Issued December 23, 1915.

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF CHESTERFIELD COUNTY, SOUTH CAROLINA.

BY

W. J. LATIMER, M. W. BECK, J. M. SNYDER, L. CANTRELL, AND N. M. KIRK.

HUGH H. BENNETT, INSPECTOR, SOUTHERN DIVISION.

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

WASHINGTON:
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1915.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., May 28, 1915.

SIR: In the extension of the soil survey in the State of South Carolina, work was undertaken in Chesterfield County during the field season of 1914.

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

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

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

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SOIL SURVEY OF CHESTERFIELD COUNTY, SOUTH CAROLINA.

By W. J. LATIMER, M. W. BECK, J. M. SNYDER, L. CANTRELL, and N. M. KIRK.

DESCRIPTION OF THE AREA.

Chesterfield County lies in the northeastern part of South Carolina, adjoining the North Carolina line. It is bounded on the north by Union and Anson Counties, N. C., on the east by Marlboro County, from which it is separated by the Peedee River, on the south by Darlington County, and on the west by Kershaw and Lancaster Counties. The county has an area of 798 square miles, or 510,720 acres.

The fall line between the Piedmont Plateau and the Coastal Plain extends across the northwestern part of the county, the greater part of which is within the Sand Hill belt of the Coastal Plain. The topography is mainly rolling or hilly, with a few comparatively smooth or nearly level areas, mainly near Cheraw and McBee. The flood plain of the Peedee River above Cheraw is very narrow, but it broadens out below this point, and has a considerable width between Cheraw and the Darlington County line. The river-terrace land, or second bottom, is developed prominently below Cheraw, forming the large, level area in the vicinity of Montrose and Cashs. The bottom lands along most of the streams in the Piedmont section are well developed, broadening out to a width of about a mile along Thompsons Creek. The swampy areas are comparatively small, even along the larger streams.

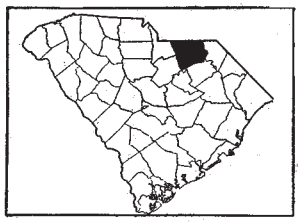


FIG. 1.—Sketch map showing location of the Chesterfield County area, South Carolina.

The surface drainage of the upland is well established, being excessive over most of the area and deficient in only a few places. The regional drainage of the county is through four systems. A belt along the eastern boundary is drained by laterals directly into the Peedee River; the northeastern and east-central section, comprising the largest area, is drained by Thompsons Creek and its tributaries into the Peedee; the central and south-central part is

drained by Big Black Creek, and the strip along the western boundary of the county is drained into the Lynches River.

The general elevation of the upland ranges from about 500 to about 750 feet above sea level. Cheraw is about 100 feet above the mean low-water stage of the Peedee River, and the town of Pageland is about 675 feet higher than Cheraw.

Chesterfield County, as it now stands, was formed from Cheraw District in 1875. The first settlements in the county were made by a colony of Welsh immigrants from Delaware in 1737. Later a number of settlers came into the county from Virginia. These were English, as were other settlers who came in from Charleston, S. C. About 1840 a large number of Scotch settlers, mainly from North Carolina, entered the county. There were very few slaves in the county, except on large plantations near Cheraw and along the Peedee River. The present population consists largely of descendants of the original settlers. The negro population is confined mainly to Cheraw and the country contiguous to the Peedee River. The total population is reported in the 1910 census as 26,601, showing an increase of nearly 6,000 (or of 29 per cent) over that in 1900. The population is 89 per cent rural. The density of settlement is 31.4 persons to the square mile. A large part of the Sand Hill section is sparsely settled.

Cheraw, the largest town in the county, has a population of 2,873, according to the 1910 census. It is located at the head of navigation on the Peedee River and is a commercial center of importance. Chesterfield, the county seat, ranks next in size, with a population of 618.

The principal industrial product of the county is lumber, and although most of the merchantable timber has been cut there are several large mills and other wood-working plants in the county. Cottonseed oil is an important product. There are a number of good water-power sites along the fall line between the Piedmont Plateau and the Coastal Plain. Most of the power is utilized for operating small mills, grinding corn, and running gins and sawmills. In some cases electricity is developed for local use.

Railroad lines do not reach all sections of the county. The Seaboard Air Line Railway traverses the county, passing through Cheraw and McBee. From McBee the Charlotte, Monroe & Columbia Railroad extends north as far as Jefferson, and the South Carolina Western Railway south into Darlington County. The Atlantic Coast Line Railroad runs north and south near the eastern border of the county. This line serves the town of Cheraw. From Cheraw the Chesterfield & Lancaster Railroad extends northwestward to Chesterfield, Ruby, and Pageland.

The public-road system of the county is not well developed, but rapid progress is being made in road improvement and extension throughout the county. The areas outside of the Sand Hill section have fairly good roads.

CLIMATE.

Chesterfield County lies almost wholly within the Sand Hill belt, a region which is noted for its salubrious winter climate and includes such widely known winter resorts as Aiken and Camden, S. C., and Pinehurst, N. C. Fruit does particularly well in this region, and it is popular for peach and grape production. The mean temperature for the year is about 62° F., and for the winter months about 44° F.; zero temperatures are extremely unusual. The winters are so mild that the hardier crops and plants may be grown throughout the year.

The summers are hot, the mean temperature for the three summer months, June, July, and August, being about 79° F. During these months temperatures of 100° are common, but there is usually a tempering breeze. Thunderstorms are quite frequent. The spring and fall have a mean temperature of about 62° F.

The precipitation is ample for successful crop production and is well distributed throughout the year. The heaviest precipitation occurs during the spring and summer months, when the moisture is most needed by the growing crops, and the lightest in the autumn during the cotton-picking season, when clear weather is desirable. The snowfall is usually light, and during some winters only traces of snow are seen. The heaviest snows remain on the ground only a short while.

The latest date of killing frost in the spring recorded at the Weather Bureau station at Cheraw is April 24, and the earliest date recorded in the fall, October 12. The average date of the last killing frost in the spring is April 5, and of the first in the fall November 1. This gives a normal growing season of nearly 7 months.

The following table, compiled from the records of the Weather Bureau station at Cheraw, gives the normal monthly, seasonal, and annual temperature and precipitation.

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

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	44.1	78	8	3.17	1.96	4.66
January	42.5	80	3	2.92	1.27	3.10
February	44.3	82	−9	4.47	1.30	1.91
Winter	43.6	.....	.....	10.56	4.53	9.67
March	54.1	93	16	3.67	3.64	3.80
April	60.7	94	28	2.92	2.09	4.51
May	70.7	103	36	3.88	4.13	10.19
Spring	61.8	.....	.....	10.47	9.86	18.50
June	77.4	104	41	5.43	0.93	9.70
July	80.0	104	51	6.09	5.61	6.20
August	78.7	103	52	6.63	6.06	12.25
Summer	78.7	.....	.....	18.15	12.60	28.15
September	73.3	101	35	3.58	3.85	8.40
October	60.9	90	27	2.71	3.20	0.18
November	52.1	90	14	2.19	0.65	0.61
Fall	62.1	.....	.....	8.48	7.70	9.19
Year	61.6	104	−9	47.66	34.69	65.51

AGRICULTURE.

The principal crops grown by the first settlers in this region were hemp and flax. The soils and climate were not well suited to these crops and they did not prove profitable. Wheat and corn were introduced and gave satisfactory returns, the latter crop being grown mainly on the rich river-bottom lands. Hog raising became prominent early in the history of the county and bacon was one of the chief exports. "Cheraw bacon" was a celebrated article of diet at one time in England. During this period "nut grass" for feeding hogs was introduced on a farm near the Peedee River, from which it is said to have spread over this general section. Indigo was introduced at an early date and soon became an important and profitable crop, but by the beginning of the nineteenth century it had begun to decline. Somewhat later tobacco became an important crop, and was exported in large quantities. This crop was gradually abandoned as cotton assumed importance.

The Civil War had a demoralizing effect on the agriculture of the county and was followed by a long period of depression. When

agriculture became reestablished, stock raising was carried on less extensively and foodstuffs were produced in far smaller quantities than before the war. Cotton became the leading money crop and steadily increased in acreage until the increased production reduced the price below the cost of growing the crop. During the last decade the market has been better, and with better methods of handling the crop as well as the use of fertilizers and the diversification of crops, the yield has been increased and the cost of production has been relatively lowered.

The agriculture practiced in the county at present is essentially a one-crop system. Cotton is the leading money crop and is grown on an acreage equal to that of all other cultivated crops combined. It has been the principal crop of the county since its production became of any importance in the South. Corn is the next crop of importance. It is grown on an acreage four-fifths as large as that of cotton. The remainder of the cultivated area is devoted to oats, cowpeas, forage crops, sweet potatoes, tobacco, sorghum, and vegetables. These crops, with the exception of tobacco, are grown for home use. Aside from a small amount of pea-vine and crab-grass hay, little hay is grown. This is produced largely upon the river terraces and bottom lands. Wheat is grown on only a small acreage, and the crop is not important. Vegetables are produced on every farm, but no truck crops are grown for market. Melons and strawberries are grown only to supply local demands. Crimson clover is being introduced in the county and grown successfully in a few small patches. Vetch is grown to about the same extent as crimson clover.

Some cattle are raised in the county, mainly in the "red-hill" or Piedmont section and on the bottom lands. The Sand Hill section furnishes very poor grazing, and very little stock is kept there. Most of the cattle are sold in adjoining counties, where they are fattened for market. Peaches are grown on a commercial scale and apples and grapes for home use.

Much of the land in Chesterfield County is undeveloped, but settlement is going on very rapidly. With a more thorough recognition of the different soils and the crops to which they are best suited, together with the practice of better methods of handling the soils, every indication points to rapid progress in agricultural development.

Both the soils and climate of Chesterfield County are well suited to the production of cotton. The census reports 44,780 acres in this staple in 1909. The acreage yield, while less than that in some of the adjoining counties, is high enough to warrant the extensive cultivation of the crop. Cotton is one of the easiest crops to market that can be grown in the county, as it can be hauled long distances, stored indefinitely, and held for suitable prices.

The upland short-staple cotton is grown by most of the farmers. The Excelsior and Cleveland Big Boll varieties are among the most popular. Long-staple cotton was grown by a large number of farmers for several years, but market conditions were unfavorable and the crop did not mature satisfactorily. The average yield of cotton is one-half to three-fourths bale per acre. On the best farms yields of 1 bale per acre are obtained in average seasons.

The acreage of corn is somewhat less than that of cotton. The average yield is low, being only a little more than 12 bushels per acre. The 1910 census reports 35,497 acres in corn, with a production of 444,138 bushels. The low yields are due in a measure to the large acreage of sandy land used for this crop. The corn produced is not sufficient to meet local demands.

Where the Williamson method of growing corn is used, good yields are made. Nearly all of the best farmers use this method or a form of it, with such changes as are made necessary by local conditions. It is doubtful if the method will prove successful upon some of the more dense soils, such as the heavier Piedmont soils and the heavier alluvial soils.

