND DIRECTOR TEST FARMS.

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SOIL SURVEY OF UNION COUNTY,  
NORTH CAROLINA.

BY

B. B. DERRICK, OF THE U. S. DEPARTMENT OF AGRICULTURE,  
AND S. O. PERKINS, OF THE NORTH CAROLINA  
DEPARTMENT OF AGRICULTURE.

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W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

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[Advance Sheets—Field Operations of the Bureau of Soils, 1914.]



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1916.

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## LETTER OF TRANSMITTAL

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF SOILS,  
*Washington, D. C., July 21, 1915.*

SIR: A soil survey of Union County, N. C., was included in the field operations of the Bureau of Soils for 1914. This work was done in cooperation with the North Carolina Department of Agriculture, and the selection of the area was made after conference with State officials.

I have the honor to transmit herewith the manuscript and map covering this county and to recommend their publication as advance sheets of Field Operations of the Bureau of Soils for 1914, as authorized by law.

Respectfully,

MILTON WHITNEY,  
*Chief of Bureau.*

Hon. D. F. HOUSTON,  
*Secretary of Agriculture.*

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# SOIL SURVEY OF UNION COUNTY, NORTH CAROLINA.

By B. B. DERRICK, of the U. S. Department of Agriculture, and S. O. PERKINS, of the North Carolina Department of Agriculture.

## DESCRIPTION OF THE AREA.

Union County lies in the southern part of North Carolina, bordering the South Carolina line, about midway between the coast and the mountains. It is bounded on the north by Mecklenburg, Cabarrus, and Stanly Counties, on the east by Anson County, on the south by South Carolina, and on the west by South Carolina and Mecklenburg County. The county line on the north follows Rocky River and is irregular. The area of the county is 630 square miles, or 403,200 acres.

The general surface features of Union County consist of broad, gently rolling interstream areas, which become more rolling, broken, and hilly as the larger streams are approached. On the whole this county is smoother than most of the country embraced in the Piedmont Plateau province. The surface conditions can best be described by dividing the county into four physiographic divisions.

The first and largest division occupies the greater part of the county, embracing the eastern, central, south-central, and north-western portions. The surface features of this division consist of a series of smoothly undulating to gently rolling interstream areas, which become more rolling, hilly, and broken as the larger streams are approached, but are nearly flat in the vicinity of Indian Trail. Small areas of low, flat bottom land, varying in width from a few feet to several rods, are encountered along all the larger streams. The second division extends inward 3 to 6 miles from Rocky River on the north and is characterized by steep, broken ridges running parallel to the river and steeply sloping to the stream banks, thus giving no bottom land. The third division extends south from Stallings in a narrow belt along the western border of the county, and comprises the area covered with soils derived from granite and gneiss. In this locality erosion has been quite active, and many deep gullies have been formed, leaving the surface rolling to hilly. The fourth and smallest division is located in the extreme south-eastern corner of the county and consists of rather steep to precipitous hills on each side of Brown Creek. The valley along this stream

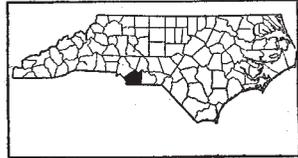


FIG. 1.—Sketch map showing location of the Union County area, North Carolina.

is from one-half mile to  $1\frac{1}{2}$  miles wide, and is flanked by bluffs rising abruptly to a height of 75 to 150 feet above the normal stream level, and continuing as more or less broken and gullied ridges to a distance of  $1\frac{1}{2}$  to 2 miles from the stream.

The highest elevations so far determined in the county are in the western part. The elevation of Weddington is 725 feet. There is a gradual slope from this point in both an easterly and a southerly direction. Other elevations along the Seaboard Air Line Railway are: Indian Trail, 690 feet; Waxhaw, 645 feet; and Monroe, 576 feet. Marshville is 554 feet, and Wingate, 4 miles west of Marshville, is 545 feet, above sea level.

The general slope of the county is revealed by the drainage system. Rocky River, which flows eastward along the northern boundary of the county, is the principal drainage way for all except the southwestern and south-central sections, which have a southwestern slope.

All the section to the northeast of the ridge which extends past Indian Trail, in the northwestern part of the county, south to the South Carolina line, by way of Prices Mill, northeast of Mineral Springs, New Hope Church, Altan, and Mount Prospect Church, is drained by numerous tributaries of Rocky River. The remainder of the county is subdivided by a second ridge which extends southeast from Mineral Springs to the South Carolina line, the section to the north of this ridge being drained by Catawba River, while that to the south is drained by Lynch's Creek.

Rocky River is the only stream in the county that has sufficient fall for the development of water power, and at the present time it furnishes power for only a few small gristmills and cotton gins.

Union County was formed in 1843 from parts of Anson and Mecklenburg Counties. The early settlers of the territory now included in Union County were of various nationalities. In 1751 the Scotch-Irish from Pennsylvania established what is known as the Waxhaw settlement, which comprises the western part of the county. The northwestern section was populated by Germans from Pennsylvania and by colonists from eastern North Carolina. The eastern part of the county was settled by Virginians and by people from other parts of North Carolina, mostly of English descent. The section now included in Buford Township was settled by immigrants from Germany. The central portion of the county was very sparsely settled prior to 1760.

According to the 1910 census, Union County has a population of 33,277, which is an increase of 6,121, or 22.5 per cent, over the 1900 figures. Of the total population 28 per cent are negroes, and less than 1 per cent are of foreign birth.

Monroe, the county seat, with a population of 4,082, is situated at the junction point of the two main lines of the Seaboard Air Line Railway, near the center of the county. The city is supplied with electric power and light generated in South Carolina, and has an excellent and inexhaustible water supply and all modern conveniences. It has two cotton mills, several cotton gins, flour mills, and buggy and wagon manufacturing plants. Icemorlee, a cotton-mill town, located about one-half mile west of Monroe, has a population of about 400.

The next town of importance is Waxhaw, which is located 12 miles southwest of Monroe and has a population of 600. It is principally a cotton-mill and cotton-market town.

Marshville and Wingate are thriving towns, while Indian Trail and Mineral Springs are thrifty railroad villages, serving as cotton markets and distributing points for farm machinery and supplies of all kinds. Several other small towns, including Weddington, Unionville, and Marvin, are scattered throughout the county.

The county as a whole has good transportation facilities. The Seaboard Air Line between Wilmington and Charlotte passes through Marshville, Wingate, Monroe, Indian Trail, and several small villages. The main line of the same railroad from Richmond and Norfolk, Va., to Atlanta traverses the county in a southwesterly direction. Mineral Springs and Waxhaw are on this road. A proposed railroad from Pageland, S. C., to Salisbury, N. C., will cross the north-central part of the county, passing through Monroe. If this line is completed, all sections of the county will have good rail service.

The good-roads movement has met with favor in Union County, and about 75 to 80 miles of well-graded highway has been constructed, a small part of which has been macadamized. Crews are kept at work opening new roads and straightening and grading old ones. Many deep cuts and fills have been made, and the grades now attained will be permanent. The main public roads throughout the county are kept in good repair, a special tax being levied for their maintenance.

The county has good schools. Telephone lines reach all parts of the county, as do rural free delivery routes.

Monroe, Waxhaw, and Marshville are good local markets for all kinds of farm produce. Truck crops of all kinds, as well as fruits, eggs, chickens, and butter, find a ready sale at good prices, but the production does not equal the demand. Cotton is sold in these markets and at the various mills.

## CLIMATE.

The climate of Union County is warm temperate. The winters are short and comparatively mild, and the summers long, but usually not excessively hot. The figures in the appended table, which have been compiled from records of the Weather Bureau station at Monroe, are indicative of the general conditions in this county.

*Normal monthly, seasonal, and annual temperature and precipitation at Monroe.*

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	42.6	75	5	3.46	3.78	4.19
January.....	41.2	78	5	3.10	2.59	5.21
February.....	40.9	76	-10	4.76	4.15	5.62
Winter.....	41.6			11.32	10.52	15.02
March.....	52.3	91	10	4.15	2.22	4.67
April.....	57.9	92	17	3.45	.85	3.82
May.....	68.3	100	28	3.62	2.34	3.21
Spring.....	59.5			11.22	5.41	11.70
June.....	74.6	101	43	5.11	4.34	3.88
July.....	78.0	103	47	5.23	5.46	4.80
August.....	76.7	100	44	7.03	11.89	19.38
Summer.....	76.4			17.37	21.69	28.06
September.....	70.7	100	35	3.93	1.31	5.09
October.....	59.0	91	23	3.49	.98	7.52
November.....	50.1	80	9	2.90	3.64	1.68
Fall.....	59.9			10.32	5.93	14.29
Year.....	59.4	103	-10	50.23	43.55	69.07

According to these records the mean annual temperature is 59.4° F. and the mean annual precipitation about 50 inches. The rainfall is ample and well distributed throughout the year. Droughts seldom occur, and damage to crops is rarely suffered, except on the porous soils of the slate belt. Snows occur frequently, but are generally of short duration.

The average date of the first killing frost in the fall is October 12, and of the last in the spring April 21, giving a growing season of about 174 days, which is sufficient for growing a wide range of crops. The date of the earliest recorded killing frost in the fall is October 3, and of the latest in spring May 10.

The weather during the spring and fall months is almost ideal, and even during the winter it is sufficiently open to permit a good deal of farm work, such as clearing the land and plowing.

Union County is favored with a high elevation, excellent natural surface drainage, and healthful and abundant supplies of water from open and driven wells. The latter type of well is rapidly supplanting the open ones, being more sanitary and healthful.

AGRICULTURE.

Union County has been settled since the latter half of the eighteenth century. It has always been an agricultural region, though the manufacture of cotton has grown to considerable importance.

