

# SOIL SURVEY OF GASTON COUNTY, NORTH CAROLINA.

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## DESCRIPTION OF THE AREA.

Gaston County lies in the southwestern part of the State of North Carolina, bordering the South Carolina line. It is bounded on the east by Mecklenburg County, on the north by Lincoln County, on the west by Cleveland County, and on the south by South Carolina. The north boundary line and also the State line on the south are straight, but the western and eastern boundaries are irregular, the

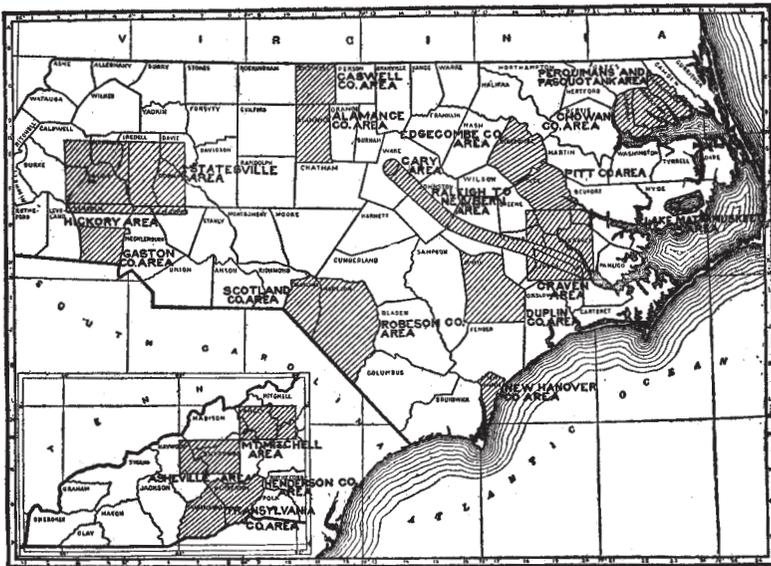


FIG. 11.—Sketch map showing location of the Gaston County area, North Carolina.

latter being formed by the Catawba River. The county has a dimension of  $17\frac{1}{2}$  miles north and south and an average width of about 20 miles east and west. It contains about 370 square miles, or 236,800 acres.

The general slope of the main part of the county is to the southeast, the extreme eastern side to the south, and the extreme northwest corner to the northeast. The surface of the county consists of gently rolling, rolling to hilly or broken, and even mountainous areas.

There are many broad, gently rolling to rolling areas around Gastonia, Dallas, Antioch Church, Cherryville, Alexis, Lucia, Belmont, and Union Church. The areas, however, become more rolling, hilly, and broken as the streams are approached. The roughest areas not included in the mountains occur along South Fork River and the larger creeks and streams which traverse the county, and here the slopes in many places are steep and have become badly eroded.

In the southwest section of the county occur mountain chains which rise about 800 feet above the general level of the surrounding country. The most prominent of these is Kings Mountain—a chain which terminates in South Carolina. In this chain are Pinnacle Mountain, which rises 1,705 feet above sea level, and Crowders Mountain, rising 1,624 feet. In the northwest-central section of the county lies Pasour Mountain, while in the east-central part Spencer Mountain is of importance. In other parts knobs and ridges typical of the Piedmont Plateau are seen. In the vicinity of Cherryville the elevation above sea level is about 1,000 feet, at the town of Kings Mountain near 1,100 feet, and around Bessemer City 900 feet, while the mountain there is considerably higher. There is a gradual slope from these points southeast to the confluence of the South Fork and Catawba Rivers, where the lowest point in the county is reached. With the exception of the mountains and a very few hilly and broken areas near the streams all the land in Gaston County can be cultivated, and even the roughest land could be used to good advantage for pasturage, except in the few spots indicated as Rock outcrop.

Along South Fork and Catawba rivers there is much fall and in many places considerable water power has been developed for running cotton mills. Much power still remains undeveloped. Some of the larger creeks furnish power for grist mills and cotton gins, and even on these streams more power can be had.

The natural surface drainage of Gaston County is excellent, with the exception of a few spots of meadow and bottom land, and even these could be drained, reclaimed, and made productive by straightening and cleaning out the natural drainage ways. The Catawba River flows southward along the eastern side of the county, and the South Fork River, entering the county near the middle of the northern boundary and flowing southeasterly, empties into the Catawba at the southeast corner of the county on the South Carolina line. Crowders, Catawba, and Long creeks are the principal streams which flow across a part of the county and empty into South Fork River, while Dutchmans and Stanley creeks flow into the Catawba River. These rivers and creeks, with their intricate system of smaller streams, drain and water the county admirably.

Parts of Gaston County have been settled for a long time, even prior to the Revolutionary War. Some of the first cotton mills in North Carolina were built along the rivers in this county. Most of

the population consists of American-born whites, some of whom are of Scotch-Irish descent. The negroes live mostly in the towns and constitute only a small percentage of the county's population. The southwest section of the county is thinly settled, as is also the region around Pasour Mountain and near Highshoals. In many places, particularly in the eastern part and around Gastonia, Dallas, and Cherryville, the country is fairly thickly settled. The county offers inducements to settlers and could support many times the present population if all the arable land were intensively farmed.

There are a larger number of towns in Gaston County than in any other county in North Carolina. Gastonia, which is to be the county seat beginning January 1, 1911, is the commercial center and chief town, with a population near 10,000. Dallas, the present county seat, Cherryville, Mount Holly, Belmont, Stanley, Bessemer City, Lowell, and McAdenville are thrifty business towns. Kings Mountain, which lies partly in Gaston County, is a town of considerable importance. The smaller towns of Highshoals, Hardins, Mountain Island, Tuckasee, Philipsburg, Mayesworth, and Spencer Mountain each have one or more cotton mills. Gaston County lies in the center of the textile belt and has the distinction of having within its borders 60 mills.

The county is well located as regards railroad transportation. The main line of the Southern Railway crosses it in an east and west direction; the Carolina and Northwestern Railway traverses it north and south; the Seaboard Air Line Railway enters the county on the east side at Mount Holly and swings northwesterly, leaving the county near Alexis, and again enters it farther west and crosses the northwest corner, passing through Cherryville. No farm in the county is more than 8 miles from a railroad station.

Rural free delivery of mail is in operation throughout the county. Good churches, school buildings, and also telephone lines are seen in the rural districts. The county now has more than 60 miles of macadam road and is constructing more. The dirt roads on the ridges are good, but the cross-country roads and those on the clay areas cut up badly during the winter months. Electricity generated on the edge of the South Carolina line is transmitted to all parts of the county for use in running cotton mills.

Gastonia and the other large towns offer good markets for the cotton and all other farm products grown in the county. The people in the towns, together with a large number at the mills, create a demand for vegetables, potatoes, fruits, poultry, butter, eggs, milk, etc. No better markets for garden produce could be desired, as the demand thus far has exceeded the supply to such an extent that high prices are always secured. As an example, sweet milk sells readily at 40 cents a gallon. The county offers splendid opportunities to the dairy and truck farmer, as well as to those growing general farm crops.

## CLIMATE.

There is no established Weather Bureau station in Gaston County, but the accompanying table, compiled from the records of the station located at Charlotte, will represent fairly well the local conditions.

This table shows a mean annual rainfall of 49 inches and a mean annual temperature of 60° F., which gives a mild and equable climate for this region. The average annual snowfall is slightly above 7 inches. The rainfall is well distributed throughout the year. During the fall months the precipitation is usually slightly less, giving a favorable season for the ripening and opening of cotton and also for harvesting both cotton and corn.

In such a climate considerable farm work can be carried on during much of the winter. There is a comparatively long growing season between the last killing frost in the spring and the first in the fall. Occasionally the seasons are somewhat uncertain and full crops are not always secured, but there is never a crop failure.

The county has a splendid health record, as the surface is high and rolling and thoroughly drained. Good water from either wells or springs can be had in all parts of the county.