In certain near-by counties corn yields have been materially increased by following more approved methods of cultivation. Throughout Chesterfield County less care is exercised in selection of seed and the use of the best varieties, and the corn is stripped instead of being cut and shocked. The Marlboro Prolific is probably the most popular variety of corn.

Oats are not grown on a very large scale, being confined mainly to the poorly drained upland and terrace soils. In the Piedmont region they are grown on the well-drained uplands to some extent. Oats are reported on 4,729 acres in 1909. Most of the soils of the county, excluding the Sand Hill region, produce fair yields of oats. Very little fertilizer is used except on sandy land. The general practice in fertilizing is to apply 150 to 300 pounds of an 8–3–3 mixture or in the spring a top dressing of 75 to 150 pounds of nitrate of soda. Where oats follow corn and cowpeas no fertilizer is used. The average yield for the county is about 20 bushels per acre. The Red Rustproof variety seems to give the best results. Winter oats are grown most extensively.

Wheat is grown to some extent upon the river terraces and bottom lands and in some cases makes good yields, but the average for the county is very low. The sandy land produces very poor yields. A total of only 134 acres is reported in wheat in 1909.

By far the greater part of the hay used in the county is shipped in. The crops grown for hay or forage are cowpeas, sorghum, redtop, kafir, and the small grains, such as wheat, rye, and barley. Crimson clover is grown in a few places. The pastures include

mainly Bermuda grass and wild grasses, which grow luxuriantly on the bottom lands and sparsely on the uncultivated sandy uplands. Broom sedge is a common growth in the old fields, and it is found also in the open woods. Lespedeza does well on the moist soils, such as those of the Congaree series.

Tobacco was introduced early in the history of the county, and was an important crop until about the time of the Civil War. A heavy export type was grown. Tobacco growing was confined to the northern part of the county, along the North Carolina State line. The industry declined as cotton became important, but within recent years the crop has been receiving increasing attention. It is grown mainly in the southern part of the county and marketed at Hartsville and Society Hill. An effort has been made to establish the industry around Cheraw, and the planters in the vicinity agreed to plant about 600 acres in 1914. The Carolina bright tobacco is the most popular. Six hundred to 1,000 pounds per acre of a tobacco fertilizer, usually of high grade, is used. Some growers use an 8–4–4 mixture, preferring to purchase one brand of fertilizer for use on all crops. Tobacco yields range from 400 to 1,200 pounds per acre.

Vegetables are grown chiefly in garden patches for home use. Truck crops have never been grown for shipment. Melons and strawberries are the garden products most extensively grown.

The peach is the only fruit produced on a commercial scale. There is only one orchard covering as much as 100 acres, although there are a number of smaller ones in the county, mainly on the Norfolk sand, loamy sand, or sandy loam. There are several small orchards in the vicinity of McBee and these receive excellent care. The leading variety of peach is the Elberta. Peaches, apples, and plums are grown in most of the home orchards. The summer varieties are about the only apples grown.

Blackberries and dewberries grow wild in nearly all parts of the county. Berry growing is developed to some extent in North Carolina on soils similar to those in this county.

Grapes are grown to a small extent. The Niagara, Catawba, and Concord, as well as the Scuppernong, do well.

Pecans are about the only nuts produced commercially.

Stock raising is not a very important industry. The attention of the farmers is given to the production of cotton rather than the growing of stock feeds, and the cattle tick quarantine in force has a tendency to discourage the raising of cattle.

Practically all the horses and mules used are imported into the county. A few sheep and goats are raised, but herding is of little importance. Milch cows are kept by most of the farmers and several small dairies are located near Cheraw, furnishing milk for the local markets.

Poultry is kept on nearly all the farms, but poultry products are not shipped out of the county, the supply being hardly adequate to meet the local demand.

The systematic rotation of crops receives but little attention in Chesterfield County. Some of the best farmers use cowpeas with corn, planting them at the last cultivation of the corn, following the next season with oats, with cowpeas planted after the oat crop is harvested, while cotton follows the third season.

As a rule the land is broken to an average depth of about 4 inches. The best farmers break the land to a depth of 6 or even 8 inches. In practically all cases one-horse plows are used. Some improved plows are used, but very few cultivators, sulky plows, or other labor-saving devices. The cultural implements in general use are turn plows, of varying weights, but usually light; dixie plows, shovel plows, scooters, bull-tongues, middle-busters, sweeps, cut-away and disk harrows, and side harrows or cultivators, with a few corn cultivators. On the better farms and on river-terrace soils and heavy land the plows are generally heavier, and plows requiring double draft are coming into more common use.

Commercial fertilizers are in general use. As a rule they are applied in large quantities for all the crops grown.

The fertilizers in general use are complete 8–4–4, 8–3–3, or 8–2–2 mixtures, the 8–3–3 predominating. Nitrate of soda, kainit, cotton-seed meal, and acid phosphate are also applied. Other fertilizers are used to a very small extent. Most of the fertilizer is bought ready-mixed and only a few farmers buy the ingredients and prepare the mixture on the farm.

Four hundred to 1,200 pounds per acre of a complete fertilizer is used for cotton. Complete fertilizer, or phosphate, is sometimes used on oats and wheat. Nitrate of soda is used as a top dressing on oats in the spring. In growing corn by the Williamson method or some modification of it, half the fertilizer is applied before planting, the other half being used as a side dressing after the plants are about knee-high. Nitrate of soda at the rate of 100 to 250 pounds per acre is usually applied as a top dressing at the last cultivation. The total expenditure for fertilizer in Chesterfield County in 1909 is reported as $398,623.

Lime is used to a very small extent. It is needed mainly on soils which have been subjected to poor drainage conditions and are sour, and on the heavy soils.

The sandy soils which have been cultivated for some time and the unimproved heavy soils are in need of organic matter.

Of the total area of Chesterfield County, 69.4 per cent is reported in farms and 29.4 per cent in improved lands by the census of 1910. The average size of farms is given as 105.7 acres and the average

number of improved acres per farm as 31. The average value of land in the county is reported as $11.97 per acre. Slightly less than one-half the farms are operated by the owners and the remainder mainly by tenants. In renting the land under the share system the common practice is for the owner to furnish the fertilizers and the tenant the tools, stock, and labor, each receiving one-half of the crop. Most of the farms in the Sand Hill region are worked directly by the owners or tenants and most of the farmers are white, while in the Piedmont section many of the farms are operated by the owner with negro labor and the remainder of the land is rented, largely by white owners to negro tenants. Around Cheraw and along the Peedee River the farms are large and are operated in many cases on a large scale with negro labor. On the cash basis, improved land rents for $5 to $10 per acre, although much of the land in the Sand Hill belt and in the Piedmont rents for $3 to $5 per acre.

Labor is usually scarce, the laborers being attracted to logging camps, brick works, lumber mills, and railroads by better wages. Improved machinery can not be used in many cases because the class of labor available is not capable of handling it.

A very small part of the county is in need of artificial drainage in order to be made suitable for crop production. A large total area could be improved by drainage, but in most cases this is easily provided by the construction of open ditches. The drainage of some of the swampy areas requires a larger expenditure than seems justifiable under present conditions.

Erosion is active in some of the more rolling or hilly areas, resulting in serious damage.

SOILS.

The soils of Chesterfield County fall into four natural divisions—upland soils derived from unconsolidated beds of sand and clay, upland soils derived by weathering from consolidated rocks such as slate and granite, first-bottom alluvial soils subject to frequent stream overflow, and second-bottom, old alluvial soils lying above overflow.

The soils are grouped into series, each series comprising soils having the same range in color, subsoils similar in color and structure, a common or similar origin, and, broadly, the same type of relief and drainage. The series are divided into types, according to texture, based upon the proportion of the various grades of sand, gravel, silt, and clay. In such miscellaneous types as Meadow the soils can not be separated on the basis of texture. Thirty-two soil types, representing 19 series, and 5 miscellaneous types are mapped in Chesterfield County.

The upland sandy soils, including the sandy loams, cover about 60 per cent of the area of the county; the upland clay soils cover about 25 per cent, the terrace soils about 5 per cent, and the first-bottom soils about 10 per cent.

The principal agencies that have acted upon the upland material to give rise to the various upland soils are weathering, including solution and chemical change, and the accumulation of organic matter. In the well-drained and well-aerated soils and subsoils the iron constituent has been well oxidized, giving the soil a reddish color. Where oxidation is less complete varying shades of red and yellow are found in the soil, according to the degree of oxidation reached The soils subject to poor drainage conditions have experienced a process of deoxidation, or, at least, have not been well oxidized. They have a drab or mottled color. The dark color of the surface soils is due to the accumulation of organic matter. These conditions tend to develop an acid or sour soil.

The terrace soils suffer very little from erosion. The changes taking place in them are much the same as those effected in the soils of the more nearly level uplands. The bottom-land or overflowed soils show very little effect of the action of the usual soil-forming agencies. Their material is being altered and built up continuously by overflows.

The following table gives the name and the actual and relative extent of each of the soils mapped in the county:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Norfolk sand	41,984	38.2	Cahaba loamy sand	1,600	0.3
Sandhill phase	153,472		Norfolk gravelly sand	1,408	.3
Norfolk sandy loam	47,936	21.1	Kalmia fine sandy loam	1,408	.3
Rolling phase	59,840		Altavista silt loam	1,408	.3
Georgeville clay loam	39,360	7.7	Portsmouth sandy loam	1,216	.2
Meadow	17,920	3.5	Norfolk fine sandy loam	1,152	.2
Norfolk loamy sand	17,536	3.4	Muck	1,152	.2
Swamp	16,768	3.3	Cahaba sandy loam	896	.2
Alamance clay loam	16,384	3.2	Okenee loam	896	.2
Ruston sandy loam	14,656	2.9	Orangeburg sandy loam	768	.1
Congaree silt loam	14,464	2.8	Kalmia coarse sand	704	.1
Kalmia sandy loam	12,672	2.5	Congaree loamy fine sand	704	.1
Congaree silty clay loam	12,096	2.4	Okenee sandy loam	640	.1
Cecil coarse sandy loam	8,576	1.7	Rough stony land	512	.1
Hoffman sandy loam	6,912	1.3	Thompson fine sandy loam	384	.1
Bradley sandy loam	5,376	1.0	Leaf silt loam	192	.1
Ruston gravelly sandy loam	2,944	.6	Coxville loam	128	.1
Durham coarse sandy loam	2,432	.5	St. Lucie sand	64	.1
Cahaba fine sandy loam	2,432	.5			
Kalmia silt loam	1,728	.3	Total	510,720	

NORFOLK SERIES.

The soils of the Norfolk series have grayish surface soils and yellow, friable subsoils. They are derived from beds of unconsolidated sands and clays of the Coastal Plain. In general they are deficient in organic matter and respond readily to fertilization. Five members of the Norfolk series, the sandy loam, sand, loamy sand, fine sandy loam, and gravelly sand, are encountered in Chesterfield County.

NORFOLK SANDY LOAM.