Agriculture has passed through several stages from the mere growing of a few necessaries through the commercial production of live stock and small grain to the production of cotton mainly, with corn next in importance, and a varied list of minor products, grown chiefly to supply the local markets. Not until 1800 was cotton grown commercially. This was near Waxhaw, and cotton became an important crop in the western part of the county between this time and the opening of the Civil War. It was not grown to any extent in the eastern part of the county until after the war.

About 1820 German farmers living in the northern part of the county grew tobacco as a commercial crop, rolling the product in hogsheads to Fayetteville. During the same period, 1820 to 1830, wheat was an important product. Prevalence of the Hessian fly caused a practical cessation of wheat growing about the latter year, though the crop was important for a time later, as will be seen. Flax was another of the crops important in the early agriculture.

The following table, compiled from the reports of the Federal census, will serve to indicate roughly the agricultural evolution of the county since 1850. The statistics also have significance as showing the crops that have from time to time been profitable to the farmers, and that, therefore, may under certain economic conditions existing or to arise again become important.

*Principal agricultural products of Union County, 1850 to 1910 censuses.*

Crop.	1850 <sup>1</sup>	1860 <sup>1</sup>	1870 <sup>1</sup>	1880	
	Production.	Production.	Production.	Acreage.	Production.
Cotton..... bales..	2 2,264	2 3,054	1,196	19,090	8,336
Corn..... bushels..	39,875	301,175	203,032	28,877	338,520
Oats..... do....	314,421	25,098	72,308	14,357	101,719
Wheat..... do....	59,856	76,321	79,934	12,464	49,783
Rye..... do....		585	256	12	67
Potatoes..... do....	7,542	7,532	8,167		5,146
Sweet potatoes..... do....	34,318	33,653	16,945	222	19,218
Peas and beans..... do....	5,645	18,740	3,176		504
Tobacco..... pounds..	641	4,088	8,262	9	3,467
Wool..... do....	18,000	14,520	12,444		15,685

<sup>1</sup> Acreage not given.

<sup>2</sup> Bales of 400 pounds.

*Principal agricultural products of Union County, 1850 to 1910 censuses—Continued.*

Crop.	1890		1900		1910	
	Acreage.	Production.	Acreage.	Production.	Acreage.	Production.
Cotton.....bales..	36,838	8,889	45,157	34,441	47,686	22,526
Corn.....bushels..	29,691	327,731	39,970	452,970	38,313	521,883
Oats.....do....	17,239	111,115	7,838	61,670	10,746	127,710
Wheat.....do....	13,872	67,602	15,847	75,770	5,815	33,626
Rye.....do....	21	99	43	360	62	390
Potatoes.....do....	79	4,955	52	3,291	129	12,613
Sweet potatoes.....do....	403	36,907	396	28,304	565	58,595
Peas and beans.....do....		43	203	2,075	510	2,171
Tobacco.....pounds..	1	120				105
Wool.....do....		11,951		5,867		<sup>1</sup> 1,300

Live stock.	1850	1860	1870	1880	1890	1900	1910
Hogs.....number..	15,646		12,163	16,603	10,717	9,585	8,850
Cattle.....do....	9,285	10,055	8,236	9,588	7,644	8,329	11,177
Sheep.....do....	11,635	11,641	8,973	10,684	6,696	2,981	1,067
Horses and mules.....do....	2,820	2,923	2,605	3,376	37,733	5,637	7,076

<sup>1</sup> Estimate.

An inspection of this table, unsatisfactory as it is, owing to its fragmentary nature, shows in general the same products in 1850 as in 1910, the most striking feature being merely an increase in the volume of the production. During this 60-year period cotton and corn, if we omit the war period, have steadily increased in production; oats and wheat have fluctuated very widely, and rye and hay have never been important. Tobacco increased in importance until 1870, when it declined, and has since been practically abandoned; wool production declined from 18,000 pounds to a little over 1,000 pounds. Wheat and oats were more important in 1850 than in 1910.

Of live stock, the number of hogs and sheep was much greater in 1850 than in 1910, and only cattle and horses and mules have increased in number.

Horses, hogs, and cattle are raised on most farms, but only a few sheep and goats are seen in the county. Dairying is not well developed, although the local markets are supplied with milk and butter, large quantities of butter being shipped to Monroe, Marshville, and Waxhaw weekly. Poultry raising is rather well developed and yields considerable revenue.

Some of the best farmers precede their corn and cotton with a winter cover crop of crimson clover, vetch and oats, vetch and rye, or rye. Where no cover crop is used the best results are obtained by deep fall or winter plowing, followed by spring plowing and frequent shallow cultivations to insure perfect tilth.

Corn yields best on bottom lands. It has been found that corn planted in deep furrows, particularly on the rolling uplands, has a better rooting system, and for this reason withstands the drought better, than if planted 2 or 3 inches under the surface. Cox prolific and some yellow dent varieties give good yields on the Piedmont soils. As spring-sown oats seldom yield well, on account of the early droughts and rust, only winter oats are grown in Union County, the principal varieties being Hundred Bushel and Appler. From October 15 to November 15 is apparently the best time to sow oats in Union County. Oats usually receive an application of acid phosphate and potash in the proportion of 8-4 or 10-4 at seeding time and a top dressing in early spring of 75 to 100 pounds of nitrate of soda.

At present very little wheat is grown in the county, although a larger acreage is probable this season (1914) than has been customary, owing to the low price of cotton and the high prices of breadstuffs.

Best results are obtained from crimson clover where the land has received an application of 1,000 to 2,000 pounds of burned lime per acre prior to seeding. In many localities inoculation of the seed is necessary. Clover is sown at the last cultivation of the corn, after the first picking of cotton, or in cowpeas. Vigorous growths are obtained when 200 to 400 pounds per acre of acid phosphate are applied. Crimson clover is sown in this county from September 15 to October 5. It is often sown with oats for hay. For successful growth red clover requires inoculation on new land and liberal applications of lime where the soil is acid. Bermuda grass is counted one of the best pasture grasses in the county.

There is no system of crop rotation generally practiced throughout the county. A few farmers follow a definitely planned cropping system which could be profitably applied to most of the soils of the county. Where general farming is followed a good rotation now in use is as follows: First year cotton, sowing crimson clover in the fall; second year corn, sowing cowpeas at last cultivation; third year a small-grain crop, sowing cowpeas again after harvesting. This allows cotton, a clean-cultivated crop, to follow a nitrogen-gathering crop. The soil so treated shows steady improvement and many farmers are now beginning to practice this rotation. Others alternate corn and cotton, with no winter cover crop. The slate and granite soils, with the exception of the slaty and shallow phases in the "slate belt," produce good yields of corn, cotton, oats, wheat, cowpeas, rye, and, where lime and inoculated seed have been used, the clovers and vetches. Rye does best on sandy soils. Wheat, oats, and clovers prefer the heavier types of the Georgeville and Cecil series. Sweet potatoes, peanuts, and early truck crops make their best development on the light sandy loams. Cabbage, Irish potatoes, sweet corn, tomatoes, and strawberries do best on the sandy

loams and the Cecil clay loam. The lighter areas of the sandy loams and the slate soils give the best returns with apples, peaches, pears, grapes, and other fruits. The Cecil and Georgeville soils give a higher color and better flavor to all fruits. The Durham soils are well adapted to the production of bright tobacco.

The farmers of Union County are using larger quantities of commercial fertilizer each year. The most common formulas used are 8-2-2 and 8-3-3. For cotton, applications of 200 to 400 pounds per acre are used. Lands making 15 to 20 bushels of corn per acre require 250 pounds of an 8-3-3 mixture per acre, while on lands producing 40 to 50 bushels per acre 400 to 500 pounds in two applications—one-half at planting time and the other when the plants are knee-high—can be profitably used. Oats generally receive 200 to 300 pounds of 8-4 or 10-4 at sowing time, nitrogen being applied in early spring in the form of nitrate of soda at the rate of about 100 pounds per acre. Many farmers buy cottonseed meal, phosphate, and kainit or muriate of potash and mix them at home in the proportions suitable for their individual needs. Watermelons regularly receive acreage applications of 8 to 10 loads of stable manure and 400 to 500 pounds of a fertilizer analyzing 8-3-3. Throughout the county the soils are prevailingly light in color, indicating a deficiency in organic matter.

Efficient farm laborers are usually paid about 75 cents to \$1 a day. Women receive about 50 cents. Monthly wages range from \$15 to \$20, with board, or else a dwelling house, firewood, and garden patch. Cotton pickers receive from 50 to 75 cents per hundred pounds, the higher rate prevailing near the close of the season. Most of the laborers are negroes. There is a growing tendency for the farmer to cultivate only as much land as he and his family can successfully care for without the aid of hired labor.

According to the census, there were 3,793 farms in the county in 1900 and 4,856 in 1910, showing an increase of 1,063, but there was only a slight increase in the acreage of cultivated land.

Before the Civil War farms and plantations contained from 1,000 to 4,500 acres, particularly in the western half of the county, but since that period these large tracts have been divided and now only about 3¼ per cent of the farms in the county contain more than 260 acres, while 74.3 per cent contain less than 100 acres, the average size for the entire county being 74.1 acres.<sup>1</sup> Small holdings of 20 to 50 acres are most numerous.

According to the 1910 census, 43 per cent of the farms in Union County are operated by the owners, 56.8 per cent by tenants, and 0.2 per cent by managers. Farms are rented either for cash or on

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<sup>1</sup> The census tabulates each tenancy as a "farm."

shares, the latter being the most common practice. Where the land alone is supplied the owner receives one-fourth to one-third of the crops produced. Where the owner furnishes the land, work stock, feed for stock, implements, and one-half the fertilizer, he receives one-half of all the crops produced.