*Normal monthly, seasonal, and annual temperature and precipitation at Charlotte, Mecklenburg County.*

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
	°F.	°F.	°F.	Inches.	Inches.	Inches.	Inches.
December.....	43	76	- 5	3.8	1.9	5.7	2.2
January.....	41	77	- 1	4.3	2.3	7.6	1.9
February.....	44	79	- 5	4.6	5.4	6.4	2.9
Winter.....	43			12.7	9.6	19.7	7.0
March.....	51	85	14	4.8	1.6	9.2	0.6
April.....	59	94	26	3.4	1.9	5.4	0.1
May.....	69	97	38	3.9	1.7	4.8	0.0
Spring.....	60			12.1	5.2	19.4	0.7
June.....	76	102	45	4.6	3.4	9.5	0.0
July.....	79	102	55	5.3	6.4	7.9	0.0
August.....	77	100	53	5.2	1.0	2.1	0.0
Summer.....	77			15.1	10.8	19.5	0.0
September.....	72	99	38	3.3	4.7	3.6	0.0
October.....	61	92	30	3.4	1.0	1.5	Trace.
November.....	51	80	18	3.0	3.7	4.7	Trace.
Fall.....	61			9.7	9.4	9.8	Trace.
Year.....	60	102	- 5	49.6	35.0	68.4	7.7

## AGRICULTURE.

Parts of Gaston County have been settled for a long time, but very little advancement along agricultural lines was made till about forty years ago. Perhaps no county in North Carolina has made more wonderful progress in agricultural, educational, and industrial development within the last twenty or twenty-five years. At the time of the civil war one cotton mill was in operation in the county, while to-day it has more mills than any other county in the South. Land values about 1870, prior to the building of any railroads, were very low, and good land could be bought at from 40 cents to \$1.50 an acre. In 1884 the county was dotted with licensed distilleries for making whisky. Practically all of the excess corn was made into whisky and this was hauled to Columbia and sold.

Corn, wheat, and oats were the first crops grown in the county. The flour was taken to Columbia and Charleston, S. C. There were a few cattle and many hogs and sheep; in fact every farmer raised sheep before the civil war, and even as late at 1880 a great many were found on the farms. The cattle were mostly scrub stock, the first Shorthorn and Durham cattle having been brought into the county within comparatively recent years. The yields of grain crops were low in the early days, owing to meager preparation and cultivation of the land.

In 1865 corn, wheat, and oats were still the main crops. The growing of cotton began about 1870 and had assumed some importance by 1880. The maximum years for the production of wheat were 1882 and 1883. About twenty-five years ago tobacco was grown to some extent, but this crop was soon abandoned, except for a few small patches for home use.

According to the census of 1880 the production of the principal crops was: Corn, 373,000 bushels; wheat, 62,000 bushels; oats, 50,000 bushels, and cotton 4,500 bales, while sorghum, sweet potatoes, and hay were grown to a considerable extent, and to a less extent rye, Irish potatoes, Canada peas, and orchard products. In 1890 practically the same acreage was devoted to corn, while the production of wheat was over 100,000 bushels, and cotton had increased about 50 per cent. There was also a noticeable increase in oats, hay, sorghum, sweet potatoes, and rye. Cowpeas was another crop of some importance at this time. By 1900 the size of the individual farms had decreased considerably; more live stock was raised; hay crops of various kinds, vegetables, and orchard products showed a marked increase, and peanuts had been added to the list of farm products. Considerable wheat was grown till about six years ago, but since that time its production has practically ceased owing to the Hessian fly, which became so numerous and destructive that the crops were ruined. This

fall (1909) is witnessing, however, a revival in the sowing of wheat, the high price of flour influencing the farmer to grow wheat again.

At the present time cotton is the chief money crop and too great dependence has been placed upon it to the exclusion of others. Corn ranks second in value and then come oats and cowpeas. A large area of cowpeas is sown throughout the county. The vines in most cases are cut for hay, while some of the peas are allowed to mature and are picked. The yield of hay is usually from 1 to 2 tons per acre. Oats do well if sown in the fall, but the spring-sown oats are not usually a success on account of the rust or unfavorable weather conditions. Rye, crimson clover, vetch, and soy beans are grown to a small extent. The growing of peanuts on a small scale commercially has been begun upon the more sandy soils with fair results. Watermelons are grown for market by several farmers. Sorghum is grown for making sirup for home use and to a limited extent for local trade. Nearly every well-established farm has some apple trees, and a few pear, cherry, peach, and fig trees are commonly seen. Irish and sweet potatoes, collards, cabbage, and turnips are grown. Cattle and hogs and a few sheep are raised.

In the past there has not been a close study of the adaptation of the various soils to the different crops, but now many of the farmers recognize the important fact that not all soils are equally suited to the growing of each and every crop. It has been observed that the Meadow or bottom-land areas which are cultivated are better suited to corn than to any other crop. The small strips of Congaree fine sandy loam produce good crops of corn and fine watermelons. Sorghum will grow on any soil, but the quality of the sirup varies considerably, the lightest colored product being secured from the sandy loam soils. Peanuts give best results upon the light-textured deep sandy loams, while sweet potatoes find their best development on the sandy loams when such soils are manured. Rye seems to fill out and fruit better on the sandy soils. The clay loam and red clay are best suited to the production of wheat, clover, oats, corn, and grasses. Cotton produces well on the clay loam and part of the clay, but in a few depressions of these heavy soils it makes a rank growth and sometimes fails to open before frost. The more sandy areas of clay loam are well adapted to cotton. Fortunately cowpeas are grown in all parts of the county, and upon practically all soils with very satisfactory results. Should tobacco growing assume any importance in this section the Durham coarse sandy loam and the light areas of the Cecil sandy loam would prove to be excellent soils.

Systematic rotation has not been generally practiced throughout the county. The best farmers, however, are now rotating their crops. A good three-year rotation, as followed by some, is cotton, corn, sow-

ing cowpeas at last plowing of corn, and the third year small grain, sowing cowpeas on the grain stubble. This allows cotton, which is a clean cultivated crop, to follow a nitrogen gathering crop. The land improves under such a rotation, and the farmers are beginning to take advantage of this method of maintaining the productiveness of their fields. More cowpeas are grown than in most of the counties of the State. With more thorough preparation and cultivation of the soils and by practicing a rotation in which cowpeas have an important place the crop yields can be greatly increased. The farmers are now using improved machinery, such as sulky plows, disk plows, disk harrows, wheat drills, and cultivators. At least 50 per cent more modern machinery is in use in Gaston County now than there was three to five years ago. Cowpea hay, corn shucks, and other rough feed are baled by machinery and marketed.

Commercial fertilizers are being used to a greater extent each year. Most of the complete fertilizer is of low grade, commonly the 8-2-2 or 8-3-3 formulas. The usual application is from 150 to 300 pounds per acre. Fertilizers are applied to cotton, corn, or wheat regardless of analyses and composition of the soil. Some farmers buy cottonseed meal, acid phosphate, and kainit, or muriate of potash, and mix these materials at home. With the present low humus content of most of the soils a heavy application of commercial fertilizer would have a tendency to burn or cause the crop to fire in dry weather. However, when the soils have been plowed deeper and larger amounts of humus incorporated therein larger quantities of fertilizers can be profitably used. Even now the application of 150 to 200 pounds could be increased to advantage.

In some parts of the county there is at times a scarcity of farm help, owing to the large demand for employees in the mills. The 60 cotton mills in the county employ a large number of men who might otherwise be farm laborers or tenants. Around Hardins the usual price for farm labor is from 75 cents to \$1.25 a day for men and from 60 to 75 cents for women. Some men are hired in various parts of the county for \$15 to \$18 a month, with board, house, firewood, and garden patch. In a few of the less-developed sections of the county women and children, as well as the men, work in the field. Many of the day laborers are negroes.