The typical Norfolk sandy loam is a gray sand passing at about 5 inches into pale-yellow sand or loamy sand, which is underlain at 10 or 15 inches by a yellow, friable sandy clay. Frequently the upper subsoil for a few inches is a sandy loam or sandy clay loam. In places the clay is 20 inches or more below the surface. The texture in many places ranges to coarse sandy loam, but no separation of the coarse areas is attempted, owing to their intricate association with the typical soil and the very slight agricultural difference between the two soils. The type also includes circular patches of Ruston sandy loam, particularly along stream slopes or on knolls and ridges.

The typical Norfolk sandy loam is extensively developed in the county, particularly in the northeastern part at and north of Cheraw and east of Chesterfield. Fairly large tracts are found in all parts of the county.

The surface is prevailingly flat to undulating. A part of the type is gently rolling, especially where streams have cut comparatively deep valleys. The topography throughout the type is favorable to cultivation and to the use of improved farm machinery, without danger of washing.

The principal crops grown are cotton, corn, oats, tobacco, and cowpeas. Cotton is the leading crop, and by far the greater part of the type is planted to cotton each year. Yields of about 1 bale per acre are obtained with the use of 600 or 800 pounds of an 8–4–4 or 8–3–3 grade of fertilizer.

This soil probably is better farmed than any other soil in the county and yields are correspondingly large. Many farmers are improving the soil by the use of stable manure and compost and by growing and turning under cowpeas. Crimson clover is grown to a greater extent on this soil than on any other. Oats produce fair yields, but are grown to only a small extent. They do not receive as much attention on this soil as on the adjoining Portsmouth soil. The tobacco-growing industry in the neighboring counties has been built up on this type of soil, and there is no apparent reason why the type in this county should be less productive of the leaf. In

different regions in all parts of the Coastal Plain crimson clover, vetch, cowpeas, soy beans, and velvet beans make good yields on this soil. In Chesterfield County cowpeas are grown more than any other of these crops. They are planted in the corn at the last cultivation and also sowed as a separate crop. The latter is the most common practice. The yield of hay ranges from 1 to 2 tons per acre.

Corn is grown by the Williamson method and yields 40 to 50 bushels per acre. Where corn is rotated with any of the legumes mentioned or where any of these crops are turned under to supply organic matter to the soil, corn has increased in yield, even where grown by the old methods.

A wide range of truck crops do well on this soil in many parts of the South, particularly in the Norfolk, Va., Charleston, S. C., Wilmington, N. C., and other trucking districts. The type is not used for this purpose in Chesterfield County. It is adapted to Irish and sweet potatoes, and strawberries, raspberries, dewberries, and blackberries would probably prove successful. Peaches, plums, and grapes do well.

The greater part of this type is cleared and under cultivation. The original forest growth consists of longleaf pine, oak, and dogwood. There is usually a heavy growth of wire grass in the forested areas.

The value of this land ranges from about $50 to $100 an acre, depending mainly on location.

Norfolk sandy loam, rolling phase.—The rolling phase of the Norfolk sandy loam differs from the main type principally in its more rolling topography. There is practically no difference in the Norfolk soil material, although the phase is less uniform, and the depth to clay is much more variable, ranging from about 8 to 30 inches. There are many variations in the soil caused by the occurrence of patches of other soils too small to be mapped separately. These included areas comprise a gray sand grading into yellow loamy sand or sandy loam and underlain by yellow stiff clay representing residual material, or consist of Norfolk sand, coarse sand, or coarse sandy loam, of Ruston sandy loam, coarse sandy loam, or coarse sand, or the Hoffman coarse sandy loam. Land of this phase has not been severely injured by erosion, although it is more subject to washing than the typical soil, particularly along stream slopes.

The rolling phase is prominent in the east-central part of the county, along the stream heads, or between the Norfolk sand and the stream valleys. It is also found in the southeastern corner and along Rocky and Big Sandy Creeks in the western part. The phase is admirably suited to brier fruits and peaches.

Agriculturally the phase is inferior to the more nearly level types and can be purchased for less than half the price, its value ranging from $15 to about $50 an acre.

NORFOLK SAND.

The surface soil of the Norfolk sand consists of a grayish, loose sand. This passes at 5 or 6 inches into a pale-yellow, loose sand which extends to a depth of 3 feet or more without change. Where the subsoil ranges to bright yellow there is usually more fine material present. These areas having a decidedly yellow or orange-yellow subsoil represent the Norfolk loamy sand. Some Norfolk loamy sand is included within the type as mapped. There are also included patches of Norfolk coarse sand, in which the material often contains small quartz gravel.

The surface configuration is undulating to gently rolling, with some fairly steep areas along stream slopes. It is much less rolling than the sandhill phase, yet more irregular than the Norfolk loamy sand. This type is most prominently developed in the northeastern part of the county and in more or less extensive areas about Pageland and Angelus.

Vegetables do well where either manure or commercial fertilizer is used. Watermelons and cantaloupes do well, but are grown to only a small extent. Where heavily fertilized the type is capable of producing good yields of cotton and the legumes, cowpeas, vetch, velvet beans, and soy beans, as well as fair yields of oats. Corn does well where grown under the Williamson method, producing about 30 to 40 bushels per acre. Cotton, with an application of about 800 pounds of an 8–3–3 fertilizer, produces one-half to 1 bale per acre, according to the season. The type is well suited to grapes, peaches, plums, and berries. The soil is low in organic matter and nitrogen.

The natural growth consists largely of longleaf pine, blackjack oak, and a fairly heavy growth of wire grass. The value ranges from about $20 to $50 an acre.

Norfolk sand, sandhill phase.—The sandhill phase of the Norfolk sand is characterized by its light-gray surface soil and its rolling, ridgy surface. The soil is prevailingly a light-gray, loose sand which passes quickly into pale-yellow or yellow sand. There are included many small bodies of Norfolk loamy sand, having a yellow or orange-yellow loamy sand subsoil. These can not satisfactorily be separated on the map from the loose sand, as they are patchy and irregular in occurrence and have a surface soil similar to that of the loose sand. This loamy sand is naturally more retentive of moisture and consequently a better soil.

The sandhill phase of the Norfolk sand occurs in extensive areas, and is the dominant soil over the wide belt of Sand Hill country occupying the greater part of the southern and central sections of the county. This sandhill phase comprises a section of the loamy Sand Hill belt, which extends from the vicinity of Loachapoka, Ala., across Georgia, South Carolina, and North Carolina into southern Virginia.

In Chesterfield County this soil is largely covered with scrub oak, principally blackjack, with some longleaf pine, and supports a scattered growth of wire grass. Clearings are being made here and there and the land put into cultivation, mainly to cotton. Recently the Sand Hill region has attracted considerable attention in the Carolinas, owing to the good yields of cotton made with liberal additions of commercial fertilizers, and a large number of farmers have moved into the belt from longer settled sections. Most of the settlements have been made upon the spots of other soil types scattered through the Sand Hill belt.

The Sand Hill section is sparsely settled, and large areas are uninhabited. The largest stretch of unoccupied land is in the vicinity of the King Sand Hills.

The sandhill phase of the Norfolk sand is suited to about the same range of crops as the typical soil, and is capable of the same improvement. The excessive drainage and droughty nature of the soil in the Sand Hill areas make crop yields uncertain, even in only moderately dry seasons.

Land of the sandhill phase ranges in price from $1 to $15 an acre.

NORFOLK LOAMY SAND.

The Norfolk loamy sand is a grayish sand or slightly loamy sand, underlain at about 5 inches by a pale-yellow sand or loamy sand which grades into yellow or orange-yellow loamy sand. The yellow loamy sand of the subsoil carries enough clay to render the moist material sticky when compacted. The type is scattered over the Sand Hill region. It has its largest development in the vicinity of McBee.

The surface is characteristically flat, but some areas in the Sand Hills are sloping and rolling. The soil is more retentive of moisture than the loose Norfolk sand, and is somewhat more productive. A number of small patches of this soil are included with the Norfolk sand on the map.

This soil from an agricultural standpoint is considerably better than the Norfolk sand or its sandhill phase, owing to its level topography, its moisture-retaining capacity, the small quantity of clay material present, and the ease with which it can be improved.

On new land good crops of cotton are produced with the use of very small quantities of commercial fertilizer. Cotton, in seasons of normal rainfall, produces about three-fourths to 1 bale per acre with the use of 800 to 1,000 pounds of an 8–3–3 fertilizer. Corn grown under the Williamson method produces about 40 to 50 bushels per acre. Cowpeas, vetch, and velvet beans are exceptionally good crops, and they leave the soil in good condition. Sweet potatoes do particularly well on this soil. It is well suited to the production of light truck crops, especially melons and cantaloupes, while strawberries, blackberries, raspberries, dewberries, and grapes succeed. The soil is probably better suited to peaches than to any other fruit. There are a few small, well-kept orchards upon the type.

The natural growth consists of scrub oak and blackjack oak, slightly larger than those in the Sand Hill belt, with some longleaf pine. The surface is covered with a thick growth of wire grass.

The value of land of this type varies widely, according to location and improvements, and ranges from $15 to $65 an acre.

NORFOLK FINE SANDY LOAM.

The Norfolk fine sandy loam, as mapped in this county, is a gray loamy fine sand, underlain at about 5 or 6 inches by a pale-yellow fine sandy loam, which quickly passes into yellow fine sandy clay. In places the soil contains a noticeable quantity of silt, approaching a silt loam in texture in the more nearly level areas.

This soil is developed in rather small areas along creek valleys in the northeastern part of the county.

The Norfolk fine sandy loam is adapted to about the same range of crops as the sandy loam. It is a slightly stronger soil, producing the same yields as the sandy loam with less fertilizer. However, it requires more care in preparation and can not be plowed so soon after a rain as the sandy loam, especially where the clay is near the surface. The incorporation of organic matter by turning under cover crops is needed more than on the other Norfolk types to improve the structural conditions and make cultivation easy.

Most of the land is cleared and under cultivation. The natural growth consists of longleaf pine and oak, with some hickory and dogwood.

The value of this land ranges from about $50 to $75 an acre.

NORFOLK GRAVELLY SAND.

The Norfolk gravelly sand is a gravelly coarse sand which is difficult to penetrate to any considerable depth with a soil auger. The gravel constitutes as much as 50 per cent or more of the soil mass

in places, and consists of white, rounded quartz pebbles ranging up to an inch or more in diameter. The sand is yellowish and mainly of coarse texture. In places sandy clay is reached within 3 feet of the surface, and this is usually reddish, like the subsoil of the Ruston types.

This type occurs on knolls and slopes. It is most prominently developed along the bluffs of the Peedee River bottoms.

The land is mainly covered with scrub oak and longleaf pine. It is of little agricultural value and very little of it is used for crop production. The soil is very porous, and water percolates through it so readily as to preclude good results with crops. In addition, it is too gravelly to permit easy cultivation.

Ruston Series.

The Ruston soils have gray to grayish-brown surface soils with reddish-yellow or yellowish-red to dull-red, friable subsoils. They have been derived by weathering from unconsolidated beds of sand and clay and occur only in the Coastal Plain. They are intermediate in color or in stage of oxidation between the Norfolk and Orangeburg series. They occupy upland areas and have a rolling topography and excellent drainage. The Ruston sandy loam and gravelly sandy loam are mapped in this county.

