

SOIL SURVEY OF ANSON COUNTY, NORTH CAROLINA.

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DESCRIPTION OF THE AREA.

Anson County is situated in the central-southern part of North Carolina, bordering the State of South Carolina. It is bounded on the north by Stanly County, from which it is separated by the Rocky River; on the northeast and east by Richmond County, from which it is separated by the Peedee River; and on the west by Union County. Its southern and western boundaries are straight land lines. The average east and west dimension of the county is about 25 miles, and the distance from north to south varies from $21\frac{1}{2}$ miles on the eastern side to 27 miles on the western side. The county has an area of 539 square miles, or 344,960 acres.

The topography is undulating to hilly. In the uplands there are some comparatively small areas of level or nearly level land, while all the stream bottoms are essentially level.

Determined elevations above sea level range from 297 feet at the railroad station at McFarlan to 465 feet at the station at Lilesville. The elevation at Wadesboro, at the junction of the Seaboard Air Line and Atlantic Coast Line tracks, is 424 feet. There are higher elevations in the county, two of the most prominent being Gordon

Mountain, in the southwestern part, and the hill in the northern part of Wadesboro known as Carrs Mountain. Practically all the areas of the county could be cultivated, although the maintenance of hill-side terraces and the growing of soil-binding crops would be necessary on the steeper slopes to prevent severe erosion, while on the more nearly level areas artificial drainage is necessary.

The county lies along the boundary between the two great physiographic regions of the southeastern United States—the Coastal Plain and the Piedmont Plateau. In its broader aspect the Coastal Plain Province represents the great area of relatively low and smooth country bordering the Atlantic Ocean from near the Hudson River to Florida, and thence extending westward along the Gulf of Mexico. The Piedmont Plateau comprises the higher, more rolling and hilly

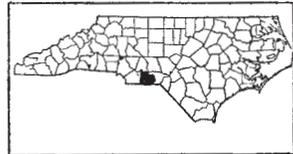


FIG. 12.—Sketch map showing location of the Anson County area, North Carolina.

country between the Coastal Plain and the Appalachian Mountains to the west. Roughly the boundary between the Coastal Plain and the Piedmont passes through Trenton, Wilmington, Baltimore, Washington, Richmond, Raleigh, Columbia, Augusta, and Columbus. The surface of the Coastal Plain gradually rises and becomes more rolling toward the interior. It joins the Piedmont Plateau at an elevation varying from about 200 to 600 feet above sea level. The Piedmont, in turn, becomes higher toward the west, approaching the Appalachian Mountains at elevations varying from about 700 to 1,500 feet above sea level. In places the Coastal Plain border is higher than some portions of the Piedmont, owing to differences in the extent of erosion.

Approximately 82 per cent of the upland area of Anson County lies in the Piedmont Plateau Province. Here there is no difference in the topography of the areas representing the two provinces, the distinction being determined by the difference in soil material. The Coastal Plain areas occur in the southeastern part of the county, centering about Bethel Church, Cason Old Field, Morven, McFarlan, and Gum Springs Church, and occupies 15.5 per cent of the total area of the county. The surface is undulating to gently rolling.

The Piedmont includes three important subdivisions, which, although based primarily upon differences in the underlying rocks, possess also fairly distinctive topographic characteristics, and these subdivisions are locally recognized chiefly upon the soil basis. They are: (1) the rolling to broken granite (millstone-grit) lands occurring along the Peedee River and such tributaries as Jones, Mill, Island, and Smiths Creeks; (2) the broad belt of undulating to rolling country underlain by Triassic rocks ("brownstone" land); and (3) the rolling slate lands (Carolina slates) of the northwestern part of the county.

There are in the Triassic belt some large bodies of comparatively level land, such as that between Hornes School and Stanback Ferry, in the northeastern part of the county, and the area southeast of Ansonville between the Peedee River and Brown Creek. In the slate belt there are scattered areas which are gently undulating, as between Phifers Store and Hopewell Church, but on the whole this part of the county is rolling, with strongly rolling, rough areas near the creeks. Other smaller undulating and level areas are scattered throughout the county. The granite lands are on the whole more rolling than any other part of the county, while the Coastal Plain and Triassic lands are prevailingly the smoothest of the uplands, although there are many gullied areas in the old fields of the Triassic belt. The latter division is less rolling north of Wadesboro, passing into undulating and flat country near the Peedee River.

The steepest slopes are those along the Rocky and Peedee Rivers from the South Carolina line to the mouth of Savannah Creek, and along Richardson, Lanes, Jones, and Smiths Creeks. In places along the Peedee River, as in the vicinity of Blewett Falls, there are some rather large, comparatively low areas, where the surface has apparently been worn down by the more active erosion accompanying the development of the valley of the river.