Land values vary greatly, being governed by location and improvements. In a narrow band 3 to 6 miles in width south of Rocky River land can be bought at \$8 to \$15 an acre. Some parts of this section, which support a good timber growth of red, white, and post oak, heart pine, and hickory, bring higher prices, depending upon the quantity of merchantable timber and the character of the topography. Farm lands in the vicinity of Monroe, Marshville, and Waxhaw sell for \$35 to \$75 an acre, while 5 to 10 miles from these towns the price ranges between \$20 and \$40 an acre.

The variety of soils, favorable topographic position, and healthful climate of Union County are favorable to the development of a highly diversified agriculture. All the soils in the county have clay subsoils, which underlie the surface at no great depth. This permits the land to be built up to a high state of productiveness and to be easily maintained in that condition.

#### SOILS.

Union County lies wholly within the Piedmont Plateau province. Its soils have been derived through the processes of weathering from the underlying rocks. These rock formations vary considerably in their physical and chemical composition and the soils resulting from their disintegration and decomposition also vary in salient characteristics. In case of the harder or more siliceous rocks the weathering has not proceeded to any great depth, and the soft rock, and not infrequently the hard bedrock, outcrops or lies within 2 or 3 feet of the surface. The quartz fragments occurring on the surface were derived from veins in the original rocks. Generally the granites and gneisses have weathered to a considerable depth, while the slate rock, particularly the harder formations, is usually encountered about 2 to 4 feet below the surface.

Sixteen distinct soil types were mapped in Union County. These have been grouped into series according to their origin, color, and structural characteristics.

All of Union County, with the exception of a narrow strip along the western border, a small area in the southwestern corner, and a patch in the extreme southeastern corner, is underlain by slate formations. Owing to the abundance of these compact slates in Union, Stanly, Montgomery, Randolph, Rowan, Davidson, Cabarrus, and Anson Counties, the general region has been called the "Carolina slate belt."

The slates underlie about 90 per cent of the area of Union County and comprise metamorphosed sedimentary rocks composed of varying admixtures of land waste and volcanic ash.<sup>1</sup> The slate ranges widely in color. When fresh it is dark green, dark to light blue, or grayish. With increasing proportions of the volcanic constituents these colors grade into lighter shades and finally into light gray and white. Upon weathering the colors brighten and become quite diverse and sometimes even brilliant, and as a result shades of purple, blue, green, red, yellow, and gray in endless variations may appear.

The weathering of these slates, together with their associated formations, embracing fine and coarse tuffs, breccias, and flows of rhyolite and dacite, have given rise to two large and important soil series—the Georgeville and Alamance. The basis of differentiation of these series is made primarily upon the color of the material. The prevailing red color of the Georgeville series is probably due to the presence of pyrite in the slate rock, which weathers to a red, whereas the predominantly light to whitish color of the Alamance series is caused by a large proportion of minerals other than iron in the parent rock. These slates in the process of disintegration crumble into small chips and finally decompose into a fine, smooth, flourlike material known as silt. All the types included in the Georgeville and Alamance series are characteristically silty in texture.

The granite, gneiss, and diorite formations are confined to the western and southwestern parts of the county. In the western part a line separating these formations from the slate begins on the Mecklenburg County line about 2 miles to the north of Stallings and runs in a southwest direction, passing Redding Springs Church and swinging about  $1\frac{1}{2}$  miles east of Marvin to the South Carolina line. This area includes 25 or 30 square miles. The line marking the area in the southwest corner begins on the South Carolina line to the northwest of Waxhaw and runs southeast through Waxhaw and thence just east of south to the South Carolina line. This area comprises about 25 square miles.

The weathering of the granites and gneisses has given rise to soils of the Cecil and Durham series. A few bodies of mica schists were observed along Waxhaw Creek, and these rocks influence the Cecil soils locally. The rocks forming the Cecil series contain a relatively high percentage of iron-bearing minerals, chiefly mica and hornblende, and the weathering of these is responsible for the predominantly red color, particularly of the subsoil. The Durham series is derived from granite of a more siliceous character and usually lower in iron-bearing minerals, consequently the light color of both the soil and subsoil is more pronounced.

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<sup>1</sup> See Bul. No. 22, North Carolina Geological and Economic Survey.

The diorite formations giving rise to the Iredell series are dark-colored, heavy, intrusive rocks, and have usually weathered to a depth of only a few feet. The types derived from these rocks are characterized by the sticky, impervious character of the subsoil material.

In the extreme southeast corner of the county small areas of gray and red medium-textured sandstone and blue shale of the Triassic age are encountered. The weathering of these rocks is responsible for the Granville series, which is represented by one type, the Granville sandy loam. The Indian-red or purplish clay immediately overlying these rocks is exposed in gullies and road cuts and occasionally outcrops. This is characteristically Penn material, but the Penn soils do not occur in areas of sufficient extent to separate. The light color of the Granville sandy loam is probably caused by the leaching out of the iron compounds in the original rock.

Bordering many of the streams throughout the county occur strips of alluvial soils representing material washed from the uplands and deposited by overflow waters on the flood plain of the streams. These sediments have been more or less modified by the accession of colluvial material from the adjoining upland, by plant growth, and by drainage conditions. This alluvial first-bottom material is separated into two series, the Congaree and the Wehadkee, the Congaree silt loam comprising the greater part of it.

The following table gives the names and the actual and relative extent of the several soils mapped in the county:

*Areas of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Alamance silt loam .....	94,528	} 24.7	Cecil fine sandy loam .....	9,408	2.3
Shallow phase .....	4,992		Iredell loam .....	9,280	2.3
Alamance gravelly silt loam .....	68,096	16.9	Cecil sandy loam .....	5,952	1.5
Georgeville gravelly silt loam .....	62,592	15.5	Durham sandy loam .....	4,416	1.1
Georgeville silt loam .....	56,064	13.9	Wehadkee silt loam .....	4,096	1.0
Congaree silt loam .....	20,160	5.0	Durham fine sandy loam .....	1,792	.5
Georgeville silty clay loam .....	19,776	4.9	Granville sandy loam .....	1,536	.4
Alamance slate loam .....	13,760	3.4			
Cecil clay loam .....	13,376	3.3	Total .....	403,200	.....
Georgeville slate loam .....	13,376	3.3			

GEORGEVILLE SERIES.

The Georgeville types are characterized by the gray to red color and predominantly silty texture of the surface soils and by the red silty clay subsoils. These soils are derived from the "slates" of the Carolina slate belt. It is believed that the rocks giving rise to this series are lighter in content of iron-bearing minerals than those giving

rise to the Alamance. This series of soils, together with the Alamance, covers a large area in this section of the State. The series is represented in Union County by four types—the silt loam, gravelly silt loam, silty clay loam, and slate loam.

#### GEORGEVILLE SILT LOAM.

The surface soil of the Georgeville silt loam to a depth of about 6 to 10 inches is a silt loam having a mellow structure and floury feel, and ranging in color from light gray through reddish yellow to red. Small, rounded slate particles or pebbles, brownish or grayish in color, are conspicuous over considerable areas of this type, but they do not occur in sufficient quantities to render the soil gravelly in character. The subsoil varies considerably in color, but is characteristically a yellowish-red, compact silty loam, which abruptly grades into a dull-red, brittle silty clay, usually extending to a depth of 3 feet or more. Quite frequently in restricted areas the decomposed pinkish and purplish slate rocks are encountered at a depth of 20 to 30 inches.

On some of the steeper slopes the surface silty material has been removed in patches, exposing the red silty clay, while at the base of the slopes it attains a depth of several inches.

The Georgeville silt loam as mapped includes patches of the Georgeville silty clay loam and gravelly silt loam and of the Alamancesilt loam, with which it is intricately associated.

Numerous areas of this type are scattered throughout the county, some of the more prominent bodies lying to the south and northwest of Monroe, south of Pleasant Grove Church, in the vicinity of Beulah Church, and to the south of Unionville.

The topography is prevailingly gently rolling to rolling. The crests of the broader divides comprise the smoother and more level portions of the type, while the more hilly and slightly broken bodies are developed along the larger creeks, along the South Carolina line, and south of the Rocky River. All areas of the type are naturally well drained. On a few of the steeper slopes terracing is resorted to for the prevention of erosion.

By far the greater part of this type is now under cultivation. It is used for the production of corn, cotton, oats, clover, cowpeas, sweet potatoes, peaches, apples, pears, grapes, sorghum cane, and garden vegetables. Crop yields are about the same as those obtained on the Georgeville gravelly silt loam. It is reported by some that this soil requires more careful handling in order to prevent baking or drying out than the gravelly type of this series.

Uncultivated areas are covered with the original forest growth, consisting of red, white, post, and blackjack oaks, with some ash, maple, poplar, cedar, dogwood, black gum, sweet gum, and pine.

Land of the Georgeville silt loam near Monroe sells for \$35 to \$75 an acre, while the more rolling and isolated areas sell for \$10 to \$25 an acre.

GEORGEVILLE GRAVELLY SILT LOAM.

The surface soil of the Georgeville gravelly silt loam consists of a yellowish-gray or reddish-yellow silt loam ranging in depth from 6 to 12 inches, resting on a subsoil of dull-red, brittle silty clay to depths of 3 feet or more. In places the subsoil is a pinkish-red or salmon-red silty clay loam, passing gradually into the red silty clay. Occasionally it is yellowish red throughout. Along the line of contact with the Alamance types many color variations occur. Distributed over the surface and disseminated through the soil section are approximately 15 to 50 per cent of small, rounded, brown and gray shale and slate fragments. Occasionally angular fragments of shale or quartz occur in noticeable quantities over the surface. Generally this type contains a higher percentage of very fine sand than does any of its associated types. Particularly is this true in small areas occurring to the southeast of Waxhaw, which have a rather deep surface soil and a relatively large content of quartz gravel on the surface. The soil is fine in texture with a tendency to compact, and the gravel content has a beneficial effect in rendering it more porous and open. The soil is deficient in organic matter.