Ruston sandy loam.

The typical Ruston sandy loam is a grayish loamy sand, grading at a depth of about 5 inches into a yellowish sandy loam which is underlain at about 8 to 12 inches by reddish-yellow to yellowish-red or dull-red, friable sandy clay. There are some included patches of Orangeburg sandy loam, Norfolk sandy loam, and Bradley sandy loam, which are too small to be shown on the soil map. Some small areas of coarse sandy loam also are included with this type.

The Ruston sandy loam occurs in relatively small areas in nearly all parts of the county, the largest developments being at Chesterfield, south of McBee, and in the south-central part.

Agriculturally the type is intermediate between the Orangeburg and the Norfolk; it is slightly stronger than the Norfolk and not quite so productive as the Orangeburg.

The topographic features of the type vary considerably. The surface is largely level to gently rolling, as in the areas at Chesterfield, while other areas are rolling, as those along the slopes of streams, especially along the escarpment of the Lynches River. These more rolling areas are of much lower agricultural value than the level stretches, and are more or less subject to erosion.

Cotton, with liberal applications of fertilizer, yields about one-half to 1 bale per acre, and corn about 20 to 50 bushels per acre. Oats do fairly well, but are grown to only a small extent. Tobacco is grown in small fields in the southwestern part of the county and gives fair returns, but this type is not quite so well suited to tobacco as is the Norfolk sandy loam.

Leguminous crops such as crimson clover, bur clover, vetch, and cowpeas do well. They are grown in a small way and are very beneficial in building up the soil. The fruits, including berries, common to this section do fairly well. The common vegetables are grown in gardens on practically all the farms. Irish and sweet potatoes should prove profitable where markets are readily available. The forest growth consists of longleaf pine, oak, hickory, and dogwood.

Land values vary widely, depending on topography and location, and range from about $25 to $100 an acre.

RUSTON GRAVELLY SANDY LOAM.

The Ruston gravelly sandy loam consists of a gray gravelly sand, passing into a pale-yellow gravelly sand or gravelly loamy sand, which is underlain at variable depths by reddish-yellow to yellowish-red sandy clay or coarse sandy clay.

The gravel consists of quartz, and is present in sufficient quantities to interfere somewhat with cultivation. The type occurs on ridges, slopes, and hillocks, and along the hill slopes bordering the larger streams. It is not very extensive and is found in the northeastern and southeastern parts of the county. The topography in general is too uneven for successful agriculture.

This is not a very valuable soil, but a large proportion is under cultivation. Cotton is the principal crop grown, and some corn is produced. The more gently sloping areas produce fair yields of both.

Berries and grapes do well. The tree growth is largely longleaf pine, oak, and dogwood.

ORANGEBURG SERIES.

The Orangeburg soils are gray to reddish in color; the subsoils are red in color and friable in structure. These soils occupy well-drained, well-aerated uplands of level to gently rolling topography. They are derived from unconsolidated beds of sand and sandy clay and are found only in the Coastal Plain. In Chesterfield County this series is represented by a single type, the Orangeburg sandy loam.

ORANGEBURG SANDY LOAM.

The Orangeburg sandy loam consists of a grayish loamy sand passing into yellowish or reddish sandy loam, which is underlain at

8 to 15 inches by red, friable sandy clay. Along eroded slopes, where the clay is near the surface, the surface soil is reddish in spots.

This type is inextensive, and is encountered in only a few small areas, the largest near Chesterfield, Ruby, White Plains, and Jefferson.

The Orangeburg sandy loam is the strongest upland soil in the county. It is adapted to a wide range of crops, and produces well with light applications of fertilizer. Cotton yields 1 bale to the acre with very little fertilization. Corn yields 40 or 50 bushels per acre and oats give heavy yields. Wheat also does well. Crimson clover, vetch, and cowpeas are widely grown throughout the Coastal Plain on this soil. They not only yield well, but improve the soil. The soil is best suited to general farming, stock raising, or dairying. Although vegetables do well in gardens, commercial trucking is not engaged in. Tree fruits do fairly well, and the brier fruits and strawberries are successful. The soil can be made very productive by proper management.

The natural forest growth is cleared from practically all the type. It formerly supported a heavy growth of longleaf pine, oak, hickory, poplar, and dogwood. The latter is very much in evidence, and is usually considered indicative of strong land. The value of this land ranges from $75 to $100 an acre.

Bradley Series.

The soils of the Bradley series are gray in color and consist of Coastal Plain material forming a mantle over a subsoil of reddish-brown to red Piedmont material. In this county the Bradley soil is derived largely from red slate of the Carolina slate formation. The sandy loam is the only type of the Bradley series recognized in this county.

BRADLEY SANDY LOAM.

The Bradley sandy loam consists of a grayish sand, grading into a yellowish sand or loamy sand which is underlain at 8 to 15 inches by red, stiff clay, similar to the subsoil of the Georgeville clay loam.

The type occupies gently rolling areas in the northwestern part of the county, along the boundary between the Coastal Plain and Piedmont. Other larger areas lie north and south of Chesterfield and along Fork and Rocky Creeks.

This is a fairly strong soil, and good yields are produced with smaller applications of fertilizer than are required on most of the soils of the county. Cotton, corn, oats, and cowpeas are the principal crops, with cotton occupying by far the greater acreage. Apples, peaches, plums, grapes, and the brier fruits all do fairly well.

The forest growth consists of shortleaf pine, oak, hickory, and dogwood. Land values range from about $25 to $50 an acre.

Hoffman Series.

The soils of the Hoffman series are gray, with mottled gray, pink, and red compact subsoils. They occur on low, rounded hills, slopes, and ridges scattered through the Sand Hill belt of the Coastal Plain. The Hoffman series is represented in this county by only one type, the sandy loam.

HOFFMAN SANDY LOAM.

The soil of the Hoffman sandy loam is a gray sand, grading quickly into a pale-yellow coarse sandy loam. The subsoil, beginning at depths of 8 to 15 inches, is a pinkish-red sandy loam to coarse sandy clay, usually mottled at lower depths with purplish, whitish, yellowish, and red colors. The lower subsoil and substratum are generally very compact or weakly cemented. Much of the type contains quartz gravel, and platy fragments of ferruginous sandstone are usually present on the surface. Small areas of Hoffman coarse sandy loam are scattered irregularly throughout the type. In some larger areas also the soil approaches a coarse sandy loam in texture. Near Hershey Mill there is a small area in which the coarse material approaches gravel.

This type occurs mainly on slopes, knolls, and ridges. It is found in scattered small areas in nearly all parts of the county, but is most prominently developed in the western part, especially along the slopes of Lynches River between Big Sandy and Cedar Creeks.

The soil has a low agricultural value, although a large part of it is cleared and cultivated. Cotton is about the only crop grown. It yields about one-half bale per acre where large quantities of commercial fertilizer are used. Cultivation is difficult where the surface sandy layer is thin, the subsoil being heavy and tenacious in places, and if plowed in a wet condition the material has a tendency to become compact.

Erosion is active over most of the cleared areas of the soil, and unless terraced the surface material is soon removed, leaving the loose clay exposed on gullied hillsides. Bermuda grass should prove very effective in checking the erosion. Liming is beneficial. The natural growth is largely pine, oak, and dogwood.

The value of this type ranges from about $5 to $25 an acre. It is usually sold in connection with other soils.

Portsmouth Series.

The Portsmouth soils are dark gray to black, and the subsoils are gray, mottled with drab and yellow, and slightly plastic and sticky.

These soils occupy low, flat areas or depressions in the Coastal Plain, occurring mainly along its seaward border. The sandy loam is the only member of the Portsmouth series recognized in Chesterfield County.

PORTSMOUTH SANDY LOAM.

The typical Portsmouth sandy loam is a black sandy loam having a large content of decaying vegetable matter, and underlain at any point from 6 to 20 inches below the surface by dark-gray to light-gray sandy clay loam or sandy clay, which quickly passes into light-gray sandy clay, usually mottled with yellow. There are some patches of Portsmouth loam in the lower situations, especially along the drainage ways. Also in some of the areas reddish mottlings occur in the lower subsoil. Along the outer edge, particularly where the land has been under cultivation for some time, the surface color is usually lighter, being gray or dark gray.

The type occurs in flat depressions having poor drainage. The areas are small and mainly surrounded by Norfolk sandy loam. Tracts of the Portsmouth sandy loam appear west of Cheraw, east of White Plains, and also in the southern part of the county.

The greater part of the type is covered with shortleaf pine and sweet and black gum. In places the land has been ditched and put into cultivation, mainly to oats and corn, which seem to give the best results. Applications of lime have proved beneficial on this soil.

Corn yields about 25 to 30 bushels per acre. Oats probably give better results on this soil than on any other type in the county. Nitrate of soda is generally used as a side dressing for corn and as a top dressing for oats, but in much lighter applications than are usually made on other soils.

Where thoroughly drained and limed this soil is adapted to a wide range of crops, and is capable of producing good yields of nearly all the crops grown on the adjoining Norfolk soils, with the exception of the legumes. The very moist condition of this soil, even where a drainage system has been installed, is unfavorable to leguminous crops.

The type furnishes good grazing and a part of it is in pasture. On account of its position a sod will remain green long after grass on higher ground has been dried. Good forage crops can be produced.

COXVILLE SERIES.

The soils of the Coxville series are gray or dark gray to brown in color, and the subsoils are mottled gray, drab, yellow, and red, and very plastic. These soils occupy flat, poorly drained areas in the Coastal Plain. The series is represented in Chesterfield County by a single type, the Coxville loam.

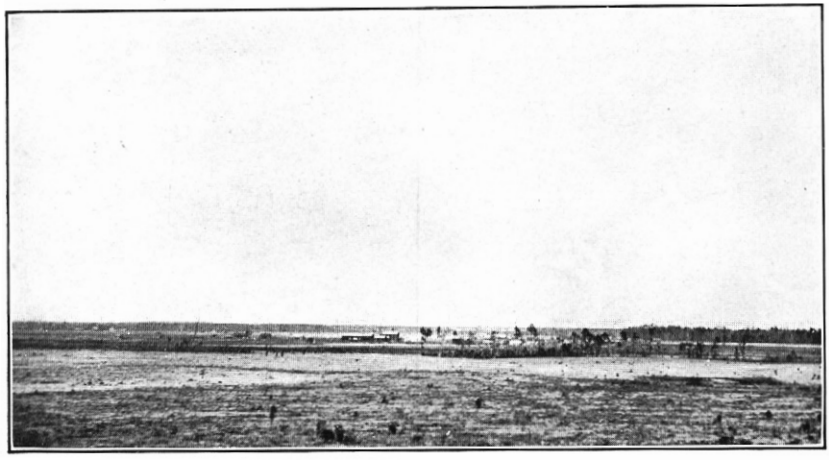


FIG. 1.—SCENE NEAR MONTROSE, SHOWING TOPOGRAPHY OF TERRACE SOILS, CHIEFLY THE KALMIA SANDY LOAM.