Probably 70 per cent of the farms are operated directly by the owners. Some of the land is rented for one-third of the corn and one-fourth of the cotton, while part of it brings a cash rent of \$100 for 30 acres. A share system is also used, whereby the landowner furnishes the land, stock, feed for stock, implements, and one-half of the fertilizer and receives one-half of all the crops produced.

Most of the farms in Gaston County are small. The average size farm in 1900, according to the Twelfth Census, was about 90 acres.

They have been decreasing in size since 1880, when the acreage was 130 acres.<sup>a</sup> Some of the farms contain from 300 to 500 acres, but the small farms of 10 to 75 acres are the ones commonly found in the best condition.

Land values in Gaston County have greatly increased within the last few years. The macadam roads, together with the growth of the population in several towns which consume all the products at a high price, have been important factors in this increase. The lowest priced land lies in the southwestern part of the county, near Pinnacle and Crowders Mountains, and even here the price ranges from \$10 to \$15 an acre. Near Mount Holly land sells at \$30 to \$60 an acre, and around Hardins at \$20 to \$30, around Cherryville and Bessemer City at \$25 to \$40, and timber land near Highshoals at \$40. The highest priced land in the county lies in the vicinity of Gastonia, Mount Holly, and Belmont, and here the desirable farming land is held at from \$40 to \$75 an acre. The average price of good farming land for the county would be near \$35 an acre.

In studying the conditions in Gaston County one is impressed with the fact that the individual farmer is endeavoring to cultivate too many acres, and therefore does not and can not prepare the land with sufficient care to insure the best results. Over the entire area are seen many eroded or bald spots "turned out" in the cultivated fields. Most of these unsightly places could be easily reclaimed and made productive by applying coarse manures and sowing cowpeas and grasses for a few years. One of the essential steps toward increased yields is deeper plowing and a much better preparation of the seed bed, and this to be followed by shallow cultivation. This applies particularly to the Cecil clay, Cecil clay loam, and the heavier areas of the sandy loams. These stiff lands need to be loosened up and aerated in order to give the plant roots a larger feeding ground and to allow more rainfall to be absorbed, thus insuring more moisture during dry seasons. The deeper seed bed will also give better drainage in wet seasons. Any kind of coarse manures—straw, leaves, or even cotton hulls—when turned under on the clays are very beneficial in loosening up the soil, as shown by marked improvements in the yields. While some of these materials add but little plant food, they have a wonderful effect upon the physical condition of the soil. In the last two or three years several of the farmers have increased their corn yields from 25 bushels to as much as 50 bushels, and in one case to 86 bushels, per acre simply by better preparation and treatment of the soil, by practicing a proper rotation, including cowpeas, and by applying liberal quantities of manure.

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<sup>a</sup>A part of this decrease is only apparent and results from a difference in classification introduced by the Twelfth Census.

In this region, where the soils and climatic conditions favor the growing of cowpeas, clovers, vetch, and rye, all the nitrogen needed for crops can be easily and cheaply secured by growing these and thus save the farmers a large part of their fertilizer expense. It pays to cut the cowpea vines for hay and not turn them under except on poor land very deficient in humus. If the land has been properly prepared for cowpeas the stubble makes an excellent seed bed for wheat. One of the main reasons why the results with wheat are not more satisfactory is the meager preparation of the seed bed.

A greater diversification and a more systematic rotation of crops should be practiced in order to build up the soil and increase the yields. Cotton has for many years been the favorite crop, and not enough attention has been given to the grain, corn, and hay crops. More corn, oats, wheat, hay, and meat should be produced and more cattle kept on the farms so that Gaston County would export instead of having to import flour, meat, and hay. The large numbers of people in the towns and factories make excellent markets for the products of the farm, particularly for such crops as sweet potatoes, cabbages, Irish potatoes, turnips, beans, tomatoes, sorghum sirup, dairy products, and poultry.

It should be the earnest endeavor of each farmer to secure a full stand of all crops, particularly of corn and cotton, so that no blank spaces may occur in the rows. In order to accomplish this the selection of good seed is highly important, as is also the variety best suited to each soil. An example of the need of this is seen in places on the red lands where the cotton does not mature; for such places an early maturing variety should be selected. The variety best suited for the sandy loams will not yield well under all conditions on the heavy clays. The North Carolina department of agriculture is determining the cotton varieties adapted to the various soils, as well as the fertilizer requirements of the different soil types.

#### SOILS.

Gaston County lies in the Piedmont Plateau region of the State and comprises a number of different kinds of rocks mainly igneous and metamorphic. In a few localities rocks of sedimentary origin were seen outcropping. The more important rocks and those which cover a large area are granites, gneisses, and schists. Granite is particularly noticeable around Gastonia, Dallas, Hardins, Highshoals, northeast of McAdenville, near Union Church, and between Dallas and Bessemer City. In certain parts of the northwest section around Cherryville and also to the west of Mountain Island a very coarse-grained granite is prominent with gneisses and schists. The weather-

ing of the coarser granites has given rise to the Durham coarse sandy loam and Cecil coarse sandy loam and also in part to the Cecil sandy loam. The Cecil sandy loam and Cecil fine sandy loam have been derived from granites, gneisses, and schists. There are small areas of talcose schists and felcitic which give rise mainly to the Cecil loam. In some places especially on the east side of Pasour Mountain and also to the east of Bessemer City occur a fine-grained sandstone, which has modified to some extent the Cecil fine sandy loam and Cecil loam found there. Throughout the county and particularly in the eastern section the underlying rocks are gneisses and schists with some fine granite, and these have weathered down to form the Cecil clay loam and Cecil clay. On the mountains, knolls, and peaks quartzite is the principal rock and the resistant action of this rock to the forces of weathering is the direct cause of the presence of these various elevations. In places are seen a green diorite and other dark-colored basic rocks, which have weathered into a dull-colored soil with impervious subsoil mapped as Iredell clay loam. Throughout the various formations are found veins of quartz and fragments of this rock persist in the soils.

The level areas along the rivers and creeks mapped as Congaree fine sandy loam and Meadow were formed and are at present being modified by material washed down and deposited by the streams.

The soil types in Gaston County are characteristic of the Piedmont section, which extends from northern Pennsylvania to eastern Alabama, and have been grouped mainly in the Cecil series. The Durham and Iredell soils are associated with the Cecil series, but they commonly occupy small areas. Soils similar to these in Gaston County were first mapped in Cecil County, Md., and the series owes its name to that fact.

The streams in many places have cut deep and usually narrow valleys, and erosion and washing has greatly influenced the texture of the soils on the hillsides. On some of the high land and knolls, especially in the river bend section, are found rounded gravel and quartz pebbles, which show conclusively that the Catawba River or some other stream at one time flowed over what is now high upland.

Owing to the numerous rock formations and the various types of soil, it was a difficult matter to draw distinct boundary lines between some of the soils. The Cecil clay loam and Cecil clay are so closely related in texture, color, topography, and agricultural value that it was deemed impracticable to separate all the small spots of each.

The following table gives the name and extent of each of the soil types mapped in Gaston County :

*Areas of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Cecil sandy loam.....	66,112	27.9	Durham coarse sandy loam...	4,480	1.9
Cecil clay loam.....	65,216	27.5	Iredell clay loam.....	4,288	1.8
Cecil fine sandy loam.....	32,768	13.8	Congaree fine sandy loam.....	4,160	1.8
Cecil loam.....	20,160	8.5	Cecil stony loam.....	3,904	1.7
Cecil coarse sandy loam.....	12,608	5.3	Rock outcrop.....	704	.3
Meadow.....	12,032	5.1			
Cecil clay.....	10,368	4.4	Total.....	236,800	.....

CECIL STONY LOAM.

The surface soil of the Cecil stony loam, to a depth of about 7 inches, is a yellowish-gray to gray loam or silt loam, containing from 20 to 50 per cent of rock fragments, usually felcite or quartz. Occasionally some large bowlders of these rocks are seen, and spots and ridges of very fine sandy loam are found throughout the type.