Along nearly every creek in the county, except some of those in the slate belt, such as Lanes and Richardson Creeks, which are bordered in most places by steep slopes, there is more or less bottom land. The most extensive strips of bottom land are those along the Peedee River and Brown and Deadfall Creeks and their tributaries, Goulds Fork, Flat Fork, and Savannah Creek. The broadest strip of bottom land is that along lower Brown Creek, where the width in places is approximately a mile. The bottom lands are continuous along most of the streams, but along the Peedee and Rocky Rivers they are narrow and interrupted, and along Brown Creek the uplands close in practically to the banks of the stream, for short distances, south of Ansonville and with approach to the Peedee River. The first bottoms are all subject to occasional overflows. There are some widely separated strips of second bottoms (stream terraces) along some of the larger creeks.

The county is thoroughly dissected by streams, and there are no large upland areas without natural drainage outlets. While there are many flat areas and depressions, in both the uplands and bottoms, which are naturally poorly drained, there is a much larger area from which the water flows off so rapidly as to cause severe erosion. The rivers, and ordinarily the larger creeks, flow throughout the year, but in protracted dry spells the flow in some of the latter ceases. The smaller streams, except those fed by permanent springs, usually are dry in late summer. On the slopes of the ridges between the larger creeks the surplus rain water flows off at a very rapid rate through depressions, gullies, and draws. All the principal streams have rapid currents, with the exception of Brown Creek, which flows rather sluggishly throughout most of its course.

There is sufficient fall on most of the larger streams for the development of water power adequate to operate grist and flour mills. Such mills are now in operation on Rocky River and Richardson, Lanes, Brown, Mill, and Jones Creeks. At Blewett Falls, on the Peedee River, there is in operation a hydroelectric plant which develops 32,000 horsepower. This plant furnishes electric power to the town of Wadesboro and to towns along the Seaboard Air Line Railway from Raleigh, N. C., to Cheraw, S. C. Important water-power development is said to be possible on Rocky River and elsewhere on the Peedee, as at Buchanan Falls.

Anson County was formed from a part of Bladen County in 1748. The eastern boundary of the county at that time extended up Drowning Creek (now Lumber River) from the South Carolina line and along a line equidistant from the Haw and Yadkin Rivers to the Virginia State line. All North Carolina west of this line to the Mississippi River, including the territory now forming the State of Tennessee, was comprised in Anson County. The first county seat was Mount Pleasant, on the Peedee River, situated on the flat now known as Ingrams Level. In 1783 New Town was made the county seat, the name being changed in 1787 to "Wadesborough." Parts of Anson County were taken to form Rowan County in 1783, Mecklenburg County in 1762, Montgomery County in 1778, and Richmond County in 1779, while a part of the county east of Lumber River was added to Bladen County in 1777, and in 1843 a strip taken from the western part was incorporated in Union County.

Settlement of the territory now included in Anson County began about 1725. The early settlers were largely Scotch-Irish and Germans from Europe, together with many immigrants from the older Provinces to the northeast. According to the census, the population of Anson County was 6,713 in 1860, 17,994 in 1880, 21,870 in 1900, and 25,465 in 1910. The population is about evenly divided between the white and the negro races. The density of population was 45.8 persons per square mile in 1910.

Wadesboro had a population of 2,376 in 1910, and South Wadesboro, 202. Morven, Lilesville, Polkton, Peachland, Ansonville, McFarlan, Pee Dee, and Cedar Hill are important railroad towns.

The principal industry of Anson County, aside from agriculture, is lumbering. It is estimated by local lumbermen and freight agents that on the average about 35,000,000 feet of dressed lumber and 4,000,000 feet of rough lumber, board measure, have been shipped out of the county in each of the last three years. Most of the lumber consists of old-field pine. The recently revived activity in lumbering has resulted from the higher valuation of old-field pine lumber for building purposes. As a result of this increased valuation standing timber is naturally more highly prized than formerly, and more attention is given to the prevention of needless burning of the old fields, where young pine springs up almost immediately following cessation of cultivation. However, much of this useless burning off of the land still takes place every year, destroying young trees and much decaying vegetable matter in the soil.

From the gravel pit 3 miles east of Lilesville hundreds of carloads of gravel are annually taken by the Seaboard Air Line Railway for use as ballast. Building stone ("brownstone") has been quar-

¹ See "The Colonial Records of North Carolina," vol. 4, pp. 887-888.

ried commercially near Wadesboro. Formerly quarrying was of considerable importance, and the stone was used widely throughout the State for building purposes.

At Wadesboro there are in operation a cotton mill, a cottonseed-oil mill, two silk mills, and a large plant for the manufacture of sulphuric acid and fertilizers. The town is supplied with such modern conveniences as electric lights, a sewerage system, waterworks, and paved streets.