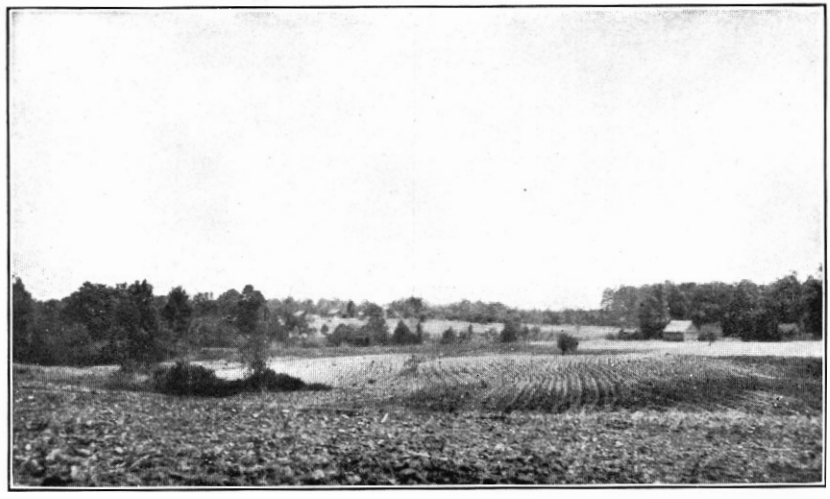


FIG. 2.—CHARACTERISTIC TOPOGRAPHY OF THE GEORGEVILLE CLAY LOAM.

COXVILLE LOAM.

The Coxville loam is a rather variable soil as mapped, consisting chiefly of loam and fine sandy loam, the loam predominating. The type is prevailingly a dark-gray loam, grading into grayish sandy clay loam, and this into a gray, tough, plastic clay, with yellowish and red mottlings in the lower part. In the higher situations areas of fine sandy loam occur, the material consisting of grayish fine sandy loam, grading through yellowish or mottled yellowish and grayish fine sandy loam or sandy clay loam into mottled yellowish, grayish, and reddish stiff clay. Some dark-gray silt loam is encountered immediately along the streams that rise in or flow through this type.

The type occurs mainly in poorly drained depressions or flats, and is very inextensive. It is largely forested with pine, sweet gum, and black gum. By ditching it can be converted into a fair oat, corn, and forage-crop soil. Applications of lime at the rate of about a ton per acre are beneficial to drained areas. Very little of this soil is cleared and cultivated. A small acreage is in pasture and furnishes fair grazing even in dry seasons.

The value of this land is high, on account of its location with respect to the town of Cheraw.

KALMIA SERIES.

The surface soils of the Kalmia series are gray to yellowish gray and the subsoils yellow with occasional mottlings of gray in the lower parts. These soils are the counterpart of the Norfolk soils, occurring on the smooth river terraces within the Coastal Plain. In Chesterfield County four members of the Kalmia series are encountered—the sandy loam, coarse sand, fine sandy loam, and silt loam.

KALMIA SANDY LOAM.

The Kalmia sandy loam is a gray sand, underlain at 2 or 3 inches by a pale-yellow sand or loamy sand, which in turn passes at about 8 to 20 inches into yellow, friable sandy clay. Gray mottlings are not uncommon in the more poorly drained situations.

This type occurs on practically level stream terraces or "benches." It is prominently developed near the Peedee River and the other large streams in the county, and is the most widely distributed of the terrace soils. (See Pl. I, fig. 1.)

The Kalmia sandy loam is adapted to a wide range of crops. It is suited to practically all the crops grown upon the Norfolk sandy loam and requires about the same treatment. It is well suited to the growing of tobacco, and a large part of the tobacco grown in the

county is produced on this type. Eight hundred to 1,000 pounds of fertilizer is used per acre, and a yield of about 1,000 pounds is obtained. The leguminous crops, such as crimson clover, bur clover, and Japanese clover, cowpeas, vetch, and velvet beans, are suited to this soil. Brier fruits and strawberries do well. The location of the type is not favorable to the production of tree fruits. Nevertheless, small orchards for home use are successful.

The natural growth consists of pine, oak, sweet gum, poplar, and dogwood. Nearly all the type has been cleared.

Land of the Kalmia sandy loam type is valued at $50 to $75 an acre.

KALMIA COARSE SAND.

The soil of the Kalmia coarse sand is a gray, loose coarse sand 5 or 6 inches deep, and the subsoil is a pale-yellow coarse sand.

This type occurs on stream terraces, largely along Big Black Creek. It occupies swells or ridges on the terraces, a position analogous to that of the Norfolk sand on the upland. As mapped the type includes small areas of Kalmia sand.

The Kalmia coarse sand is suited to the same range of crops as the sandy loam, but it is not quite so strong a soil and requires more fertilization. It is inclined to be droughty and much less productive in dry seasons than the sandy loam type: It is well suited to melons, light truck crops, vetch, and velvet beans.

The original growth consists of pine, oak, sweet gum, and dogwood. This type ranges in value from about $35 to $50 an acre.

KALMIA FINE SANDY LOAM.

The Kalmia fine sandy loam is a grayish fine sand to fine sandy loam, underlain at a few inches by pale-yellow loamy fine sand. At about 8 to 15 inches a yellow fine sandy clay, often mottled in the lower part with shades of yellow and with gray, is encountered.

The type occurs on stream terraces as practically level land. It is very inextensive. It is developed in scattered areas on the second bottoms of the larger streams, particularly the Peedee River. The soil is fairly well drained. Only occasional spots require artificial drainage, and these, with reclamation, are as productive as the remainder of the type. A little more care is required in plowing this soil than is necessary with the sandy types, as there is a tendency toward the forming of clods where plowed too wet. The type is in need of lime and organic matter.

The Kalmia fine sandy loam is fairly well suited to such crops as cotton, corn, oats, wheat, sorghum, cowpeas, and soy beans. Irish and sweet potatoes would probably do well under good management, but these crops receive little attention. Truck crops, such as cab-

bage, beans, etc., do well, but are not grown commercially. Tobacco makes a good growth, and produces about the same yields as on the sandy loam type.

The fertilizer requirements of this soil are about the same as those of the sandy loam. Where lime and organic matter are added, the soil produces better crops with less commercial fertilizer. This land ranges in value from about $35 to $65 an acre.

KALMIA SILT LOAM.

The soil of the Kalmia silt loam is a gray or brownish-gray silt loam, passing at about 5 inches into pale-yellow silt loam. The subsoil, beginning at about 10 or 12 inches, is a yellow, moderately friable silty clay, carrying considerable fine sand and some mica flakes, mottled in the lower part with yellowish and grayish colors, and having a stiff structure.

The type occurs as second-bottom or terrace land, and is scattered in small areas over parts of the Peedee River bottoms not subject to overflow.

This soil requires considerable care in handling. It clods where plowed too wet, and remains wet and "cold" late in the spring. A good plan is to put in winter wheat or oats, so that there may be a growing crop in the spring. The soil is low in both organic matter and lime.

The topography is comparatively level, but drainage is fairly well established. The original forest growth consisted of pine, oak, sweet gum, poplar, and sycamore. The greater part of the type is cleared and under cultivation.

Cotton and corn do only fairly well, as the type does not respond so readily to commercial fertilizers as the lighter soil types. Such crops as wheat and oats do well; the type is probably the best wheat soil in the county. Where organic matter is turned under and a good soil formed a large number of crops, including potatoes and other vegetables, and leguminous crops, which under present conditions are not grown and do not succeed, can be successfully produced. Cowpeas are beneficial in building up the soil. In its present condition of low organic-matter and lime content the crops on this soil can not make use of the commercial fertilizer applied, and the yields are poor, even where relatively large quantities are used. The value of land of this type ranges from $35 to $50 an acre.

ALTAVISTA SERIES.

The soils of the Altavista series are gray, overlying subsoils of yellow to mottled yellow and gray or yellow, gray, and red. In texture the subsoil is as heavy as or heavier than the soil. These soils occur on stream terraces within the Piedmont Plateau or within the

Coastal Plain along streams issuing from the Piedmont. The topography is smooth. The silt loam is the only member of this series encountered in Chesterfield County.

ALTAVISTA SILT LOAM.

The Altavista silt loam consists of a grayish silt loam, underlain by pale-yellow silty clay loam to silty clay, which is somewhat compact, and inclined to be plastic when wet, though friable when dry.

This type occurs on small stream terraces in the northwestern part of the county, and is derived almost wholly from Piedmont soils, Alamance material predominating. The topography is level or nearly level. The drainage as a rule is fairly well established, but where large level stretches occur the drainage is poor and drab mottlings sometimes occur in the deep subsoil. The soil of the better-drained areas is sometimes yellowish brown in color.

The Altavista silt loam is a fair oat, wheat, corn, and grass soil.

The soil is difficult to handle. It remains "cold" and damp late in the spring, and where plowed in a wet condition clods are formed, resulting in impairment of the soil which requires several seasons to overcome. The soil is in need of lime in heavy applications and is low in organic matter. Where these elements are supplied good crops are possible with the use of very little commercial fertilizer.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Altavista silt loam:

Mechanical analyses of Altavista silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
242345	Soil	0.3	1.2	0.8	4.8	9.6	66.5	16.6
242346	Subsoil	.1	.6	.3	3.3	8.4	59.6	27.5

OKENEE SERIES.

The surface soils of the Okenee series are dark gray to black; the subsoils are gray or drab, mottled with yellow. The soils of this series occur on terraces along rivers of the Coastal Plain, and have a level topography and poor drainage. In some cases the surface soils contain enough organic matter to make them somewhat mucky. The subsoils are usually water-logged. The Okenee loam and sandy loam are mapped in Chesterfield County.

OKENEE LOAM.

The Okenee loam is a black, mucky loam, underlain at about 10 to 24 inches by dark-gray to gray sandy clay. This soil occurs in

poorly drained flats and depressions on stream terraces, along Thompsons Creek and the Peedee River near Cheraw and Montrose. With the establishment of good drainage, which can be accomplished by ditching, corn and oats give good results. Applications of lime or ground limestone increase the productive capacity of such land, but it is generally useless to add lime before good drainage is effected.

A part of the type is cleared and drained, and both corn and oats yield well without fertilization. The use of commercial fertilizer on this soil is not considered profitable. The Okenee loam is suited to such truck crops as onions, lettuce, celery, tomatoes, and beans, and to sorghum and forage crops.

This land is held at about $35 to $50 an acre It should bring a higher price when improved, but there is little demand for land that is not suited to cotton.

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

Mechanical analyses of Okenee loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
242315	Soil	2.4	6.0	3.5	12.5	12.3	45.5	17.4
242316	Subsoil	1.2	4.3	3.2	10.8	12.8	39.2	27.7

OKENEE SANDY LOAM.

The Okenee sandy loam is a black sandy loam, underlain at 6, 8, or 10 inches by a grayish sandy loam which passes into light-gray, somewhat sticky and plastic sandy clay, mottled in places with yellow. Small areas of coarse sandy loam and fine sandy loam are included in the type as mapped. These do not affect its agricultural value.

This type occurs on stream terraces in very poorly drained situations. It is encountered in small areas on the terraces of the larger streams.