The subsoil is a red silty clay, clay loam, or clay, with a noticeable content of fine sand particles. In certain localities on the steep slopes near the mountains the subsoil is a yellowish clay. The clay subsoil is usually free from stones, except where such areas border the Rock outcrop and on a few ridges and slopes where the bed rock comes near the surface.

The Cecil stony loam occurs mainly in Crowders Mountain Township, on and near Pinnacle, Crowders, Pasour, and Spencer mountains, Jackson Knob, and Berry Mountains. Small spots and ridges are found in various other parts of the county.

The Cecil stony loam possesses rough surface features, the slopes of the mountains being broken and steep while the tops and almost perpendicular walls are bare Rock outcrop. The small areas are hilly or consist of knolls and ridges which are rolling. With such surface conditions the natural drainage is very good. The type is derived from the weathering of igneous rocks, mainly felcite, schist, and quartzite. It is influenced in places, especially on the east side of Pasour Mountain, by the underlying sandstone.

In the more inaccessible places some of the original timber growth is still standing. This consists of oak, pine, and some hickory. On the rolling areas and ridges is seen a small growth of somewhat scrubby oak, which has succeeded the original growth. Part of the type is so steep that it should remain forested.

There is practically none of this soil under cultivation except a few spots on the ridges where a small yield of corn is secured. These rolling areas could be profitably used as grazing land for cattle and sheep. On some areas where altitude and air drainage are favorable apple growing might prove a success. Land of this type of soil sells at \$5 to \$20 an acre.

CECIL COARSE SANDY LOAM.

The surface soil of the Cecil coarse sandy loam consists of a yellowish-gray to light-brown coarse sandy loam ranging in depth from 5 to 12 inches. It contains in the typical areas from 5 to 15 per cent of angular quartz gravel, and in a few localities quartz and other rock fragments are seen on the surface. Near Cherryville many bodies of brown loam with a large percentage of coarse sand were encountered. There is enough of the coarse sand to cause the soil to be mapped as sandy loam, the finer interstitial material being mainly silt and clay.

The subsoil, to a depth of 36 inches, is a red or reddish-yellow mottled clay, containing a considerable amount of coarse sand particles. Much of this clay, especially the deep-red clay, is tough and stiff. The lighter-colored areas are generally more friable and contain a greater proportion of sand. As would naturally be expected the subsoil of this type is more crumbly than that of the finer textured types. Some mica scales are frequently seen in both soil and subsoil.

The main occurrence of this type is in the northwest section of the county. It is typically developed around Cherryville, where a large area of very irregular outline was mapped. A large body lies to the northeast of McAdenville and reaches to Goshen Church. Another body is found just north of Penley Chapel along the Cleveland-Gaston County line.

The surface of this soil is gently rolling to rolling, becoming quite rolling and broken as some of the larger streams are approached. The type forms some of the most elevated farming land in the county, lying between 950 and 1,000 feet above sea level. On the steeper slopes considerable washing and erosion have taken place. The type possesses splendid surface drainage; no ditching is necessary, but terracing to prevent erosion is essential on the steeper slopes.

The Cecil coarse sandy loam is derived from the weathering of coarse-grained granites, gneisses, and other igneous rocks. The more loamy areas have been derived from the finer textured gneisses and schists, carrying numerous quartz veins.

The greater part of this type has been cleared and cultivated. There are yet a few bodies of the original timber, consisting of white, red, and post oak, and some hickory and pine. The soil is suited to

cotton and corn. On the more sandy areas truck crops would do well, while the brown loamy areas are well adapted to wheat, oats, corn, cowpeas, and clover. Cotton yields from one-third to 1 bale per acre, the latter yield being secured by liberal applications of fertilizer and manure and by good cultivation. Corn yields ordinarily from 12 to 15 bushels, but as high as 40 bushels can be obtained; wheat 5 to 15 bushels, oats 18 to 30 bushels, and cowpea hay 1 ton. Sweet potatoes, Irish potatoes, and peanuts do well. Small fruits and apples and peaches give fair returns. Trucking on a small scale would be profitable near the markets. Most of the corn, cotton, and wheat are fertilized with about 200 pounds of commercial fertilizer of 2-8-2 or 3-8-3 formula. This soil will probably respond freely to phosphoric acid.

This type of soil needs more organic matter. This should be supplied by growing leguminous crops, which would also furnish nitrogen. Coarse manures will be very beneficial. Deeper plowing of the heavier phases would give increased yields. This land sells at \$20 to \$40 an acre.

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

*Mechanical analyses of Cecil coarse sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
22203.....	Soil.....	15.5	19.9	7.2	13.3	6.8	27.4	9.9
22204.....	Subsoil.....	6.0	6.9	2.3	4.2	1.9	23.9	54.7

CECIL SANDY LOAM.

The soil of the Cecil sandy loam, commonly called "gray land," consists of a yellowish-gray, gray, or light-brown medium sandy loam 6 to 12 inches deep. Below the first 6 inches and extending to the red clay subsoil the material is yellowish in color, very little organic matter being mixed with the soil beyond the depth of cultivation. Throughout all areas of the type are found many small bodies of fine sandy loam, coarse sandy loam, and loam. There are also a few spots of stony loam, while in some localities a few rock fragments are scattered over the surface, the little knolls being covered more commonly with quartz. There are large areas of the type which are free from stones and quite uniform, especially around Gastonia and Dallas. The subsoil of the typical areas is a red stiff clay to a depth of 3 feet and more. Some areas have a reddish-yellow or slightly mottled friable clay subsoil containing more sand. In local areas the bed rock comes within 3 feet of the surface.

In addition to the typical areas there occur several variations or phases which require special mention, but which in themselves are not of sufficient size and importance to be mapped as distinct types. Bordering the clay loam and clay areas, but more particularly on many knolls and slopes, where erosion has removed the gray sandy surface, is seen a brown or red heavy sandy loam, loam, or clay. In the vicinity of Union Church and to the south occurs a yellowish-gray loose, medium-textured sandy loam with a depth of 10 to 15 inches, underlain by a reddish-yellow to yellow clay which is rather friable. This represents the deepest phase of the type. Immediately southwest of Gastonia and in many other places near the smaller streams the surface soil is a medium sandy loam which grades into a yellow or whitish sandy clay or clay. Such bodies are usually very narrow, are crawfishy, and become spongy when wet. Land of this character is not as productive as the true Cecil sandy loam. To the north of Cherryville and in other places scattered over the type in River Bend Township and out from Gastonia are encountered spots of brown gravelly loam carrying considerable quantities of gravel, underlain by a clay or clay loam subsoil. North of Cherryville there is a noticeable amount of fine rock fragments, mainly gneiss and schist and also mica scales. Other spots of this gravelly soil are seen 2 miles west of Gastonia and on the road from Bessemer City to Dallas, near Long Creek, and to the northwest of Gastonia near the Flint mill. In such areas is found a coarse-grained granite within 2 or 3 feet of the surface. The larger gravel areas have been indicated on the soil map by symbols.

The Cecil sandy loam, including all of its phases, is a mellow and easily tilled soil, and improved machinery can be used over a large part of it. It is one of the most extensive types in the county and occurs in large, unbroken areas extending north and south through the central part of the county. It covers the greater part of Gastonia Township, being well developed around Gastonia, Dallas, Hardins, and in smaller bodies in the localities of Long Creek Church, Snapp, and Sellers store. Areas of this soil lie to the north of Cherryville, around Lucia, and in the River Bend section of the county. Small bodies are scattered throughout other parts of the county, particularly the eastern.

The surface of this type is gently rolling to rolling, becoming more rolling and broken as the streams are approached. The inter-stream areas around Gastonia, Dallas, Lucia, and Union Church in many places lie beautifully for general farming purposes. The roughest and most broken areas usually occupy the hillsides near the larger streams. The surface drainage is all that could be desired. On many hillsides and slopes terracing is practiced to prevent washing. Many eroded and gullied areas are seen, and this washing has given rise to great variation in the texture of this soil.