A few of the small, rounded, brown slate particles also are present in the subsoil. The decomposed and broken slate rock is frequently encountered within the 3-foot section and occasionally lies within 8 or 10 inches of the surface. Very narrow veins of quartz pierce the subsoil in many places, and it is to this source that the quartz fragments on the surface owe their origin.

The Georgeville gravelly silt loam is one of the most extensive soil types in Union County. It is the predominant type in the northeastern part of the county and is also well represented in the central part. Large, irregular areas occur around Monroe, along Richardson Creek, and to the south of Rocky River, while smaller bodies are scattered throughout the eastern half of the county.

The type occupies gently rolling to hilly areas having smoothly rounded slopes and knolls, being intermediate in topography between the gently rolling Georgeville silt loam and the strongly rolling to hilly Georgeville slate loam. Practically all of it is sufficiently smooth to permit of cultivation. The rolling surface promotes excellent natural drainage. The presence of the gravel and fine slate particles has a tendency to prevent surface washing, and consequently few gullies have been formed.

The native forest growth on this type consists of red, white, post, and blackjack oaks, hickory, dogwood, sourwood, heart pine, poplar, maple, cedar, and sweet gum. Most of the merchantable timber throughout the central part of the county has been cut, but fairly large wooded areas are to be found just south of Rocky River.

Cotton, corn, wheat, oats, rye, sweet potatoes, Irish potatoes, cowpeas, clover, sorghum cane, garden vegetables, and certain fruits are successfully grown on the Georgeville gravelly silt loam. It is used principally for the production of corn and cotton. Corn yields 15 to 40 bushels, cotton one-fourth to 1 bale, oats 10 to 65 bushels, and cowpeas one-half to 1 ton of hay per acre. The yields of sorghum cane are satisfactory, but the color of the sirup is not quite so bright as of that produced on the Alamance soils. The crop is grown to only a small extent.

Both red and crimson clovers do well on this soil where lime is applied and the seed inoculated before sowing. Alfalfa is grown to some extent.

Apples, peaches, pears, grapes, and figs are the principal fruits grown, the following being the favorite varieties: Apples, the Stayman Winesap, Early Harvest, and Maiden Blush; peaches, Sneed, Early Alexander, and the Elberta, Greensboro, and other varieties of the Chinese Cling group; pears, the Kieffer; grapes, the Concord, Niagara, and Scuppernong; and figs, the Brown Turkey.

Corn usually receives an acreage application of 300 to 400 pounds of an 8-2-2 or 8-3-3 fertilizer mixture and cotton from 300 to 600 pounds of an 8-3-3 mixture.

The silty clay subsoil of this type enables the soil to be built up to a rather high and permanent state of productiveness. The effects of the incorporation of barnyard manure or of any vegetable matter are quite lasting. The application of burnt lime is also beneficial.

Land of this type varies greatly in value, depending upon its location and the character of the improvements. Near Monroe the price ranges from \$50 to \$75 and in the southern and northern parts of the county from \$15 to \$40 an acre.

#### GEORGEVILLE SLATE LOAM.

The surface soil of the Georgeville slate loam consists of a silty loam varying in color from yellowish gray through reddish yellow to pale red, and extending to a depth of 5 to 10 inches. The subsoil is a pale-red or salmon-red, brittle silty clay, which continues downward until the bedrock is reached or it grades into a red silty clay within the 3-foot section. Fragments of slate and shale having a gray, brown, yellowish or purplish color, the largest of which range

from 2 to 6 inches in diameter, are distributed over the surface and mingled with the soil to the extent of 20 to 60 per cent of the soil mass.

Angular fragments of yellowish and purplish slate or shale are abundant in the subsoil. In many places the decomposed bedrock lies near the surface, and occasionally outcrops of it are seen on the steeper slopes. Included in this type are spots of Georgeville gravelly silt loam and Alamance slate loam which were too small to separate on the map.

The type is closely related to the Georgeville gravelly silt loam. It is developed mainly in the northeastern part of the county. The more prominent bodies are found along Richardson, Gourdvine, and Niggerhead Creeks, and along Rocky River. Smaller bodies are found southwest of Monroe and in the southeastern part of the county, in the vicinity of Brown and Lanes Creeks. The Georgeville slate loam possesses the roughest topography of any type in the county, consisting mainly of strongly rolling to hilly areas bordering the larger streams. Most of these slopes and hills have a comparatively smooth surface, and erosion is not very active. The natural surface drainage is excellent.

The native vegetation on this type consists of red, white, and post oak, heart pine, hickory, dogwood, sourwood, and old-field pine.

Only a small percentage of this type is under cultivation, owing in a large measure to the hilly character of the country, the numerous slate particles and fragments on the surface, which interfere more or less with cultivation, and to its generally isolated situation. The steeper portions of the type are best used for forest or pasture lands. On the areas possessing the most favorable topography and containing the smallest proportion of slate particles fair yields of corn, oats, wheat, cotton, cowpeas, and clover are produced. Corn and cotton are the principal crops. Corn yields 10 to 30 bushels and cotton one-fourth to three-fourths bale per acre, depending upon the quantity of fertilizer used. Certain varieties of apples, peaches, and grapes can be profitably produced on the slopes where the air drainage is good.

Like the Georgeville gravelly silt loam, this type is greatly benefited by the addition of vegetable matter and lime.

Land of the Georgeville slate loam in the remote sections of the county can probably be purchased for \$8 to \$15 an acre, while areas lying close to towns and lines of transportation are held at considerably higher prices.

#### GEORGEVILLE SILTY CLAY LOAM.

The Georgeville silty clay loam is typically a red silty clay loam to a depth of 4 to 6 inches, underlain by a deep-red heavy silty clay, extending to a depth of 3 feet or more. The subsoil is hard, but mod-

erately brittle when dry and plastic when wet. The type is locally called "red land." There is considerable variation in the color and texture of the surface soil, owing largely to the different depths of plowing and methods of cultivation and to erosion. Over extensive areas the upper 4 inches of the surface soil consists of a yellowish-gray to reddish-yellow or salmon-red silt loam, closely resembling the Georgeville silt loam in appearance. On some of the eroded slopes and knolls the silty clay has been exposed by erosion.

A few quartz fragments are present on the surface over the greater proportion of the type. The Georgeville silty clay loam is closely related to the Georgeville silt loam, and frequently the boundary separating the two on the soil map is more or less arbitrary.

The Georgeville silty clay loam has a comparatively large development in the western part of the county, occurring along the border line between the slate and granite soils. The principal areas are situated to the north and northeast of Waxhaw. Smaller bodies lie to the east and southeast of this place, continuing toward the South Carolina line.

The topography is gently rolling to hilly, being rougher than that of the adjoining areas of slate soils and more nearly resembling that of the Cecil and Durham types. Erosion has been quite active, and as a result many shallow gullies have been formed, their shallowness being due to the fact that bedrock is commonly encountered at a depth of 3 to 5 feet. All areas of this type possess excellent natural surface drainage.

In the forested areas a heavy growth of red, white, and post oaks, and some hickory, poplar, and shortleaf pine constitute the native vegetation. Old-field pine is a conspicuous growth on the abandoned fields.

The Georgeville silty clay loam is the heaviest of the slate soils and requires strong teams and heavy machinery for its most profitable and highest development. Wheat, oats, clover, and cowpeas are successfully grown on it. Corn yields from 15 to 30 bushels and oats about 25 bushels per acre, although as much as 95 bushels of oats has been obtained by deep plowing, the addition of barnyard manure, and the application of 300 pounds per acre of an 8-3-3 fertilizer and 200 pounds of nitrate of soda, the last being used as a top dressing in spring. Cotton is grown to a small extent, but the yields are usually low. Wheat is not grown at present, although it does well on this soil.

This type is capable of being built up to a high state of productivity by more thorough plowing, frequent shallow cultivations, and the addition of organic matter and lime. Terracing or seeding to some pasture grass is necessary on the steeper areas. Land of this type is held at \$15 to \$35 an acre.

Below are given the results of mechanical analyses of samples of soil and subsoil:

*Mechanical analyses of Georgeville silty clay loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
233509.....	Soil.....	1.6	2.9	2.5	9.2	19.4	35.0	29.3
233510.....	Subsoil.....	.2	.6	.5	2.2	6.3	21.9	68.4

ALAMANCE SERIES.

The Alamance series is closely associated with and related to the Georgeville series. The soils of the Alamance series are characterized by the white or light-gray color of the surface soils and the yellow color of the subsoils. Locally some of the types are known as "white land." Both the soils and subsoils are prevailingly silty in texture and possess a smooth, floury feel. Scattered over the surface are fragments of the parent rock and small, smooth, flat, and rounded particles of slate. The soils of this series are derived from fine-grained slates. Three members of this series are represented—the Alamance silt loam, gravelly silt loam, and slate loam.

ALAMANCE SILT LOAM.

The surface soil of the Alamance silt loam, locally called "white land," consists of a whitish, light-gray, or yellowish-gray floury silt loam, grading at about 5 to 8 inches into a pale-yellow or yellow compact silt loam which extends to a depth of 10 to 15 inches. In the slight depressions and in the areas which have been heavily manured the first few inches of the surface soil is usually gray in color.

The subsoil of the typically developed areas is prevailingly a yellow silty clay loam or brittle silty clay to a depth of 3 feet or more. Not infrequently on the ridges and knolls the lower subsoil shows faint mottlings of red, or assumes a reddish-yellow or pale-red color. In the poorly drained and slightly depressed situations and near the base of some of the slopes the subsoil is a pale-yellow silty clay mottled with shades of gray and white. In small areas where this type occurs in association with the Iredell loam the subsoil is a brown tough clay, which owes its origin to the weathering of the intrusive diorite rocks. Some slate gravel and platy fragments are scattered over the surface of this type.

Included with the Alamance silt loam are patches, too small to be represented on the soil map, of practically every type of the Georgeville and Alamance soils occurring in the county. Such spots

are readily recognizable in the field and can be identified from the description of the respective types given elsewhere in this report.