Small areas of the type are under cultivation. The principal crops are corn and oats. This soil is adapted to the same crops as the loam type, and furnishes good grazing. It is easier to cultivate than the silt loam, on account of the smaller percentage of clay material in the surface soil. This soil is in need of artificial drainage and liming. The natural growth consists largely of pine and sweet gum. Land values range from $25 to $50 an acre.

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

Mechanical analyses of Okenee sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
242347	Soil	3.7	21.9	12.6	27.8	6.8	13.1	14.0
242348	Subsoil	3.8	18.2	12.0	24.1	5.7	11.8	24.2

LEAF SERIES.

The surface soils of the Leaf series are light gray to gray. The subsoils characteristically consist of gray or mottled gray and yellow, compact silty clay, which grades downward into mottled red and gray or red and yellow, plastic clay, through which water and air pass with difficulty. Iron concretions are common on the surface. These soils are developed on stream terraces in the Coastal Plain region. The series is represented in Chesterfield County by a single type, the Leaf silt loam.

LEAF SILT LOAM.

The Leaf silt loam is a grayish silt loam passing quickly into pale-yellow to bright-gray silt loam, underlain at about 6 to 10 inches by mottled yellow and gray clay, which in the lower part is stiff and plastic and mottled yellow, gray or drab and red and yellowish red. In places very little yellow is seen in the subsoil, the color being light gray or drab, mottled faintly with red. This difference is due largely to drainage conditions, the yellow being present in the higher, better drained areas. The texture ranges in places to a loam.

The type occupies stream terraces and has a fairly level topography. It occurs in the bottoms of the Peedee River not subject to overflow in a few small, scattered areas south of Cheraw. Very little of the type is under cultivation. Wild grasses afford good grazing where the land is properly cleared and drained. The original forest growth consists of pine, oak, and sweet gum.

Where drained, limed, and well supplied with organic matter good crops can be grown, but in its present condition it produces low yields. Agriculturally, the type has a low value. It is very difficult to cultivate, requiring considerable treatment to bring it into proper condition for a seed bed; it is more difficult to handle than the Kalmia silt loam.

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

Mechanical analyses of Leaf silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
242319	Soil	1.7	7.7	5.0	12.8	10.2	46.0	16.4
242320	Subsoil	1.8	5.8	4.3	11.0	9.4	38.5	28.6

St. Lucie Series.

The St. Lucie soils are characterized by their white (snow white) color, loose structure, and extremely droughty nature. These soils consist of almost pure quartz sand, free of vegetable matter, and without the hardpan layer of the Leon series, although similar hardpan material may be found in the deep substratum. The surface is flat to gently rolling, and hummocky and ridgy. The more rolling areas are probably wind-blown in origin. The series is always noticeably elevated above associated flatwoods soils. In this survey the sand type is mapped.

ST. LUCIE SAND.

The St. Lucie sand is a white, loose, incoherent sand, showing practically no change within the 3-foot section. It occurs in stream bottoms in situations above overflow. While this is not strictly representative of the St. Lucie position, the material so closely resembles the St. Lucie in character that it is included with that series. The natural growth consists of some scrub water oak; aside from this the surface is barren. The type has practically no agricultural value.

Thompson Series.

The soils of the Thompson series are gray to grayish brown, with subsoils of yellow, showing mottlings of gray and shades of yellow and brown in the poorly drained areas, which usually occupy swales adjoining hill land. The subsoil is friable. It is slightly plastic in the heavier, poorly drained areas. These soils are developed in first bottoms along streams in the Coastal Plain region and are subject to overflow. They are mainly fairly well drained. The fine sandy loam is the only member of this series recognized in Chesterfield County.

THOMPSON FINE SANDY LOAM.

The Thompson fine sandy loam is a grayish, slightly compact fine sandy loam, underlain at about 8 or 10 inches by a yellowish, friable fine sandy clay.

The type occupies first bottoms and consists largely of alluvium derived from Coastal Plain soils. It is developed along the Lynches

River and tributary streams and has a relatively small total area. It is subject to overflow, but in normal years can be cultivated. It is suited to about the same range of crops as the Congaree soils, including corn, oats, sorghum, forage crops, and grass.

The natural growth is sycamore, elm, maple, sweet gum, and black gum. The type is unimportant in Chesterfield County.

In the following table the results of mechanical analyses of samples of the soil and subsoil are given:

Mechanical analyses of Thompson fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
242340.....	Soil.....	0.1	1.0	1.1	19.4	31.3	36.6	10.5
242340a.....	Subsoil.....	.1	.4	.7	22.7	35.7	30.8	9.1

ALAMANCE SERIES.

The soils of the Alamance series are gray in color; the subsoils are yellow and free from mottling. Fragments of the parent slate are scattered over the surface throughout the soil section. These soils occur in the Piedmont Plateau as a belt extending across the State of North Carolina and into South Carolina. The topography is smooth to rolling. The Alamance series is represented in this county by a single type, the clay loam.

ALAMANCE CLAY LOAM.

Typically the Alamance clay loam is a gray silt loam, underlain at 1 inch to 3 inches by pale-yellow silty clay loam, which quickly grades into yellow, dense clay. In many places the subsoil has a reddish shade and in others it is mottled with shades of yellow and red. The soil over the main part of the type plows up as a silty clay loam. As in the Georgeville clay loam, fragments of weathered slate and quartz are of common occurrence. There are many included patches of Georgeville clay loam and some slate loam areas.

The type occurs on stream slopes and in comparatively smooth interstream areas, in the northern and northwestern parts of the county. The material is residual from the Carolina slates.

The Alamance clay loam is not so productive as the Georgeville clay loam, but requires about the same general treatment. It is best suited to corn, small grain, and grasses, such as red top, Bermuda grass, the native wild grasses, and lespedeza. The type is mainly used for cotton. It is a rather "cold" soil, warming up late in the spring. Fall plowing hastens its coming into condition in the spring,

and the growing of fall-sowed crops relieves the farmer of the necessity of plowing during the spring, when farm work is most pressing.

The natural forest growth is largely shortleaf pine and oak, with a scattering of other hardwood trees. Very little of the type is under cultivation. This land is valued at $10 to $25 an acre.

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

Mechanical analyses of Alamance clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
242359	Soil	3.6	5.7	3.1	8.0	7.6	47.7	24.3
242360	Subsoil	2.0	3.0	1.6	4.6	7.2	61.2	20.1

CECIL SERIES.

The Cecil soils are gray to brown or, in the heavier members, reddish brown. The subsoils are red, and are heavier in texture than the soils. These soils are of residual origin, derived from the weathering in place of granite and gneiss, usually to a considerable depth. The topography is rolling to hilly. The coarse sandy loam is the only member of the Cecil series encountered in Chesterfield County.

CECIL COARSE SANDY LOAM.

The Cecil coarse sandy loam is a grayish coarse sandy loam or sandy clay loam, underlain at about 6 or 8 inches by red clay, containing coarse, angular quartz grains. The subsoil is compact and friable when dry and slightly sticky when wet. There are in places quartz fragments the size of stones, and bowlders of granite or partially decomposed granite are common, mainly on slopes along streams. The material is residual from coarse-grained highly quartziferous granite.

The topography is generally rolling. The type occurs mainly along stream slopes where the drainage is good. The soil is well drained and well aerated. It is encountered in the northwestern part of the county, largely along Fork and Little Fork Creeks and on the slopes of the Lynches River. The type is devoted to general farm crops, cotton leading in acreage. Some corn, oats, cowpeas, and wheat are grown. The soil is naturally strong and produces fair to good yields of most of the crops grown.

Deep plowing and the turning under of cover crops are necessary to maintain the productiveness of the soil, and heavy liming is beneficial. With such improvement this soil produces heavy yields.

Cotton produces an average of one-half to three-fourths bale per acre with the use of 600 to 800 pounds of complete fertilizer. Yields of 1 bale per acre are obtained from the most improved fields. Corn makes fairly good yields for this part of the United States. Crimson clover and cowpeas do well, and are beneficial to the soil.

The type was cleared and put under cultivation early in the history of the county, and much of it has been "cropped out," the continued cultivation of the soil without the addition of organic matter having exhausted the fertility. The natural growth is mainly shortleaf pine and oak. This soil is subject to erosion, and terracing is necessary except where a Bermuda-grass sod is maintained. This prevents washing and furnishes good pasture.

Durham Series.

The soils of the Durham series are gray, overlying bright-yellow subsoils, which are usually friable in structure. The material is derived from granite, frequently not very deeply weathered, so that the original or partially decomposed parent rock is encountered in the 3-foot section. The surface is level to gently sloping, and drainage is usually good. This series occurs in the Piedmont Plateau. It is represented in Chesterfield County by one type, the Durham coarse sandy loam.

Durham coarse sandy loam.

The Durham coarse sandy loam is a grayish coarse sand, grading into pale-yellowish coarse sandy loam, underlain at 10 to 24 inches by yellowish coarse sandy clay. The soil is fairly loose and open in structure and the subsoil is slightly compact and friable. The type contains angular quartz fragments about the size of small gravel. The soil is derived from coarse-grained granite.

The difference between this soil and the Cecil coarse sandy loam is apparently due mainly to drainage or aeration conditions. While the Durham is considered a well-drained soil, its topography is fairly level and its position along the base of the hills is not favorable to thorough aeration. It is easily cultivated and may be worked at almost any time of the year.

General farm crops, including cotton, corn, oats, sorghum, and cowpeas, are grown. Cotton does fairly well, yielding one-half to 1 bale per acre. As much as 1,000 pounds of fertilizer per acre is used on this soil. Corn makes good yields where heavily fertilized. Oats do fairly well. Cowpeas succeed and make good hay when cut with crab grass. Crimson clover and vetch could be grown to advantage. The type is fairly well suited to peaches, pears, grapes, and plums. It is usually deficient in organic matter.

The type is mainly cleared and under cultivation, with only small areas in original or second-growth forest. The natural growth consists of shortleaf pine, oak, hickory, and dogwood. The type is not subject to severe erosion. In some of the more sloping areas terracing is advantageous.

The price of this land ranges from $50 to $100 an acre, the higher values being due to location and improvements.

Cahaba Series.

The surface soils of the Cahaba series are brown to reddish brown and the subsoils are yellowish red to reddish brown. The structure of both soils and subsoils is friable. The types occupy old stream terraces along streams within the Coastal Plain. The topography is smooth. In Chesterfield County the Cahaba series includes three types—the fine sandy loam, sandy loam, and loamy sand.

CAHABA FINE SANDY LOAM.

The Cahaba fine sandy loam is a brownish-gray fine sandy loam, underlain at about 5 to 8 inches by dull-red clay or fine sandy clay, passing below into yellowish-red clay with some yellow mottlings. The lower subsoil is stiffer than the upper part, which is quite friable. The subsoil is stiffer than the typical subsoil of the Cahaba occurring on stream terraces in other parts of the Coastal Plain region, owing to the higher content of material washed from the heavy Piedmont soils and also to the inundation of this type during high floods. Patches of red clay loam are found on the lower slopes of the type. These areas comprise the Amite clay loam, but are too small to be mapped separately.