The Cecil sandy loam owes its origin to the weathering of granites, gneisses, and schists. In the brown loamy areas the mica schists predominate, while in the gravelly areas north of Gastonia and in other places the soil has been derived from coarse-grained granites. This rock can be seen outcropping on slopes and in road cuts. The decay of these rocks, which are composed chiefly of feldspar, quartz, and a small amount of mica, gives rise to a medium to coarse sandy loam. The red color of the subsoil is due to the oxidized iron compounds in the rocks.

A large percentage of this type is cleared and cultivated, although a few areas are still forested to pine and oak suitable for the manufacture of lumber. In some places the scrubby shortleaf pine (*Pinus virginianus*), hickory, dogwood, sourwood, cedar, and old-field pine are seen. The reforested areas usually consist of old-field pine, valuable only for fuel.

The deeper and more sandy areas of the Cecil sandy loam are especially adapted to sweet potatoes, Irish potatoes, peanuts, berries, melons, and garden vegetables, and it can be rightly termed the trucking soil of the Piedmont Plateau. The average textured and more shallow loamy areas of the type are suited to the production of cotton, corn, and cowpeas.

Cotton, the principal crop grown at present, yields from one-third to 1 bale per acre, averaging about one-half to two-thirds bale, with good cultivation and liberal applications of fertilizers. Cook's Prolific seems to give the best returns. Corn yields from 10 to 15 bushels ordinarily, but by deeper plowing, thorough cultivation, and liberal applications of fertilizers and manures as high as 75 and even 93 bushels per acre have been secured. Wheat yields from 5 to 10 bushels per acre, oats 15 to 40 bushels, cowpea hay 1 to 2 tons, and sweet potatoes 75 to 300 bushels per acre. Irish potatoes do well. If the land is inoculated and a good stand is secured, crimson clover makes a thrifty growth. Sorghum usually yields from 50 to 150 gallons of sirup per acre, but as much as 300 gallons could be obtained. Many small patches and a few fields of peanuts were seen, and these gave good returns. Watermelons and cantaloupes yield well, and garden vegetables and fruits can be successfully grown. Cowpeas are sown extensively. Some of the peas are picked, but in most cases the vines are cut for hay and the stubble turned under or the land disked for oats or wheat.

Some of the yields of corn and cotton secured indicate what this soil is capable of producing under favorable conditions when properly manured and fertilized. It can be easily and greatly improved and such improvement is quite lasting on account of the red clay subsoil foundation, which prevents leaching. By turning under leguminous crops or coarse manures to supply the much-needed or-

ganic matter and nitrogen, by plowing the land deeper where the clay comes near the surface, and by practicing better cultivation, together with a systematic rotation of crops, this soil could be brought to a state of high productivity.

It is the common practice of many farmers to use about 200 pounds per acre of a 2-8-2 or 3-8-3 fertilizer. Some use cottonseed meal, muriate of potash, and acid phosphate and do home mixing. Kainit prevents to a certain degree rust in the cotton on poorly drained land or on some land with yellow subsoil, and pipe-clay land.

The Cecil sandy loam, mainly on account of its location, is the highest-priced soil in the county, selling at \$30 to \$75 an acre.

The results of mechanical analyses of samples of the soil and subsoil of this type are given in the following table:

*Mechanical analyses of Cecil sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
22209.....	Soil.....	3.9	21.2	13.9	27.3	15.4	13.5	4.8
22210.....	Subsoil.....	2.4	9.2	4.4	9.3	6.8	28.2	39.6

CECIL FINE SANDY LOAM.

The soil of the Cecil fine sandy loam is a gray or light-brown fine sandy loam with a depth of 5 to 12 inches. The subsoil in typical areas is a red tough clay to a depth of 36 inches and more. Occasionally a red friable clay is found which grades into the underlying rock at 30 inches. In spots south of Trinity Church and south of Pasour Mountain a yellow clay subsoil is seen.

A brown or slightly reddish colored phase of this type occurs in the areas of or near the clay loam type. In a few places near the mountains a yellowish-gray fine sandy loam with a high percentage of silt was encountered. The soil is typical in the vicinity of Bessemer City and to the northwest of Cherryville. In many localities is found a considerable amount of fine rock fragments and quartz gravel, and spots of gravelly loam are not infrequent. The soil is mellow and easily tilled.

The Cecil fine sandy loam occurs in large areas around Stanley, Alexis, southwest of Spencer Mountain, north of Dallas, around Bessemer City and Kings Mountain, south of Trinity Church, and in the extreme northwest corner of the county. Many small bodies are scattered throughout the county. The surface of the type is gently rolling to rolling, becoming broken and hilly near the streams. The type occupies some of the highest elevations not included by the mountains. It has good natural surface drainage in all areas,

ditching being unnecessary except in an occasional depression. The soil has been derived from the decay of fine-grained gneiss, mica schist, and felsite. In a few places these rocks come within 3 feet of the surface. Such areas, together with those having a yellow subsoil, are less productive than typical areas of the type.

The forest growth consists of oak and pine with some hickory, sourwood, dogwood, and cedar.

The Cecil fine sandy loam is a good soil for various crops. It is best suited to cotton, melons, and truck, though corn, wheat, oats, cowpeas, and clover can be profitably grown. Cotton yields from one-third to 1 bale per acre, with an average of about one-half bale; corn 10 to 25 bushels, and wheat 5 to 10 bushels. Watermelons, sweet potatoes, Irish potatoes, sorghum, cowpeas, and garden vegetables give good returns. The various crops are fertilized with from 200 to 400 pounds of a 2-8-2 or 3-8-3 fertilizer. For increasing the productivity of this soil the same treatment can be followed as outlined under the Cecil sandy loam. In those areas where the clay subsoil comes within 5 inches of the surface the plowing should be sufficiently deep to mix a little of the clay with the sandy surface, thus producing a more loamy soil. Subsoiling would probably be advisable also under such conditions. Land of the Cecil fine sandy loam sells at \$20 to \$40 an acre.

The results of mechanical analyses of soil and subsoil of this type are given in the following table:

*Mechanical analyses of Cecil fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
22211.....	Soil.....	1.0	2.4	3.5	29.5	32.4	23.3	7.7
22212.....	Subsoil.....	.2	.7	1.1	7.8	9.8	24.9	55.5

CECIL LOAM.

The surface soil of this type consists of a yellowish, gray, or light-brown silty loam from 5 to 8 inches deep. There are a few knolls and ridges where the soil is pale yellow or whitish in color with rotten rock near the surface. Spots of yellowish-gray silt loam occur in a few places, while near the clay loam areas the soil grades into a somewhat heavier brown loam. Over a considerable portion of the type is found a small quantity of quartz gravel and fine rock fragments. With the exception of these coarse particles the soil is smooth and mellow.

The subsoil for the most part is a red friable clay, although in some places it is tough and plastic. Spots of brownish or reddish-

yellow clay are sometimes encountered. In the southwest section there are spots of pinkish or brown clay, while on the east side of Pasour Mountain a yellow clay is found in places. Occasionally the partially weathered felsite and talcose schists come within 2 feet of the surface.

The Cecil loam occurs in the southwestern part of the county in Crowders Mountain Township and in an unbroken belt which swings northwesterly across the county. It is quite prominent around Unity Church, Philipsburg, Bessemer City, Pasour Mountain, and Highshoals. There are also bodies near Alexis and Lowell and small spots elsewhere in the county. The type is found on the ridges and slopes in the southwestern part of the county, on the high rolling plateaus in the northern part, and on gently rolling to rolling areas near Alexis and Lowell. It has good natural surface drainage.

This soil has been derived, through weathering, from talcose schist, felsite, and fine-grained gneiss and schist. In these rocks in a few places veins of quartz occur which upon the breaking down of the rock give rise to the fragments found in the soil. In local areas the partially decayed felsite and talcose schist come within a short distance of the surface. Such spots are usually droughty and less productive than the typical areas.