The Alamance silt loam is the most extensive and widely distributed type in Union County. It has its greatest development through the northern, central, and southern parts of the county, beginning at the Mecklenburg County line on the north and extending in irregular, broken areas across the county to the South Carolina line. Typically developed areas lie to the south of Monroe, to the east of Mount Prospect Church, along the Seaboard Air Line Railway between Bakers and Stout, and to the south of Brief. The type occupies broad interstream areas and slightly depressed positions, the topography ranging from flat to undulating and gently rolling. The flattest areas are developed in the vicinity of Bakers and Stout, while some of the most rolling bodies lie to the south of Brief, along Goose Creek. All of this type has a surface highly favorable to farming and all kinds of improved farm machinery can be successfully operated on it.

With the exception of some of the flatter bodies, swales, and spots contiguous to the heads of small streams, which can be adequately drained by small open ditches, all areas of the Alamance silt loam have good natural surface drainage.

The Alamance silt loam supports a forest growth consisting mainly of red, white, post, and blackjack oaks, with some hickory, poplar, sycamore, elm, black and sweet gums, pine, cedar, dogwood, and black walnut.

The soil is markedly deficient in organic matter and is inclined to run together and puddle when wet. The poorly drained areas are sour and in need of lime. Where the soil is properly supplied with vegetable matter good yields of cotton, corn, oats, and other crops are obtained. Cotton yields from one-fourth to 1 bale, depending upon fertilization and cultural methods. Corn yields ordinarily about 15 bushels per acre, but as much as 55 bushels has been obtained under good management. Oats yield from 10 to 60 bushels per acre. Sorghum cane does well and the sirup produced on this soil is of excellent quality. Sweet and Irish potatoes are grown for home use and the local markets, and the yields of these are satisfactory. Cowpeas make a fairly good growth, giving from one-half ton to 1½ tons of hay per acre. A field of alfalfa in the vicinity of Marshville was observed to be in a healthy condition, and this crop gives promise of fair returns. Garden vegetables, consisting principally of cabbage, collards, beans, English peas, okra, onions, tomatoes, turnips, squash, and cucumbers, are grown for home consumption, and are sold to some extent on the local markets.

The price of land of the Alamance silt loam varies widely in Union County. Near Monroe and Marshville it ranges from \$30 to \$75 an acre, and in the more remote sections from \$10 to \$25.

*Alamance silt loam, shallow phase.*—The surface soil of the Alamance silt loam, shallow phase, to a depth of 6 to 8 inches consists of a gray to nearly white, floury silt loam, the darker surface color being commonly encountered in the forests or in some of the longer cultivated fields which have been heavily manured. The subsoil is a friable, compact silty loam to silty clay extending to a depth of 10 to 18 inches, below which the decomposed slate, or, in some instances, the solid bedrock, is encountered. In many places this loose, decomposed slate lies immediately underneath the surface soil, and occasionally it outcrops on eroded knolls and on the slopes bordering the streams. Scattered over the surface there is a large quantity of fine slate particles and a few quartz fragments.

This phase is inextensive and occurs only in small bodies scattered throughout the eastern half of the county, being closely associated with the Alamance gravelly silt loam and silt loam. It occupies narrow ridges, knolls, and steeper slopes adjacent to the streams, where erosion has been active. Generally the elevation of the shallow phase is higher than that of the surrounding soils.

The native forest growth on this phase consists principally of red, white, and blackjack oaks, pine, and some hickory.

The yields of corn, cotton, and a few other crops now grown are extremely low under ordinary conditions. Sweet potatoes, garden vegetables, cowpeas, and rye give fair yields when manured and fertilized. This soil is more likely to bake and pack than the typical soil and is greatly benefited by the incorporation of coarse manures or the turning under of green manuring crops. Lime applied in liberal quantities improves the structure of the soil and considerably increases the yields. The best use of this soil is for forest or pasture lands.

This phase is considered a much less desirable soil for farming than the typical Alamance silt loam, owing, in part, to its droughty nature. The value of the land ranges from \$8 to \$15 an acre.

#### ALAMANCE GRAVELLY SILT LOAM.

The surface soil of the Alamance gravelly silt loam, locally called "white gravelly land," consists of a whitish, light-gray, or yellowish-gray silt loam to a depth of about 5 to 8 inches. The subsoil is a yellow silty clay loam or brittle silty clay having a depth of 3 feet or more. Distributed over the surface and disseminated throughout the soil section are approximately 15 to 50 per cent of small, smooth, flat, rounded brown and gray shale and slate particles. Thin, platy fragments of slate or quartz also occur in noticeable quantities over the surface. Very few slate fragments occur in the subsoil. This gravel gives to the surface of the fields and roads a brownish appearance.

Certain variations in soil and subsoil are to be noted. Usually where the surface soil is over 8 inches deep a pale-yellow or yellow compact silt loam which extends to a depth of 12 to 15 inches is encountered. In slight depressions and in areas containing much humus from forest leaves or where liberal additions of barnyard manure have been made or green manuring crops used the soil to a depth of a few inches is gray. Along the Trinity road and south to the South Carolina line, also along the Anson County line south of Marshville, the upper 6 inches of the soil carries from 20 to 60 per cent of finely broken dark-brown quartz gravel, giving the surface a dark-brown color and a slightly sandy feel. Frequently the lower part of the 3-foot section shows faint mottlings of red or along the border line of the Georgeville soils becomes reddish yellow or pale red in color. In restricted areas where this type is associated with the Iredell loam the subsoil is a brown tough clay, owing to the weathering of the intrusive diorite rocks. Such areas have a typical Alamance gravelly silt loam surface soil. In the depressions and poorly drained places mottlings of various shades of gray and white are present in the lower part of the 3-foot section.

Occasionally the decomposed bedrock is encountered at 24 to 36 inches, and in such areas the surface soil carries larger quantities of finely broken slate. The subsoil is frequently penetrated by very narrow quartz veins, and it is to this source that the quartz fragments on the surface owe their origin. The Alamance gravelly silt loam is so closely associated with the Alamance silt loam and slate loam and with the types of the Georgeville series that it was almost impossible to establish definite soil boundaries between them. As mapped, the type includes patches of the above-mentioned soils.

The Alamance gravelly silt loam is one of the most extensive types in Union County. It has its principal development north and south of Marshville, south of Olive Branch, in the vicinity of Euto, around Benton Cross Roads Church, north and south of Wingate, and in isolated patches throughout the southern part of the county.

This type occupies gently rolling to rolling areas having smoothly rounded slopes and knolls, being intermediate between the undulating to gently rolling areas of the Alamance silt loam and the gently rolling to hilly areas of the Alamance slate loam. All of the land is sufficiently smooth to permit the successful operation of improved farm machinery. The type is naturally well drained, but, owing to the presence of the gravel and finely broken slate particles, is not subject to severe erosion, and very few gullies have been formed as a result of surface washing.

This soil supports a timber growth consisting principally of hardwoods and shortleaf pine. Among the hardwoods hickory, white oak, red oak, post oak, blackjack oak, dogwood, and maple are promi-

ment. Cedar, sweet gum, poplar, and black walnut are also found on some areas of this type.

The principal crops grown on the Alamance gravelly silt loam are corn, cotton, wheat, oats, cowpeas, clover, sorghum cane, rye, sweet potatoes, and garden vegetables. Certain varieties of apples, peaches, pears, and grapes do well when given the proper care. The yields of these and other crops grown are equal to or slightly higher than those obtained from the Alamance silt loam. This soil needs less frequent cultivation than the Alamance silt loam and has a higher capacity for retaining moisture. The gravel content prevents the baking of the surface soil so frequently encountered on the Alamance silt loam. The soil is in need of vegetable matter and lime.

The Alamance gravelly silt loam, being located in general a considerable distance from towns and transportation facilities, sells at comparatively low prices, ranging from \$12 to \$30 an acre.

#### ALAMANCE SLATE LOAM.

The Alamance slate loam consists of a gray silt loam about 6 inches deep, underlain by a pale-yellow, compact silt loam or silty clay which usually extends to a depth of 10 to 18 inches, below which disintegrated slate rock is encountered. In many places the disintegrated slate immediately underlies the surface soil, and outcrops of the slate rock are numerous. Gray or bluish-gray platy slate fragments, usually angular, and ranging up to several inches in size, are distributed over the surface and intermixed with the upper portion of the soil section, generally in sufficient quantities to interfere seriously with cultivation and the growing of certain crops. In places quartz gravel and a considerable quantity of quartz rock and arenaceous shale boulders are scattered over the surface. At a distance of several miles south of Marshville there is a small body of dark-gray to almost black silty loam, locally known as "flint lands," the surface of which is strewn with black slate or shale fragments.

The Alamance slate loam is an inextensive and unimportant type, occurring in a few bodies and numerous isolated patches throughout the southeastern, central, and extreme northern parts of the county. The largest areas lie in the vicinity of Macedonia Church, south of Marshville, along Beaverdam and Lanes Creeks, and southwest of Brief.

The type embraces gently rolling areas, knolls, and hilly to rolling areas bordering the stream courses. It is excessively drained and crops suffer from even ordinary droughts. The greater part of this soil is either in pasture or is covered with a growth of red, white, black-jack, and post oaks, and old-field pine. It is best used for pasturage or forestry. The areas in which the slate rock outcrops or lies immediately beneath the surface soil are unsuited for general farming.

Upon those areas which have a few inches of subsoil and contain only a moderate quantity of slate fragments, corn, cotton, and sorghum cane are grown, but much smaller yields are obtained than upon the Alamance silt loam.

Generally the areas of this type are so small that it is seldom sold independently of its associated types.