This type occurs on low terraces along the Peedee and Lynches Rivers. The topography is usually slightly rolling or includes swells running parallel to the watercourses. This soil occurs within the main river bottoms or depressions in locations which are not desirable for homesteads.

The soil is well drained and aerated and is suited to a wide range of crops. It is capable of producing good yields of nearly all the crops grown in this section with the use of relatively small quantities of fertilizer. Cotton, corn, wheat, oats, tobacco, sorghum, leguminous crops, and vegetables do well. Cowpeas and crab grass yield as high as 4 tons of hay per acre. With proper methods corn yields about 50 to 60 bushels and oats about 30 to 40 bushels per acre. When plowed while wet the soil clods rather badly, making the preparation of a good seed bed difficult.

In a few places the application of small quantities of lime is advantageous. The incorporation of organic matter and the growing

of legumes form the best method of building up the soil. Where this is accomplished good yields can be obtained with the use of little or no commercial fertilizer.

CAHABA SANDY LOAM.

The Cahaba sandy loam is a brownish-gray loamy sand, passing quickly into yellow or yellowish-brown loamy sand. This, at about 8 to 15 inches, grades into reddish-yellow to yellowish-red or dull-red, friable sandy clay.

This soil is encountered mainly on a high terrace along the Peedee River. It has a level to slightly undulating surface, often marked by swells running parallel with the watercourses. The drainage is well established and the soil, subsoil, and substratum are well aerated.

This is the strongest soil of the terraces, and probably the most desirable soil in the county. It is suited to the same range of crops as the fine sandy loam, giving probably better yields of cotton, tobacco, and leguminous crops. It produces 1 bale of cotton per acre.

With a good seed bed, inoculation of the soil, and the application of lime and complete fertilizer, alfalfa could possibly be grown successfully on this soil. Other legumes, such as cowpeas, velvet beans, soy beans, vetch, crimson clover, bur clover, and Japanese clover, do well.

The value of this type is conservatively placed at $100 an acre, but it is doubtful whether it could be purchased at that price if sold separately.

CAHABA LOAMY SAND.

The Cahaba loamy sand is a brownish to grayish-brown loamy sand or sand, grading into orange-colored loamy sand, and this into reddish-yellow or yellowish-red loamy sand. The type occurs mainly in hummocky or billowy areas on terraces of the Peedee River, and is usually found well out upon the terrace system along the edge of the first bottoms. The small area at Cashs lies higher than the greater part of this type.

In general the type is excessively drained, but the high water table makes crops almost certain even in dry seasons.

The Cahaba loamy sand is not quite so strong a soil as the other Cahaba types, but it is adapted to a large range of crops. Cotton or tobacco can not be grown successfully without the use of at least 600 pounds per acre of commercial fertilizer. This type is not so well suited to oats or wheat as the other soils. Leguminous crops, with the exception of the clovers, thrive, especially vetch, velvet beans, and cowpeas. Cowpeas and crab grass produce heavy yields

of hay. The soil is well suited to watermelons, cantaloupes, and light-truck crops. Manuring and the turning under of green crops, preferably legumes, constitute the best method of building up this soil. Complete fertilizers are necessary for the successful production of crops.

Congaree Series.

The Congaree soils are brown to reddish brown or chocolate brown in color, overlying subsoils of essentially the same shade, though they may be somewhat lighter in color, and in the heavier members are sometimes mottled with yellow and gray or brown spots in poorly drained areas. These soils are encountered as first-bottom overflow land along streams in the Piedmont section or streams that head in the Piedmont. Three members of the Congaree series, the silt loam, silty clay loam, and loamy fine sand, are mapped in Chesterfield County.

Congaree silt loam.

The Congaree silt loam is a brownish-red, mellow silt loam, passing at 10 or 12 inches into reddish-brown, chocolate-brown or dark-brown, mellow silt loam to silty clay loam. In places the lower subsoil is a yellowish, plastic silty clay loam or silty clay with some faint grayish mottlings. Mica flakes are usually conspicuous throughout the soil section.

The type occurs chiefly in the first bottom of the Lynches River, Hills and Thompsons Creeks, and the other creeks of the Piedmont section, as well as along the Peedee River north of Cheraw. It is subject to deep overflows, and crops are sometimes damaged by floods. Some areas of the type need draining, but very little of the soil is sour, as the frequent inundations have a tendency to sweeten the soil. The soil becomes somewhat intractable where plowed when too wet; however, the clodding results only in injury to the one following crop, as the next overflow corrects the lumpy condition.

This type is well adapted to corn, oats, sorghum, and grass, and heavy yields are obtained in normal seasons. Cotton also does well in dry years, but during wet seasons the plant has a tendency to go to weed, and for this reason cotton is not grown to any appreciable extent. The same is true of wheat. Oats have a tendency to lodge, but are not damaged by lodging as much as wheat. There is little need of fertilizers, except for wheat, oats, or cotton. A fertilizer containing phosphate and potash, to strengthen the stock and increase fruiting, is beneficial. Leguminous crops do well, especially in the higher, better drained areas. Lespedeza grows luxuriantly. Crimson clover also succeeds.

Sorghum suffers very little from overflow and can be grown successfully on this soil. It does well on a bottom-land soil, where the plant food is replenished every season.

The natural growth consists of sycamore, elm, pine, poplar, sweet gum, and willow. Large "canebrakes" are common on this soil in its natural state. Wild onion is the chief weed pest, both on cultivated and pasture land. Bulrush also is troublesome on pasture land.

This is a strong soil, but on account of overflows it is not held at a very high price.

CONGAREE SILTY CLAY LOAM.

The Congaree silty clay loam is a brownish-red to chocolate-brown silty clay loam, underlain at variable depths either by a yellowish silty clay, which in places is sandy and mottled with reddish yellow, or by a light-gray or drabbish silty clay, mottled with rusty brown and yellowish. In the numerous swales, where water stands long after rains, the soil is often grayish at or very near the surface. This type is subject to deep overflows; in places it is sometimes inundated to a depth of 10 to 15 feet or more. Practically all of the type is forested. Tupelo, sweet gum, ash, haw, and ironwood are the principal trees. The merchantable timber is rapidly being removed. Owing to its low situation and the numerous shallow depressions, this soil has such poor drainage that it is not suitable for uses other than forestry and pasturage. If overflows could be prevented, the type would be valuable for the production of corn, oats, grass, and other crops, but it is not probable that the expense of diking is warranted under present conditions. Where properly cleared the type is capable of producing good yields of wild hay and lespedeza. Like the silt loam, this type is well suited to sorghum.

This type occupies the broad bottoms of the Peedee River between its confluences with Cedar Creek and Thompsons Creek, and extends in a narrow strip along the north side of lower Thompsons Creek. The bottom land where this type occurs is covered at high stages of the river by backwater, where the currents are comparatively quiet, allowing the heavy material to settle. The Congaree silty clay loam has a low agricultural value.

CONGAREE LOAMY FINE SAND.

The Congaree loamy fine sand is a brown or dark-colored, mellow, loamy fine sand, containing large quantities of mica flakes. There is little change in the material within the 3-foot section.

This soil occurs along the banks of the Peedee River, above the mouth of Thompsons Creek, and stands higher than the silt loam

and silty clay loam areas of the bottoms as a natural levee. It is well drained between overflows.

This is a good corn, oats, grass, and forage-crop soil. It is well suited to the legumes. Cowpeas and crab grass produce heavy yields of hay. Melons and light-truck crops should do well, as the soil is above normal overflow. The soil is easily cultivated. The natural growth consists of sycamore, elm, willow, and cane.

Georgeville Series.

The soils of the Georgeville series are of reddish-brown color, overlying deep-red subsoils, usually as heavy as or heavier than the soils. The material is derived from the Carolina slates. This series is the red equivalent of the Alamance. The slate giving rise to these soils either contains a higher percentage of iron than the slates giving rise to the Alamance soils or the iron is more completely oxidized than in the Alamance. The topography of the Georgeville soils is undulating to rolling or broken along streams. The drainage is good. This series is represented in Chesterfield County by one type, the Georgeville clay loam.

Georgeville clay loam.

The Georgeville clay loam is a red clay loam, underlain at about 5 or 6 inches by a red, brittle clay, which is much denser than the red clay subsoil of the Orangeburg soils. Some partially decomposed fragments of yellow slate are frequently present in the subsoil. In places the immediate surface soil is a brownish loam or sandy loam, but deep plowing turns to the surface enough clay to form a clay loam. Fragments of weathered slate are of common occurrence on the surface and throughout the soil section. White quartz fragments are abundant in patchy areas, and are of common occurrence in large areas.

This type is encountered mainly on the slopes of streams in the northwestern and north-central parts of the county. In some areas the type extends to and across the crests of the ridges. In the section north and northwest of Pageland this type is the predominant soil and occupies rolling topography. Plate I, fig. 2, shows the characteristic topography of the Georgeville clay loam.

The material is residual from the Carolina slates. On some of the slopes and knolls there are small bodies of shale loam, and such elevations are known locally as "shaly knolls."

Much of the land is cleared and under cultivation. The original growth consists largely of shortleaf pine, with a few oaks and a scattered hardwood growth.

Cotton, corn, oats, wheat, and grass are the chief crops. Cotton yields about one-half bale per acre, and it is only where much care is exercised in preparing land and large quantities of fertilizers are used that this yield is exceeded. The quantity of fertilizer used is less than upon sandy land, about 400 to 600 pounds per acre being applied for cotton. Corn does only fairly well. The Williamson method is not suited to the character of the soil, and is not practiced. Large yields of corn can not be expected unless cover crops are turned under or the organic-matter content is increased by the use of manure. Oats and wheat do fairly well, and are grown on larger acreages on this type than on any other soil, except those of the river terraces. The use of bone meal or phosphate with nitrate of soda as a top dressing is beneficial in growing these grains. The type is fairly well suited to grass, though very little is grown for hay. It furnishes fair pasturage and is well suited to stock raising, which would serve to build up the soil better than any other type of farming. Leguminous crops are advantageous, and cowpeas, clover, and vetch can be grown with success. The type is only fairly well suited to fruit. Apples probably do better on this soil than on any other soil in the county.

This soil was cleared in large areas and put under cultivation during the early history of the county, so that the greater part of the type has been tilled for many years. The original supply of organic matter has been largely depleted, and the soil is difficult to handle. Much care is necessary in plowing. Where the soil is plowed in a wet condition clods are formed, and thorough cultivation for a number of years is required to overcome the bad effects of this clodding. A heavy equipment is needed to plow the soil properly. Most of the plowing is shallow, resulting in a poor seed bed. Disk harrows are coming into use, and the use of these implements, together with deep plowing, improves the condition of the type considerably.

The greatest need of this soil probably is lime. The application of 1 ton of burned lime or 2 tons of crushed limestone per acre improves the physical condition of the soil and makes the plant food held in the heavy soil more readily available.

The type is valued at $25 to $30 an acre. A few more favorably located or better improved farms are valued at $50 an acre.

Miscellaneous Material.

Muck.