A fine, original growth of white, post, and red oak and some hickory and pine stands on this type in many localities, especially in the vicinity of Highshoals and to the north and west of Pasour Mountain. Most of the original growth has been cut in the southwest section and around Bessemer City, and the areas have grown up to scrub oak and scattering pine. Such land would not be very expensive to clear and get in suitable condition for cultivation. In the southwest corner around Crowders and Pinnacle mountains and also in the vicinity of Pasour Mountain the country is very thinly populated.

Practically all of this soil can be easily cultivated. It is suited to the production of corn, cotton, oats, wheat, cowpeas, potatoes, and fruits. Cotton yields from one-third to 1 bale per acre and corn 15 to 30 bushels. Cowpeas and oats do well and also wheat on the heavier and redder areas. Apples, pears, and peaches give fair returns on the ridges. Some commercial fertilizer is used on all crops and occasionally barnyard manure is applied.

The areas of the type having the brown surface soil with heavy red-clay subsoil are the most productive and most easily improved. This type, particularly the lighter-colored areas, needs organic matter, which can be supplied by turning under manures, cowpea vines or stubble, and rye. The type can be further improved by deep plowing and subsoiling. On account of the good clay foundation the soil shows the beneficial effects of manures or green crops turned

under for a considerable time. This type of land sells for \$10 to \$40 an acre.

The average results of mechanical analyses of samples of the soil and subsoil are given in the following table:

*Mechanical analyses of Cecil loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
22215, 22217.....	Soil.....	1.3	2.9	2.7	10.4	21.8	46.7	14.1
22216, 22218.....	Subsoil.....	.4	1.4	1.3	4.5	8.4	40.8	43.2

CECIL CLAY LOAM.

The soil of the Cecil clay loam, or "red land," consists typically of a red or brown loam or clay to a depth of 5 to 7 inches. Over large areas of this type there occurs a heavy sandy loam, 2 or 3 inches deep, passing into the loam or clay below. In other areas, especially in the South Point section, is found a brown to red loam containing considerable medium to coarse sand. There are small spots where the surface soil is a heavy sandy loam to the subsoil. In a few localities are found bodies of a dull brown loam having a depth of 10 to 15 inches, which is locally called "push land" or "dead land," on account of the fact that the soil does not slide easily from the plow. All through the clay loam areas are many spots of Cecil clay which were not separated on the map as the two types are very closely related as regards texture, crop yields, and general agricultural value. In some areas are found quartz fragments and occasionally gneiss and schist fragments. There are also a few spots where stones are quite noticeable.

The subsoil is a bright-red stiff clay, tough and hard when dry, plastic and sticky when wet, and cracking a little on drying. In some places the presence of mica scales gives it a smooth greasy feel. Spots of reddish-yellow clay are occasionally seen where aeration has not been good. Some quartz sand is felt in the subsoil and frequently a vein of quartz is encountered.

The Cecil clay loam when plowed under proper moisture conditions is easily handled, otherwise the soil will clod and bake. The areas which contain the largest amount of sand are more friable and the soil works up into a better tilth and is more easily handled than in the heavier areas.

The Cecil clay loam is one of the important types in Gaston County. It occurs to a greater or less extent in all parts of the county, but its greatest development is found in the southeastern part in South Point Township, between the Catawba and South Fork rivers, where

a continuous area is broken only by small spots of other soils. Other important areas are found along South Fork River, in the central part of River Bend Township, throughout Dallas Township, and from Concord Church north to Webb Chapel. Bodies of this soil are also found around Antioch, Pisgah, and Long Creek churches and Landers Chapel, and also south of Bessemer City and south of Crowders Mountain.

The type occupies gently rolling, rolling, and hilly areas, which are the characteristic surface features of the county. The ridge which extends from Belmont down into South Point is gently rolling on the crest, but becomes hilly and broken as the rivers are approached. Some of the roughest and most broken areas lie west of Stanley, southeast of Hardins, and along rivers and larger creeks.

Part of the type is badly gullied and eroded, as the small streams have made deep inroads into the clay subsoil. The surface is sufficiently rolling to insure the best natural surface drainage. Terracing is practiced in many places on the slopes to prevent washing.

The Cecil clay loam is a residual soil formed by the decay of the underlying rocks, mainly gneisses and schists, but with some fine-grained granite and other igneous rocks. The mica scales present have come from the mica schist. The quartz veins seen in the subsoil and left as fragments on the surface are harder and were better able to withstand the forces of weathering than the rocks in which they were embedded and hence have persisted. Many of these rocks contain hornblende. The iron in these rocks has oxidized, giving the distinctive red color to the type.

Though a large part of this soil is cultivated, there still remain some areas of the original forest growth of white, red, and post oak, interspersed with hickory and some pine, dogwood, and sourwood. The areas which have been cleared and abandoned commonly support a growth of old-field pine.

The Cecil clay loam is particularly adapted to the production of corn, wheat, oats, clover, grasses, and cowpeas. It is also a good soil for cotton. Cotton yields from one-third to 1 bale per acre, the latter yield being secured by good methods of cultivation and by applying a fair amount of manure and fertilizers. Kings Improved is the variety said by many farmers to give the best results. One trouble with cotton on this type is that it does not open early enough. An early maturing variety should be sought for the heavier areas and for the "push land." The yield of corn ranges from 12 to 86 bushels per acre, with an average of not more than 20 bushels. The high yields have been secured by deep plowing, by thorough preparation and cultivation, by preceding the corn with a crop of cowpeas, and by applying manures. Wheat gives from 10 to 25 bushels. The heads fill our well, but the crop is occasionally damaged by

freezes. Oats yield from 20 to 60 bushels and cowpeas 1 to 2 tons of hay or 20 to 30 bushels of shelled peas per acre. Clover, both crimson and red, and orchard grass do well. Sorghum yields fairly well, but does not give quite as light-colored sirup as in case of the sandy loams. Cabbage, turnips, potatoes, apples, cherries, and pears give good returns.

Some of the farmers are beginning to plow deeper, prepare the soil better, and give more frequent cultivation, and these methods, together with the turning under of cowpeas and coarse manures, are bringing much larger crop yields. This soil, like the other types in the county, needs humus, and it particularly needs to be loosened up so that air and water can permeate it easily. It is naturally a strong soil and one capable of much improvement. By growing leguminous crops, such as cowpeas and clover, and adding large quantities of acid phosphate and some potash, the fertilizer requirements will have been practically met. The clovers and cowpeas will secure nitrogen from the air and store it in the soil for the crops. The cotton, corn, and wheat, and in some instances the cowpeas, are fertilized usually with 150 to 300 pounds of 2-8-2 or 3-8-3 fertilizers. A few farmers buy cotton-seed meal, acid phosphate, and kainit and mix them before applying to the land.

The Cecil clay loam sells at \$30 to \$75 an acre, depending on improvements and location.

The results of mechanical analyses of samples of soil and subsoil of this type are given in the following table:

*Mechanical analyses of Cecil clay loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
22221.....	Soil.....	0.5	2.0	2.5	10.7	20.4	27.0	36.7
22222.....	Subsoil.....	.2	.4	.5	2.0	3.2	37.2	56.4

CECIL CLAY.

The Cecil clay is locally known as the "heavy red clay land." The soil is a red or reddish-brown clay loam or clay ranging in depth from 4 to 7 inches. In some places it contains a noticeable amount of angular quartz sand. The subsoil to a depth of 36 inches, and usually to a depth of several feet, is a red clay, which is tough and hard when dry and sticky and plastic when wet. Occasionally a vein of quartz is seen in the subsoil, and small scales of mica are sometimes present in both the soil and subsoil.

Many areas of Cecil clay occur in the county, but the largest and best developed bodies lie to the north of Belmont around St. Marys

College, along the Seaboard Air Line Railway west of Nims, to the south and east of Webb Chapel, and north of Concord Church. Small spots of clay occur throughout the county in practically all areas of the Cecil clay loam.