#### CECIL SERIES.

The Cecil series includes the most important and widely distributed soils of the Piedmont Plateau. The heavier members are known as "red clay lands." The soils are grayish to red in color and the subsoils are bright-red stiff clays. Small mica scales are frequently distributed through the 3-foot section, while sharp white quartz sand is of characteristic occurrence. The soils of this series are derived from granites, gneiss, and schists, some of the granites containing a high percentage of potash. The Cecil sandy loam, fine sandy loam, and clay loam are developed in Union County.

#### CECIL SANDY LOAM.

The surface soil of the Cecil sandy loam is a gray or light-brown medium sandy loam or loamy sand, ranging from 6 to 12 inches in depth. Usually where the surface soil is more than 6 inches deep a yellowish-gray to reddish-yellow sandy loam immediately overlies the subsoil. The typical subsoil consists of a bright-red stiff clay which extends to a depth of 3 feet or more. Frequently the subsoil is faintly mottled or streaked with yellow. Sharp quartz sand particles are characteristic of the subsoil, and in places small scales of mica are present. Quartz gravel and stones and large granite boulders occur on the surface in places.

This type includes patches of reddish-brown heavy sandy loam or clay loam of insufficient extent to be represented upon the soil map.

On a few of the ridges southwest of Waxhaw the surface soil is a gray loamy sand, grading at about 6 inches into a yellowish to reddish-yellow loamy sand, which extends to a depth of about 20 inches, being underlain by the typical red clay subsoil. Near the base of slopes in a few localities the sandy surface material is deeper than that of the typical soil and the subsoil is yellow or mottled yellow and red clay. Such spots resemble the Appling sandy loam, but are too small to be shown on the map. On the Mecklenburg County line about 1 mile west of Antioch Church, and also 1 mile northeast of Dixie School, north of Waxhaw Creek, are included spots of Cecil coarse sandy loam too small to separate.

The Cecil sandy loam occurs in many small areas to the south and southwest of Waxhaw and in the vicinity of Weddington and Antioch Church. The topography of the greater part of this type is gently

rolling to rolling. Along the small streams the surface is somewhat hilly and broken. On the hillsides there are numerous small gullies caused by erosion.

Practically all of the Cecil sandy loam has been cleared and is devoted to the production of crops. A few areas support growths of hardwoods, consisting of white oak, red oak, post oak, and hickory, together with a sprinkling of persimmon, sweet gum, dogwood, poplar, ash, and old-field pine.

The principal crops grown on this soil are cotton, corn, oats, clover, cowpeas, sweet potatoes, watermelons, and garden vegetables. This is the best trucking soil in the county, though trucking is not followed extensively. Cotton yields from one-third to 1 bale per acre, depending upon fertilization and cultivation. Corn generally yields from 15 to 25 bushels per acre, although much higher yields have been obtained with good cultivation and liberal fertilization. Cowpeas do well, especially when fertilized with acid phosphate, yielding from two-thirds of a ton to 1½ tons of hay per acre. Sweet potatoes do remarkably well, giving large yields of a fine-flavored product. Watermelons are grown in large quantities for the local markets. Patches of sorghum cane are grown, some sirup being manufactured for home consumption. Commercial fertilizers are applied to all these crops, cotton receiving the heaviest applications.

Some of the best farmers have more than doubled their yields by deep plowing, thorough pulverization of the soil before planting, and frequent shallow cultivation. The content of organic matter is generally low.

The Cecil sandy loam is considered one of the best general-purpose soils in Union County. It ranges in value from \$20 to \$50 an acre, depending upon its proximity to towns and the general improvements on the land.

#### CECIL FINE SANDY LOAM.

The Cecil fine sandy loam consists of a fine sandy loam from 5 to 12 inches deep, varying in color from yellowish gray through gray to light brown, resting on a bright-red, stiff, tough clay, usually extending to a depth of several feet. In a few localities spots of a reddish-brown fine sandy loam to silty loam are included. Throughout the type coarse sand particles are prominent and quartz fragments occur in many places on the surface. On the eroded slopes spots of Cecil clay loam are encountered, while on some of the knolls and ridges patches of medium sandy loam occur. Occasionally the subsoil to a depth of about 20 inches shows mottlings of red and yellow, or it may have a brownish cast throughout the 3-foot section. In spots it is a pale-red or salmon-red friable clay.

This type is closely associated with the Cecil clay loam, occurring in many bodies throughout the southwest corner and along the

western border of the county. Some of the more prominent areas are situated in the vicinity of Weddington, Marvin, and Gordon Store, north of Stallings, and west of Waxhaw.

Most of the Cecil fine sandy loam is developed on the broader inter-stream areas and the surface is prevailingly gently rolling to rolling. Along the drainage ways small areas may have a hilly to slightly broken topography, but practically all the type can be easily cultivated. Terracing is practiced to some extent on the steeper slopes in order to prevent serious erosion or gullying. The position of this type favors excellent natural surface drainage.

The greater part of this soil is under cultivation, but a few small bodies support a growth of red, white, and post oaks, and some shortleaf pine.

The Cecil fine sandy loam is a mellow soil and when properly cultivated a good tilth is easily obtained. On some of the areas having a shallow surface soil baking of the surface is frequently noticeable. This often causes a poor stand of cotton.

Corn, cotton, clover, cowpeas, wheat, oats, sorghum, sweet potatoes, garden vegetables, strawberries, watermelons, cantaloupes, and certain varieties of apples, peaches, and pears are successfully grown on this type, corn and cotton being the principal crops. Some tomatoes, squash, cabbage, watermelons, cantaloupes, and peaches are sold on the local markets. All crops are fertilized or manured. Corn yields from 15 to 25 bushels and cotton from one-fourth to 1 bale per acre. Cowpeas and sweet potatoes give fair returns.

Land of this type sells at \$15 to \$40 an acre, the latter price being obtained for the best improved farms.

#### CECIL CLAY LOAM.

The surface soil of the Cecil clay loam, locally called "red clay land," consists of a red or reddish-brown clay loam or loam ranging in depth from 4 to 8 inches. The subsoil is a bright-red stiff clay extending to a depth of several feet. It is hard and brittle when dry and sticky when wet. Occasionally a few scales of mica are seen in the subsoil and locally small quantities of quartz fragments are observed on the surface.

Slight variations occur in the surface soil of this type, but none of these were of sufficient importance to be recognized as individual types. In a few places the upper 2 to 4 inches of the type is a gray to reddish-brown sandy loam, but such land when plowed to a depth of 6 inches would show a typical clay loam soil. On a few eroded knolls and slopes all the sandy or loamy material has been removed by surface wash, leaving exposed patches of the bright-red stiff clay. Spots of dark-brown or snuff-colored loam or clay loam known as "dead land" or "push land" are of local occurrence. Along Waxhaw Creek

near the county line are found narrow strips and patches of a reddish-brown clay loam underlain by red friable clay. Mica scales are present in both the soil and subsoil, being very abundant in the latter, producing therein a friable structure and giving a decidedly greasy feel to the material. Such spots are typical Louisa clay loam, but of insufficient size to be shown on the map.

This type is confined to the southwestern corner of the county and along the western border. Rather large and continuous areas are encountered south and southwest of Waxhaw, while smaller bodies are found along Sixmile Creek and west of Weddington.

The topography is characteristically rolling to hilly. The crests of the broader ridges have a gently rolling surface, and the areas bordering the streams are rough and broken. Natural drainage is well established. Terracing the slopes to prevent washing and gullying is practiced in a few instances. In many places the small streams have cut deep into the clay subsoil and the rapid run-off has carved out numerous gullies.

Approximately one-half of this type is cleared and used for the production of crops. The native forest growth consists of white, post, red, and chestnut oak, hickory, shortleaf pine, and some dogwood, sourwood, and cedar. In the abandoned fields which have naturally become reforested old-field pine is the characteristic growth.

The principal crops grown on the Cecil clay loam are corn, clover, cowpeas, cotton, potatoes, cabbage, garden vegetables, sorghum, and tree fruits. Corn ordinarily yields from 15 to 30 bushels per acre, but as much as 60 bushels has been obtained by deep plowing, good cultivation, and the incorporation of organic matter. Cotton yields one-fourth to three-fourths of a bale per acre, and cowpeas from 1 to 2 tons of hay, or 10 to 20 bushels of seed. Garden vegetables, fruits, sorghum, potatoes, and cabbage are grown both for home use and for the local trade.

Some of the best farmers have increased their yields greatly by deeper plowing, preferably in the fall, occasional subsoiling, rebreaking and harrowing in the spring, and frequent shallow cultivations. This soil is susceptible of great and lasting improvement.

The price of the Cecil clay loam is influenced by its proximity to towns and the general topography, and ranges from \$15 to \$50 an acre.

#### DURHAM SERIES.

The Durham types are distinguished by their whitish to grayish surface soils and yellow brittle clay or sandy clay subsoils. They are derived from the light-colored granites and gneisses, consisting principally of quartz, feldspar, and mica. These soils are particularly noticeable in Durham, Granville, and other counties in the Piedmont region. Two members of the series occur in this county—the sandy loam and fine sandy loam.

## DURHAM SANDY LOAM.

The surface soil of the Durham sandy loam consists of a gray to whitish loamy sand, grading at about 6 inches into a pale-yellow or yellowish-gray medium sandy loam which extends to a depth of 10 to 18 inches. The subsoil is a yellow, friable, heavy sandy clay or clay, which usually shows mottlings of red in the lower part of the 3-foot section on the slopes and knolls, and mottlings of gray in slight depressions. In places the subsoil is a reddish-yellow or mottled red and yellow friable clay, and where it has been influenced by diorite rock a brownish heavy clay is encountered. Small mica flakes are present locally in both the soil and subsoil, and angular quartz fragments are frequently encountered on the surface. Near Antioch Church the type includes spots of Durham coarse sandy loam which were too small to separate on the map. Along the western border of the county on the South Carolina line large granite boulders are seen, and frequently the bedrock lies near the surface, and occasionally outcrops.