Muck consists of black, finely divided decomposed vegetable matter, carrying in places some mineral material. In some areas a dark-brown sand or sandy loam is encountered at a depth of 2 or 3 feet, while in others, such as the very swampy areas east of Cashs, it

is more than 3 feet from the surface. The Muck areas are very wet and swampy, and occur on the Peedee River and Lynches River terraces and in other parts of the county.

The natural growth varies from a scattering of longleaf pine, with an undergrowth of cane, smilax vines or "bamboo vines," and ferns, to a dense growth of gum and maple, with cane, smilax, and moss.

With proper drainage land of this kind is capable of producing good yields of corn, cabbage, tomatoes, lettuce, onions, celery, Irish potatoes, and other vegetables. Applications of lime are usually found beneficial.

SWAMP.

The areas mapped as Swamp consist of alluvium occurring in very swampy stream bottoms, where overflows are frequent and where water stands on the surface of much of the land during the greater part of the year. In the Peedee River "low grounds" the Swamp areas occupy depressions which are very wet between overflows. The material in these areas is mainly a dark silt loam or silty clay loam overlying drab silty clay. Tupelo grows abundantly. In areas other than those of the Peedee bottoms much of the material is a black loam. The areas are often mucky and heavily forested with gum, maple, and cypress, with an undergrowth of vines and evergreen shrubs. In some places the material is a black sandy loam and in others a grayish sandy loam. Hummocks about trees and cypress knees are common, and these often support a growth of moss and fern. The larger areas are known as cypress swamps and the smaller as black-gum swamps.

The forest growth is being removed from some areas for market. The reclamation of even a part of the Swamp areas requires extensive drainage operations, which would entail a considerable cost. With proper drainage this soil is capable of producing good corn and forage crops.

MEADOW.

Meadow occurs as narrow, overflowed stream bottoms. The material is markedly variable in texture and color, both in the vertical section and in different areas. It is encountered largely in the small stream bottoms along the contact of the Piedmont and Coastal Plain regions. Meadow is not overflowed so deeply and is not generally so wet as Swamp.

Small areas are cleared and in pasturage, and afford good grazing even in dry seasons. The greater part of the type can be drained with very little ditching, and with drainage it is capable of producing good yields of corn, oats, sorghum, forage crops, and grass.

The native growth is largely sycamore, maple, sweet gum, and black gum. Reeds and brambles form a dense undergrowth.

ROUGH STONY LAND.

Rough stony land includes areas so thickly covered with stone fragments that cultivation is impracticable. They have little or no agricultural value. The rocks are mainly angular quartz fragments. There are some ferruginous concretions, and in a few places granite bowlders are present. The only area of Rough stony land mapped is located about a mile west of Jefferson.

ROCK OUTCROP.

Rock outcrop represents bare-rock exposures. These areas have practically no soil covering and are without agricultural value. The rock is granite. The areas are encountered along the contact of the Piedmont and Coastal Plain where the surface of the granite has been exposed by stream action. They are indicated on the soil map by Rock outcrop symbols.

SUMMARY.

Chesterfield County, S. C., is located in the northeastern part of the State, adjoining the North Carolina State line. It has an area of 798 square miles, or 510,720 acres.

The county comprises parts of the Piedmont and Coastal Plain Provinces; it is mainly within the Sand Hill section of the Coastal Plain. The surface is rolling to hilly, with a few level areas, the largest of which are in the vicinity of Cheraw.

The surface drainage is generally well established. The drainage of the county is through four systems, all tributary to the Peedee River.

The county was settled early in the eighteenth century by Welsh, English, and Scotch immigrants. The present population is descended largely from the original settlers. The population is reported as 25,301 in 1910. Nearly nine-tenths of the population is rural. The Sand Hill section is sparsely settled, and up to a few years ago was practically uninhabited. The Piedmont section and the country adjoining the Peedee River, where the large slave plantations were located before the Civil War, constitute the regions longest settled.

Cheraw, with a population of almost 3,000, is the principal town in the county. Chesterfield, the county seat, has a population of less than 1,000.

Lumbering is the leading industry. Cotton production probably ranks next in importance, and the manufacture of brick and fertilizer third. Several railroad lines serve the county, and the county roads are being improved.

Chesterfield County, like the Sand Hill region in general, is noted for its mild winters. The summers are hot. There is an average growing season of about 7 months, but hardy plants grow throughout the winter. The mean annual precipitation is about 48 inches. This is well distributed throughout the year. The snowfall is extremely light.

Cotton is the principal crop, occupying about one-half the acreage planted to crops. Corn is the next crop of importance, and is planted on about three-fourths of the remaining area cultivated. Oats, cowpeas, and sorghum are grown, and vegetables and melons for home use. Truck crops are not produced commercially. Crabgrass and pea-vine hay is produced on a small scale. Peaches and grapes are the leading fruit products. Both do well and their commercial production would seem practicable. Stock raising has not been important since the Civil War.

Little improved labor-saving machinery is in use. Cotton-stalk cutters, disk harrows, and disk plows are used on a few large farms. Breaking is usually too shallow. No systematic crop rotation is practiced.

About 70 per cent of the land is in farms. The average farm[1] comprises 106 acres, 31 of which are improved. Slightly less than half the farms are operated by the owners.

The soils of Chesterfield County fall into four general groups—upland soils derived from beds of unconsolidated sands and clays, upland soils derived from slates and granites, first-bottom overflow land, and terrace or old alluvium. The first covers about 60 per cent of the county, the second about 25 per cent, the third about 10 per cent, and the fourth about 5 per cent. The soils are classed in 32 types, representing 19 series, and 5 miscellaneous types.

The Norfolk series comprises five types. The surface soils are gray and sandy, the subsoils yellow and friable. These soils cover a large part of the county. They are generally deficient in organic matter, and respond readily to fertilization. They are well suited to a wide variety of general farm crops, truck crops, and fruit.

The Orangeburg series is represented by only one soil type, the sandy loam. It is a gray to grayish-brown sand with a red sandy clay subsoil. This is the strongest upland soil type in the county.

The Coxville loam has a dark-gray soil and a mottled gray, drab, and red, stiff, plastic subsoil. It is poorly drained and little used for agriculture.

The Portsmouth sandy loam, like the Coxville, is poorly drained. It has a dark-gray to black soil and a drab and yellow mottled, sticky sandy clay subsoil.

[1] Each tenancy is considered a farm in the census.

The Ruston series is represented by the sandy loam and gravelly sandy loam. They have gray sandy soils and reddish-yellow to dull-red, friable sandy clay subsoils. The drainage is well established.

The Hoffman sandy loam has a gray sandy soil with a mottled yellow, gray, pink, and red, sometimes compact, sandy clay subsoil. It has a rolling to sloping topography, and is not a very strong soil.

The Alamance clay loam is an upland residual soil, derived from slate. It has a gray, silty soil and a yellow clay subsoil. The topography is fairly level to rolling.

The Georgeville clay loam is also derived from slate. It has a red clay loam soil, with a red clay subsoil. The topography is rolling, and the drainage well established. This type is largely used for cotton production.

The Cecil coarse sandy loam is derived from granite, and has a gray sandy soil and a friable, red sandy clay subsoil. It is a strong upland type, well drained and well aerated. It is used for general farm crops. The topography is rolling.

The Durham coarse sandy loam is derived from granite. The topography is less rolling than that of the Cecil, and the drainage is less well established. It consists of a gray sandy soil, with a yellow, friable sandy clay subsoil. It is used for general farm crops.

The Bradley sandy loam has a soil of gray sandy material, of Coastal Plain origin, and a subsoil of red clay or sandy clay, consisting of Piedmont material.

The Cahaba series includes terrace soils consisting of old alluvium derived largely from Piedmont material. The soils are brown and the subsoils red and friable. These soils are among the best in the county.

The Kalmia soils occupy river terraces. They have gray soils and yellow subsoils, in some cases slightly mottled with drab and shades of yellow in the lower part.

The Okenee series includes poorly drained terrace soils. They have dark-gray to black soils and drab or mottled gray and yellow, plastic or sticky subsoils.

The Leaf silt loam is a poorly drained terrace soil closely associated with the Okenee. It has a dark-gray to black, somewhat compact soil, underlain by a stiff, plastic clay subsoil. It has a low agricultural value.

The Altavista silt loam is a terrace soil. It is fairly well drained, and has a gray soil and a yellow, friable subsoil.

The St. Lucie sand occurs in the same relative position as a terrace. It consists of a light-gray to white, incoherent sand, extending to a depth of 3 feet or more. It is of little value for crops.

The Congaree series occupies first-bottom overflow land. The material is derived largely from the Piedmont Plateau. The soil is brown or reddish brown and changes very little within the 3-foot section. These are naturally strong soils.

The Thompson fine sandy loam is not very extensively developed. It has a gray soil and a yellow, friable subsoil. Drainage is fairly well established. The type is derived largely from Coastal Plain material.

Meadow consists of undifferentiated material of mixed derivation, usually very poorly drained.

Swamp consists of more or less mucky soil, usually black in color and underlain by a drab soil of variable texture. It is inundated during the greater part of the year. The natural growth consists of cypress and black gum. Swamp has a comparatively small extent.

Muck is found on terraces and along the streams. It consists of a black, decomposed mass of organic matter, underlain at 2 or 3 feet by a drab soil, usually consisting of clay. It is not used for agriculture.

Rough stony land includes areas which have little or no agricultural value because of the occurrence of granite bowlders, quartz fragments, or ferruginous sandstone.

Rock outcrop, indicated on the soil map by symbols, consists of basal granite outcrops. It is nonagricultural.

[PUBLIC RESOLUTION—No. 9.]

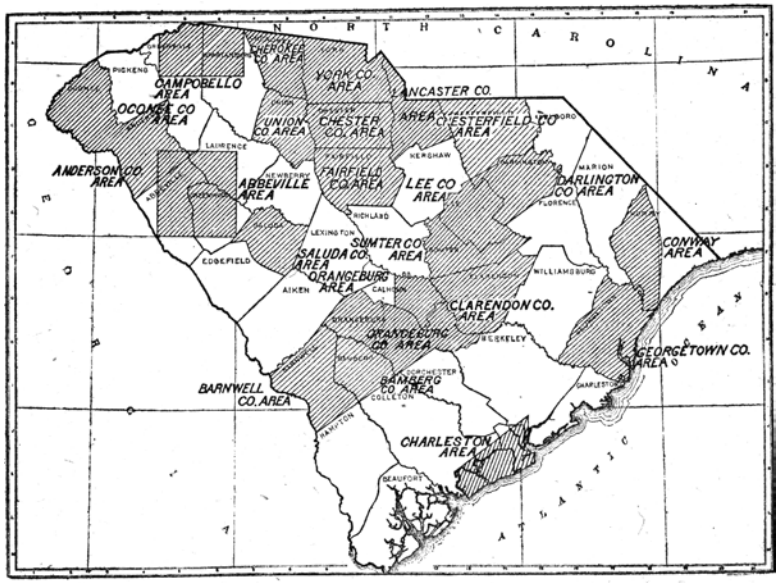
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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 the 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 South Carolina.

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