The surface features of this soil vary from gently rolling to rolling uplands, together with a few rather steep slopes near the streams. The natural surface drainage is good, but the heavy clay subsoil prevents a rapid percolation of the rain water downward. The flowing of this excess over the surface is the principal reason why erosion on the hillsides of this soil has been so marked. Shallow plowing has also aided this surface washing. In order to prevent in a large measure the washing of these clay areas deep plowing is essential and also the growing of more grass crops, and especially winter cover crops.

The Cecil clay has been derived from the weathering of hornblende gneiss, micaceous schist, diabase, and fine-grained granite. The quartz veins frequently seen in the subsoil and left as fragments occasionally on the surface were imbedded in the solid bed rock and have withstood the forces of weathering.

The original forest consisted of a heavy growth of red, white, and post oak, and also considerable hickory, with some dogwood, sourwood, cedar, and shortleaf pine. This was excellent merchantable timber and most of it has been cut, although patches are still standing.

The Cecil clay is naturally one of the strongest soils in the Piedmont Plateau. It is particularly suited to the production of wheat, clover, oats, and grasses. Corn, cotton, and cowpeas also do well. Corn and cotton are now the main crops, though some wheat and oats and a considerable quantity of cowpea hay and seed are produced. Corn yields from 12 to 86 bushels per acre, the average being about 18 bushels. The higher yields have been secured by thorough preparation of the land, together with good cultivation and a liberal application of home-mixed fertilizers. Cotton yields from one-third to 1 bale per acre, wheat 10 to 30 bushels, oats 20 to 40 bushels, and cowpeas 20 to 30 bushels of peas and a good yield of hay. Clover does well but is grown only to a small extent. Some patches of sorghum are cultivated and the yield of sirup is from 60 to 150 gallons per acre, the sirup being of a dark color. Some apples, cherries, and peaches are grown. The fertilizers used are those in common use throughout the county.

Deep fall plowing and occasional subsoiling followed by better preparation of the seed bed and more thorough cultivation of the growing crops will greatly increase the yields on this soil. The growing of clover and cowpeas will supply the humus which the soil needs, and as these crops also supply nitrogen the further needs of

the soil would be liberal applications of potash, phosphoric acid, and lime. Cowpeas and clover will also loosen up the soil and improve its physical condition. By preparing a deeper seed bed the soil would absorb more rain water and maintain a more adequate supply of moisture for the plants during droughts. It would also facilitate drainage in wet seasons and give better aeration, thus affording more favorable conditions for microorganisms. Farms consisting in whole or in greater part of land of this type are held at \$40 to \$75 an acre.

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

*Mechanical analyses of Cecil clay.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
22225.....	Soil.....	3.4	10.1	8.9	20.8	8.4	20.0	28.5
22226.....	Subsoil.....	.9	5.3	4.0	9.8	5.6	17.6	56.7

DURHAM COARSE SANDY LOAM.

The surface soil of the Durham coarse sandy loam, to a depth of 8 to 12 inches, is a yellowish-gray or light-gray coarse sandy loam containing a considerable quantity of fine quartz particles. In a few localities the sandy loam surface soil ranges in depth from 12 to 18 inches. Where fields of this soil have been abandoned the surface presents a whitish appearance. Sharp quartz gravel occurs in some areas.

The subsoil, to a depth of 36 inches, is a yellow, coarse, sandy clay or clay loam containing some angular quartz fragments. Near Cherryville a mottled to reddish-yellow clay with some sand particles is encountered. Generally the subsoil extends to a depth of several feet, but in a few instances the bed rock comes within 3 feet of the surface, and usually immediately over the rock the subsoil is a coarse sandy loam. Spots of brown clay loam occur in a few places. Small mica scales are seen in both soil and subsoil.

The Durham coarse sandy loam is of limited extent in the county. The largest areas occur in the northwestern part east of Cherryville and on the county line near Sellers store and extending in broken strips northward to the Lincoln County line. There is also a large and important body of this soil to the southwest of Mountain Island along the macadam road and in the vicinity of the Catholic church.

This type occupies gently rolling to rolling areas, but frequently extends down the hillsides to the streams. It is eroded and broken on some of the slopes. The loose, open texture of the soil, coupled with the rolling surface, insures excellent drainage for all areas of

the type. It warms up early in the spring and can be tilled immediately after rains.

The Durham coarse sandy loam is a residual soil derived mainly from the weathering of granite and gneiss. Most of this granite is a coarse-grained biotite variety composed of feldspar, quartz, and mica. As this rock decays the feldspar forms clay while the quartz remains as sand and the mica is also broken up and left in small particles. The coarser-grained rocks give rise to the coarser-textured soil, and hence more coarse sand and gravel are seen in some places.

The original forest growth was white, red, and post oak, some hickory, dogwood, sourwood, and shortleaf pine, but only spots of this timber now remain. A few fields which were once cultivated have grown up to old-field pine and scrub oak.

The Durham coarse sandy loam is especially adapted to the production of bright tobacco, such as is grown in Caswell County, N. C., and around Danville, Va. It is a splendid soil for sweet potatoes, truck crops, fruits, and berries. By proper rotation good crops of cotton and corn can be produced. The main crops grown are corn, which yields from 10 to 20 bushels, and cotton, which yields from one-third to three-fourths bale per acre. Sweet potatoes give good yields, and cowpeas do fairly well, while the yields of wheat and oats are low. Corn and cotton are usually fertilized with 200 pounds of a 2-8-2 mixture, although a few farmers use a higher grade.

This soil contains very little organic matter and can be greatly improved by applying barnyard manure or turning under green manuring crops, such as cowpeas and rye. These crops would fill the soil with humus, making it more loamy and more retentive of moisture. The Durham coarse sandy loam sells for \$15 to \$40 an acre.

The results of mechanical analyses of the soil and subsoil of this type are given in the following table:

*Mechanical analyses of Durham coarse sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
22231.....	Soil.....	13.5	23.5	8.9	14.9	6.1	20.1	12.9
22232.....	Subsoil.....	9.0	9.7	3.9	5.8	3.0	15.7	52.6

IREDELL CLAY LOAM.

The soil of the Iredell clay loam, or what is locally known as "pipe clay land," is a drab, dull-brown, or dark-gray medium to a fine sandy loam, with a depth of 5 to 9 inches. In spots the soil is a loam or clay loam and in a few places a light-gray sandy loam. Small, rounded iron concretions are present in the soil in many places, and occa-

sionally quartz gravel occurs. In a few instances, particularly in one place near the Seaboard Air Line Railway, diabase boulders, or "niggerhead" rocks, are found in large quantities on the surface. Occasionally on the slopes the sandy covering has been washed off, leaving the brown clay exposed.

The subsoil is a brown or yellowish-brown sticky impervious clay which at a depth of 20 to 30 inches grades into the soft, rotten, greenish-colored rock. In places, especially near the Durham coarse sandy loam, the subsoil is a yellow, sticky, sandy clay. Both the soil and subsoil lack uniformity. The typical clay areas crack open and form blocks when dry and are exceedingly sticky when wet.

This type has a small acreage in the county. The largest bodies lie in the eastern part in the vicinity and to the north of Mount Holly and northwest thereof along the railroad, and another body lies about 2 miles east of Stanley. Very small spots occur in various sections of the county. The type occupies gentle slopes, knolls, rolling areas, and hillsides. In places the surface is badly eroded. The surface drainage is good, but the underdrainage is very poor, owing to the impervious character of the clay subsoil, which hinders the downward or lateral passage of water.

This soil has been derived from the weathering of diorite rock, which is usually dark green in color, and it is also modified to some extent by materials coming from granite and diabase rocks.

The forest growth consists mainly of black-jack oak, although some valuable white, post, and red oak was seen.