The Durham sandy loam is a relatively inextensive type. The larger areas are located along the Mecklenburg County line and immediately to the south thereof. A large body also lies southwest of Waxhaw on the South Carolina line.

The topography of this type is characteristically gently rolling. Approaching the streams and in the vicinity of rock outcrops the surface is rolling to broken, but along the Mecklenburg County line and around Stallings it is undulating to gently rolling, being favorable for agricultural operations. The soil is naturally well drained.

The original forest growth consisted principally of white oak, post oak, red oak, hickory, and pine, but only patches of merchantable timber now remain. A few areas supporting a second growth of old-field pine, scrub oaks, and sweet gum were seen.

Bright-yellow tobacco does splendidly on this soil, although not grown here on a commercial scale at present. The principal crops grown are corn, cotton, cowpeas, watermelons, and cantaloupes. Sweet potatoes, peanuts, sorghum cane, garden vegetables, and certain varieties of peaches and apples also do well. Corn yields 10 to 25 bushels, cotton one-fourth to two-thirds bale, and sweet potatoes 150 to 200 bushels per acre. Watermelons and cantaloupes give large yields and the fruit is of fine quality. Sorghum cane makes only fair yields, but the quality of the sirup produced is excellent. Cotton usually receives from 400 to 600 pounds per acre of an 8-2-2 or 8-3-3 mixture, and the other crops are also fertilized to some extent. The soil is decidedly deficient in organic matter.

Land of this type sells for \$20 to \$50 an acre, the latter price prevailing near towns.

## DURHAM FINE SANDY LOAM

The surface soil of the Durham fine sandy loam consists of a light-gray to whitish fine sandy loam, which may continue downward to the typical sandy clay subsoil or may grade into a substratum of pale-yellow or yellowish-gray fine sandy loam at about 6 inches. The subsoil, beginning at any depth between 8 and 20 inches, is a yellow, friable fine sandy clay. Frequently at about 30 inches the subsoil is a reddish-yellow or mottled red and yellow fine sandy clay, and at the base of the slopes it occasionally consists of a mottled pale-yellow and light-gray clay. In places a few angular quartz fragments were observed on the surface.

This is one of the inextensive and relatively unimportant types encountered in the survey. Its occurrence is confined to small areas in the vicinity of Marvin and to a few isolated patches lying to the south of Waxhaw.

The type occupies the higher ridge crests, and the topography is gently rolling to rolling. The open structure of the soil, together with its sloping surface, favors splendid natural drainage.

Practically all of the Durham fine sandy loam is under cultivation, the crops and yields being about the same as on its associated type, the Durham sandy loam. Like the latter type, this soil is deficient in organic matter.

The Durham fine sandy loam has about the same value as the surrounding soils.

## GRANVILLE SERIES.

The Granville series includes soils of a gray color and subsoils of yellow sandy clay, changing quickly to mottled yellow and gray and passing at any depth between 15 and 36 inches into an Indian-red or purplish clay. This Indian-red clay is characteristically Penn material and includes various colorations of yellow, gray, and white. The rocks giving rise to the Granville series are the Triassic sandstones and shales. The Granville sandy loam is the only type of this series encountered in the county.

## GRANVILLE SANDY LOAM.

The surface soil of the Granville sandy loam consists of a light-gray sandy loam or loamy sand ranging in depth from 6 to 10 inches. The subsoil is a pale-yellow sandy clay which quickly grades into a mottled yellow and gray heavy sandy clay. This material may extend to a depth of 3 feet, but usually it grades into an Indian-red clay between 15 and 36 inches. In places a few quartz fragments occur on the surface, but not in sufficient quantities to render the soil a stony type.

Included in this type are patches of light-gray or brownish fine sandy loam and areas of gray coarse sandy loam which are too small to separate on the soil map.

This type is confined to small areas in the extreme southeastern corner of the county bordering the Anson County line and adjacent to the bottom lands along Brown Creek.

The topography is gently rolling to rolling or hilly, and the natural surface drainage is excellent and in places excessive. Erosion has been very active, resulting in the formation of numerous V-shaped gullies and ravines. In a few places the surface sandy mantle has been removed by heavy rains, exposing the Indian-red clay. One of the difficulties encountered in connection with the cultivation of this soil is the control of erosion.

The forest growth on the Granville sandy loam consists mainly of old-field pine. Only a very small percentage of the type is farmed. Cotton, corn, cowpeas, rye, sweet potatoes, watermelons, and garden vegetables are successfully grown on the gently rolling areas. Cotton yields from one-third to two-thirds bale per acre with an acreage application of 400 pounds of commercial fertilizer analyzing 8-3-3. Corn gives fair returns when fertilized or manured. Sweet potatoes yield from 100 to 200 bushels per acre, depending upon the methods of cultivation and fertilization. Cowpeas yield well when fertilized with 200 pounds per acre of acid phosphate. Garden vegetables are successfully grown and mature earlier than upon the slate soils.

Most areas of the Granville sandy loam are decidedly deficient in organic matter, and some of the farmers have greatly improved the land by turning under green manuring crops, such as cowpeas and rye, and by the application of barnyard manure. The rougher and gullied areas are best used for forest or pasture.

Land of this type sells at \$10 to \$25 an acre, depending upon the surface and character of improvements.

Mechanical analyses of samples of soil and subsoil gave the following results:

*Mechanical analyses of Granville sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
233503.....	Soil.....	5.3	20.9	12.2	15.3	11.6	28.6	6.1
233504.....	Subsoil.....	3.5	10.1	6.6	9.2	9.4	41.4	19.9

#### IREDELL SERIES.

The soils of the Iredell series are dark gray to dull brown in color and commonly carry small iron concretions. The subsoils consist of brownish-yellow or dingy-yellow, sticky, waxy, impervious clay, a characteristic structure seldom encountered elsewhere in the Piedmont region. At 20 to 30 inches this clay is underlain by greenish-yellow, soft, disintegrated diorite rock. The parent rocks giving rise to this series are diorite and chloritic schists. The only type developed in this county is the Iredell loam.

## IREDELL LOAM.

The surface soil of the Iredell loam, locally called "bull tallow" or "blackjack-oak land," is a dark-gray to dull-brown loam, very fine sandy loam, or silty loam ranging from 6 to 12 inches in depth. The subsoil is a yellowish-brown or dingy-yellow, sticky, waxy, impervious clay, which grades at about 20 to 30 inches into a greenish-yellow, soft, rotten diorite rock. Occasionally a yellowish subsurface stratum is encountered of about the same texture as the soil lying between the soil and subsoil at about 4 to 8 inches below the surface. Small rounded iron concretions or accretions are distributed through the surface soil, while soft black concretions are present in the subsoil. The subsoil, when exposed, turns brown, and upon drying cracks open, forming blocks.

To the east of Indian Trail and southeast of Waxhaw, near Walkerville Church, and in fact all along the line of contact between this type and the soils derived from slates, the surface soil is predominantly a grayish silty loam, passing into a pale-yellow loam, which usually extends to a depth of about 10 inches. Scattered over the surface and mixed with the upper few inches of soil are quartz fragments and gravel and fine slate fragments. There are also included spots of Iredell sandy loam and fine sandy loam, of insufficient extent to be separated.

Areas of this type varying in size from a few acres to 2 or 3 square miles are situated in the western part of the county. Some of the largest bodies are developed southwest of Stout, northeast of Indian Trail, north of Stewart Mill, and along the Mecklenburg County line, bordering the bottom lands of Sixmile Creek. Smaller bodies occur in the vicinity of Walkerville Church, about 3 miles east of Waxhaw, and in the southern part of the county.

The topography of the Iredell loam is comparatively flat to gently rolling or rolling, becoming hilly or broken as the streams are approached. The smoother areas are situated east of Indian Trail and in the vicinity of Walkerville Church. The natural surface drainage is generally good. There are, however, small flat areas and bodies contiguous to the heads of small streams where surface drainage is not well established. Such spots can be drained and reclaimed by means of open ditches. The impervious character of the subsoil accounts largely for the puddling of this soil in some of the poorly drained situations. The underdrainage of this type is poorer than that of any other type in the county; therefore the flatter areas have naturally a cold, late soil.

Blackjack oak is the predominating forest growth, with some post, red, white, and willow oaks. A few old-field pines and cedars are the typical growth on ridges and slopes.

Cotton, corn, oats, wheat, cowpeas, and grasses are successfully grown on this type, and of these oats do best. The value of this land for the growing of cotton has but recently been recognized. Cotton yields from one-half bale to  $1\frac{1}{2}$  bales, corn from 15 to 60 bushels, and oats 20 to 60 bushels per acre. Cowpeas give good returns, although not generally grown. Vetch, Johnson grass, and lespedeza do well and afford good pasturage.

The higher yields of cotton are obtained by the addition of stable manure, 400 pounds per acre of 8-2-2 fertilizer, and 100 to 200 pounds of kainit, the latter being drilled into the soil 10 days to 2 weeks before planting time. The kainit in a large measure prevents the "rusting" of cotton and considerably hastens the maturity of the bolls. Corn has a tendency to "french" on these soils and kainit corrects this tendency when applied in liberal quantities. A top dressing of nitrate of soda applied to corn in the middle of July increases yields. This soil also responds readily to applications of lime.

The Iredell loam under normal conditions sells at \$20 to \$35 an acre, but there are a few highly improved farms which are held at much higher prices.

#### CONGAREE SERIES.

The Congaree soils are brown, ranging in places to reddish brown. There is comparatively little change in color, structure, and texture from the surface downward. Occasionally grayish and yellowish mottling is encountered in the subsoil of poorly drained areas. These soils are developed in the overflowed first bottoms of streams of the Piedmont region and in similar positions in the Coastal Plain along streams issuing from the Piedmont. The material is derived from the soils of the Piedmont region, with some admixture of Appalachian material, and in the Coastal Plain a slight admixture of Coastal Plain material. The soils are usually poorly drained. The Congaree silt loam is the only type mapped in this county.