This soil is suited to cotton, corn, oats, wheat, and Johnson grass. Oats and grasses are the preferable crops. Some good crops of cotton are secured, the yields ranging from one-third to 1 bale per acre. Corn does fairly well. Oats, wheat, and cowpeas are grown to a very limited extent. The soil is acid in character and needs lime. Barnyard manure is especially beneficial, as is also the turning under of cowpeas. Cotton rusts to some extent on this soil, but this can be remedied in a measure by using kainit. Nitrate of soda in connection with manures and fertilizers would doubtless give greatly increased yields. Land of this type of soil is worth from \$10 to \$40 an acre, depending on location.

The following table gives the results of mechanical analyses of soil and subsoil of the Iredell clay loam:

*Mechanical analyses of Iredell clay loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
22234.....	Soil.....	6.7	8.2	5.0	16.0	26.9	26.4	10.4
22235.....	Subsoil.....	2.9	3.8	3.0	7.0	11.8	31.2	40.1

## CONGAREE FINE SANDY LOAM.

The Congaree fine sandy loam consists of a fine sandy loam varying in color from a gray to light brown and extending in many places to a depth of 3 feet or more. Occasionally at 20 inches the material changes somewhat in texture, becoming more compact and containing a greater amount of silt, and in a few small depressions or swales a brown silty loam is encountered. Throughout the type are found many ridges of fine sand or loamy fine sand which extends to a depth of 2 to 3 feet. Small mica scales in considerable quantity are seen in all sections of this type.

The Congaree fine sandy loam occurs as strips varying from a few yards to about one-fourth mile in width following the Catawba and South Fork rivers. It occupies level, flat, bottom land, together with a few very low ridges and an occasional depression which gives it a slightly undulating surface in places. The soil is open and loose, thus allowing free passage of water, and open ditches serve to drain it. Much of the type is subject to overflow during high water, but crops are not usually damaged.

This soil is of alluvial origin and consists of fine sand, silt, and clay which have been brought down from the uplands and deposited by streams. It is a mellow, smooth, and very easily tilled soil and most of it is under cultivation. It produces good crops of corn and watermelons, and will also grow rye, cantaloupes, and vegetables. Corn is the principal crop, the yields ranging from 15 to 40 bushels per acre. Some of the largest melons in the county are grown on this soil. A small quantity of grass is grown for hay and also a few cow-peas. The corn is seldom fertilized, but in growing watermelons manure and commercial fertilizers are used.

## MEADOW.

The land mapped as Meadow consists of a variety of soil conditions and has no definite textural characterization. The surface material varies from a coarse sandy soil to a clay loam. Usually adjoining the areas of the clay or clay-loam type the soil is a brown loam, while in the more sandy areas near the headwaters of the streams the soil is commonly a sandy loam interspersed with spots of loam and ridges of sand. There are some large bodies of brown loam or silty loam along Long, Crowders, and Dutchmans creeks. In taking borings to a depth of 3 feet it was common to find several different strata of material. In many places there is a noticeable amount of small mica scales.

The Meadow lies along the creeks and branches throughout the county, being best developed along Crowders, Catawba, Long, Hoyles,

Stanley, Dutchmans, and Beaverdam creeks. The largest bodies are found on Long Creek. The Meadow areas vary in width from a few rods to more than one-fourth mile, though the maximum width is seldom attained.

This low, flat Meadow land lies only a few feet above the normal water level of the streams. Most of it is subject to overflow at times of heavy rainfall. Open ditches are necessary to drain the broad areas. Some of the best loam areas have been covered in recent years by a deposit of sand, thus materially affecting the producing value of the land and in places rendering it practically worthless for native grasses. On the higher portions crops are usually safe. Nearly all of the Meadow could be drained, reclaimed, and made productive by straightening and cleaning out the natural drainage ways. Some of the best land, however, along the streams is so flat and so near water level that it is unfit for cultivation.

The soil has been formed by the wash of materials from the surrounding soil formations at times of heavy rainfall, being reworked and subsequently deposited by the streams. The more silty and clayey bodies were deposited in comparatively quiet water. Owing to the low-lying position and moist condition of the areas a rank vegetation has flourished and the decay of this covering has supplied the soil with considerable organic matter. This accounts in a large measure for the high productiveness of the better areas.

A considerable part of the Meadow is cultivated, while large areas of it are devoted to natural hay and pasture. On some of it there is a growth of willows, elms, and shrubbery. About 15 years ago the Meadow was among the highest priced lands in the county. The brown loamy and heavy areas produced the largest yields of corn of any soil in the county, the yields ranging from 20 to 50 bushels per acre without fertilization. A large quantity of wild grass is cut for hay. Other areas furnish good grazing for cattle during the summer months.

#### ROCK OUTCROP.

The Rock outcrop areas have been indicated on the map by check marks. Bare rock walls, almost perpendicular, rise 150 to 300 feet in certain places on the sides of Crowders and Pinnacle mountains, while the steepest slopes of these mountains are also rough and stony. On the crest of Pasour and Spencer mountains and Jackson Knob the solid rock protrudes through the surface in many places, and large isolated boulders are also present. This rock is mainly quartzite, although some fine-textured sandstone occurs on Pasour Mountain and in other places. Some of the quartzite has been quarried and used for macadamizing the roads.

## SUMMARY.

Gaston County lies in the southwestern part of the State, bordering the South Carolina line. It contains 236,800 acres, or 370 square miles, and is almost square in shape.

The county possesses excellent transportation facilities, being crossed by the main line of the Southern Railway and also by the Carolina and Northwestern Railway and Seaboard Air Line Railway. About 70 miles of macadam road have been built. Good schoolhouses, churches, and neat farm dwellings are seen in many parts of the county.

There are many towns in Gaston County. Gastonia, with a population near 10,000, is the largest. All of these towns furnish good markets for the various farm products. There are now in the county 60 cotton mills, the largest number of any county in the South. Electricity generated in South Carolina is transmitted to all parts of the county. Most of the county is fairly well settled.

The general surface consists of a series of gently rolling, rolling, and hilly areas, in places broken by knobs and low mountains. In the southwest section Pinnacle and Crowders mountains attain an altitude of over 1,700 feet. The general elevation ranges from about 500 feet to something like 1,100 feet.

All parts of the county are well watered and drained by the South Fork and Catawba rivers and tributary streams. Much water power has been developed along these streams and used for running cotton mills, gristmills, and cotton gins.

The rainfall for this section is ample and well distributed throughout the year. The climate is mild and healthful, and favorable for farm work even during much of the winter.

The soils of Gaston County are typical of the Piedmont Plateau. They are formed through weathering from the underlying rock formations. Owing to the great variety of rocks a large number of soil types are found. The more important formations are granite, gneiss, and schist, and these have given rise to the main soil areas.

There are two principal groups of soil in the county—the gray sandy loams, which vary in texture from fine to coarse and are underlain by red clay, and the red clay loam and red clay, which are the typical red lands of the county. In addition to these, small bodies of bottom land occur along Catawba River and Meadow areas along the small streams. There is also a gray sandy loam with yellow clay subsoil and small spots of stony loam near the mountains.

The largest and best-developed types are the Cecil sandy loam and Cecil clay loam. These are considered good soils for the different crops common to the county. The more sandy soils are best suited to the production of truck crops, while the heavier types are admirably

adapted to grains, clovers, and grasses, and also to cotton and corn. The soils in Gaston County can be easily improved and made to produce larger crop yields.

Gaston County has made wonderful advancement in agriculture and manufacturing within the last few years. Land values have greatly increased. The present prices for farm land vary from \$15 to \$75 an acre, with an average for the county near \$35. Most of the farms are small or of medium size and about three-fourths of them are tilled by the owners. Considerable farm machinery has been bought recently. A rotation of crops is practiced by the best farmers.

More of the necessary supplies for home use are being produced now on the farms. The principal crops of the county are cotton, corn, cowpeas, and oats. Commercial fertilizers are used to a considerable extent, but the acreage applications are usually small.

Gaston County offers many opportunities for those who would engage in farming. The soils can be built up and made very productive, and the numerous towns afford good markets for all products.

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