#### CONGAREE SILT LOAM.

The surface soil of the Congaree silt loam is a brown silt loam ranging in depth from about 8 to 12 inches. The subsoil is a brown or light-brown, rather compact silt loam approaching in texture a silty clay loam, which extends to a depth of 36 inches or grades into a bluish or steel-gray silty clay loam at depths between 30 and 36 inches. Generally the subsoil shows some mottlings of rusty-brown or iron stains and occasionally in the poorly drained situations faint mottlings of yellow and gray are noticeable. In a few localities the surface soil is gray or light brown in color. This is particularly noticeable along some of the streams issuing from Alamance soils.

Along Sixmile, East and West Forks of Twelvemile, and Waxhaw Creeks, in the southwestern part of the county, where there is more or less intermixing of the Congaree and Wehadkee silt loams, a brown fine sandy loam is encountered in narrow strips and patches. This material is typical Congaree fine sandy loam and would have been separated from the silt loam type had it occurred in sufficiently extensive areas to be represented on the soil map.

One of the characteristic features of the fine sandy loam is the presence of finely divided mica scales disseminated through both the soil and subsoil. The typical Congaree silt loam and all of its variations possess a mellow, smooth structure, and when the soil is properly cultivated a good tilth is obtained.

Areas of this type occur in the first bottoms along practically all of the streams in the county. The widest and most continuous strips are developed along Stewarts, Goose, East and West Forks of Twelvemile, Waxhaw, Cane, Richardson, Lanes, and Brown Creeks; also along the North and South Forks of Crooked Creek. Narrow bands are also found bordering many of the smaller streams.

The Congaree silt loam has a prevailingly flat and level surface, although in places there is a slight gradient toward the streams. In other places there is a gradual slope from the stream banks toward the base of the uplands. While this type lies several feet above the normal water level of the streams, yet all of it is subject to overflow during periods of heavy rainfall. Considering the topography, a part of the type is fairly well drained. By straightening and deepening the natural drainage ways and digging lateral ditches leading into these main canals all of it can be reclaimed at a reasonable cost. At present the spring floods and the subsequent slow drying out of the soil delay the planting of crops. Occasionally the crops are partially destroyed or damaged by heavy overflows.

A considerable proportion of this type is devoted to the production of corn. Most of the remainder supports a growth of gum, willow, sycamore, poplar, some birch and beech, and an undergrowth of briars, reeds, and weeds. Upon the cleared and uncultivated areas a luxuriant growth of grass furnishes good hay and summer pasturage.

The present yields of 20 to 50 bushels of corn per acre without the aid of fertilizer or manures indicate the capabilities of this soil where adequately drained, plowed deeper, more thoroughly pulverized, and properly cultivated. Oats are grown to a small extent on the better drained areas and in favorable seasons produce from 15 to 45 bushels per acre.

None of the Congaree silt loam is sold except in conjunction with the adjoining uplands. It greatly enhances the value of farms, as it is held in high esteem by the farmers.

## WEHADKEE SERIES.

The Wehadkee soils are whitish or grayish in color, and silty in texture. The subsoils are mottled gray and yellow or rusty brown in color, compact in structure, and prevailingly silty clay in texture. These types represent alluvial material derived from Piedmont soils, are subject to overflow, and are closely associated with the Congaree soils. Only one type was encountered, the Wehadkee silt loam.

## WEHADKEE SILT LOAM.

The surface soil of the Wehadkee silt loam is an almost white to gray or light-brown silt loam, from 6 to 10 inches in depth. Occasionally faint mottlings of rusty brown are observed in the soil section. The subsoil is a mottled yellow, brown, and gray silty clay loam extending to a depth of 3 feet or more. The lighter colored surface soil is the result of frequent accessions of material washed from the adjoining light-colored upland soils.

This type has a very inextensive development in Union County, occurring in only a few spots and narrow strips bordering the streams which have their origin mainly in the Alamance soils. Some of the largest areas lie along Brown Creek and near the headwaters of the South Fork of Crooked Creek.

Like the Congaree silt loam, this type occurs in the first bottoms and has a uniformly flat and level surface. In places it occupies slight depressions lying between the Congaree silt loam and the uplands. Near the headwaters of the streams the surface has a gentle slope in the direction of the flow. The natural surface drainage of the type is inadequate. Overflows occur during freshets and the water remains on the surface of the border areas for a considerable length of time. Artificial drainage is essential in order to reclaim this soil. It can be accomplished by the construction of open ditches leading into the natural drainage ways.

About one-half of this type is under cultivation, the remainder being forested with gum, ash, willow, poplar, and oak, or used for summer pasturage. It is considered less productive than the Congaree silt loam, but when drained is profitably used for the production of corn and grasses. Bermuda grass does exceptionally well and affords excellent grazing. The best use of this soil is for pasturage. Some pasturage is afforded during the summer months by Johnson grass and broom sedge, which grow wild.

Corn ordinarily yields from 15 to 30 bushels per acre without the use of fertilizers or manure, higher yields being obtained from the better drained areas. The soil is sour and is greatly improved by the application of 1,000 to 2,000 pounds of lime per acre. Thorough drainage and deep plowing are also very beneficial.

The price of land of the Wehadkee silt loam is determined by the value of the upland soils, as no areas of this type are sold separately.

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

*Mechanical analyses of Wehadkee silt loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
233505.....	Soil.....	0.4	1.9	2.2	5.7	6.1	62.9	20.7
233506.....	Subsoil.....	2.8	3.9	3.5	7.7	8.0	45.6	28.7

#### SUMMARY.

Union County, with an area of 630 square miles, or 403,200 acres, lies in the southern part of North Carolina, bordering the South Carolina line.

The general surface features of Union County consist of broad, gently rolling interstream areas, which become more rolling, broken, and hilly as the larger streams are approached. The central, eastern, and northern portions of the county slope to the northeast and are well drained by the Rocky River and its tributaries, while the remainder inclines toward the southwest, being drained by tributaries of the Catawba River.

In 1910 the population of the county was 33,277. Monroe, the county seat, with a population of 4,082, is the largest town. It is the junction point of the two lines of the Seaboard Air Line Railway connecting Charlotte and Hamlet and Atlanta. These two lines afford fairly adequate transportation facilities for the county.

The climate is healthful and favorable for agriculture, and the rainfall is abundant and evenly distributed throughout the year. Excellent water is obtained from deep wells and from a few artesian wells located at Monroe.

Cotton and corn are the leading crops. The small grains are grown to some extent. There is a growing demand for truck, fruit, and other special crops to supply the local markets, as well as for the staple products now grown extensively.

Union County lies in the Piedmont Plateau province, and its soils have been formed by the weathering of the underlying rocks, principally "Carolina slates," granites, gneisses, schists, gabbros, and various diorites. There are 8 soil series, comprising 16 types and 1 phase, recognized in the county.

The soils of Union County are especially well adapted to both general and specialized farming. The Georgeville types, while not the most extensive, are recognized as the strongest soils in the county.

The Alamance soils cover the largest area and are second in importance. Cotton, corn, oats, wheat, cowpeas, crimson clover, sweet potatoes, fruit, and garden vegetables of all kinds are successfully grown on all these types.

The Cecil soils are next in importance, the sandy loam and fine sandy loam being used for the production of early truck crops, such as sweet corn, lettuce, tomatoes, cucumbers, snap beans, English peas, Irish potatoes, watermelons, cantaloupes, and squash, and for general farm crops, while the clay loam is mainly used for the production of small grains.

Bright tobacco and general farm crops are grown on the Durham types. Scuppernong grapes do especially well on both the Cecil and Durham soils.

The Iredell series is represented by the Iredell loam, which produces excellent yields of cotton, corn, oats, and grasses when kanit is applied in large quantities.

The Congaree silt loam is without doubt the best corn soil in the county and in dry seasons is prized for the growing of cotton and small grains.

The Granville sandy loam, while inextensive, is a good general-farming soil.

The Wehadkee silt loam produces good yields of corn and grasses when well drained.

Land values range from \$10 an acre for the rough undeveloped and more remote areas to \$75 an acre for the best farming land near towns.



[PUBLIC RESOLUTION—No. 9.]

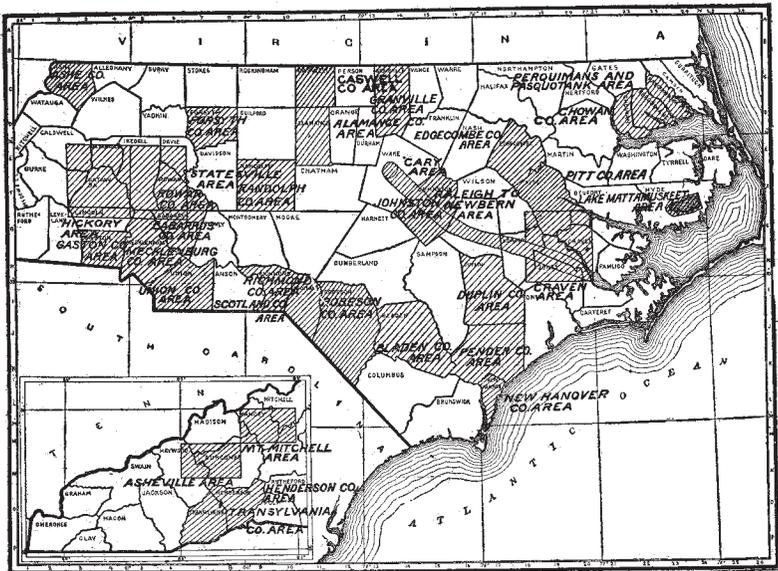
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

*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.]



Areas surveyed in North Carolina.

# **NRCS Accessibility Statement**

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