The transportation facilities of the county are good. The Seaboard Air Line Railway traverses the central part of the county from east to west, giving direct connection with Atlanta, Ga., and Birmingham, Ala., 300 and 466 miles, respectively, to the southwest; with Wilmington, N. C., 135 miles nearly due east, and with New York City 622 miles northeast. The Winston-Salem Southbound Railway extends from Wadesboro to Winston-Salem, N. C., where connection is made with the Norfolk & Western Railway. The Atlantic Coast Line Railroad runs from Wadesboro southeasterly to Florence and Charleston, S. C., Savannah, Ga., and Jacksonville, Fla.

All the public roads leading out of Wadesboro have been graded and surfaced. Some of the highways have been improved as far as the county line. (See Pl. XIV.) Improved roads (sand-clay surfaced) also lead out of Morven in several directions. This work of highway improvement is being extended by the county and by Morven Township with the use of both convict and contract labor.

There are rural schools and churches throughout the county, and most sections have rural mail routes.

CLIMATE.

As there is no Weather Bureau station in Anson County, the following climatological data have been compiled from records kept by the stations at Rockingham, Richmond County, about 18 miles east, and at Monroe, Union County, about 30 miles west of Wadesboro.

Normal monthly, seasonal, and annual temperature and precipitation at Rockingham, Richmond County.

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1897).	Total amount for the wettest year (1901).	Snow, average depth.
	° F.	° F.	° F.	Inches.	Inches.	Inches.	Inches.
December	44.0	78	7	3.94	3.41	5.45	1.9
January	42.4	82	- 2	2.96	1.40	2.18	1.6
February.....	42.9	82	-15	4.80	6.55	1.68	3.7
Winter.....	43.1	82	-15	11.70	11.36	9.31	7.2

Normal monthly, seasonal, and annual temperature, etc.—Continued.

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1897).	Total amount for the wettest year (1901).	Snow, average depth.
	° F.	° F.	° F.	Inches.	Inches.	Inches.	Inches.
March.....	55.0	95	17	3.59	4.81	3.98	T.
April.....	61.1	97	28	3.35	2.67	4.61	T.
May.....	71.1	102	38	6.62	2.40	10.55	0
Spring.....	62.4	102	17	13.56	9.88	19.14	T.
June.....	77.3	104	45	6.02	5.09	11.12	0
July.....	80.1	103	55	6.40	4.98	9.41	0
August.....	79.5	103	54	6.90	2.98	12.45	0
Summer.....	79.0	104	45	19.32	13.05	32.98	0
September.....	73.9	100	41	3.96	.70	7.41	0
October.....	61.6	91	27	3.40	3.89	.43	0
November.....	51.8	87	14	2.56	.82	.80	T.
Fall.....	62.4	100	14	9.92	5.41	8.64	T.
Year.....	61.7	104	-15	54.50	39.70	70.07	7.2

Normal monthly, seasonal, and annual temperature and precipitation at Monroe, Union County.

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

An average of the data given in the two tables can safely be taken as representative of the climate of Anson County. This gives a mean annual temperature of 60.5° F. The mean annual rainfall is, on the same basis, about 52.36 inches.

The rainfall is generally well distributed throughout the growing season. There is no record of complete crop failures from dry weather, although corn, grain, and cowpeas, and, to a less extent, cotton, are occasionally injured somewhat by droughts. It is doubtful whether the cotton crop has ever been cut down as much as 50 per cent by reason of unfavorable seasonal conditions.

The depth of freezing is rarely more than 1 to 3 inches, but freezes are of sufficient frequency to have a beneficial effect upon fall-plowed land. The winters are usually characterized by short periods (3 to 6 days) of moderately cool to warm weather, alternating with periods of about equal duration during which the weather is cold enough to make fires desirable. Zero weather is very rare; in fact, temperatures lower than 20° F. seldom occur.

The dates of the latest recorded killing frost in the spring and of the earliest in the fall are, respectively, April 24 and October 2 at Rockingham and May 10 and October 3 at Monroe. The average dates of the last killing frost in the spring and the first in the fall are, respectively, April 8 and October 31 at Rockingham and April 21 and October 12 at Monroe. The length of the average growing season is about 190 days. This is ample for maturing all the general farm crops, and usually two crops, as corn or cowpeas after small grains, can be grown in one season. The mild climate is favorable to the growth of winter cover crops, including clover, vetch, and small grains, and vegetables such as cabbage and turnips. Roses, hyacinths, and violets frequently bloom in midwinter, and in many yards "Christmas honeysuckle" and forsythia blossom regularly in January. Cultural operations can be carried on throughout the winter. Cattle and hogs can be safely pastured all winter without protection.

AGRICULTURE.

Agriculture has been the principal interest of Anson County since its settlement, nearly 200 years ago. The early settlers, taking up land along the Peedee River, grew corn, wheat, potatoes, and other vegetables. Much of the meat supply of the pioneer days consisted of game, but hogs and beef cattle were introduced at an early date. Indigo, flax, and hemp are said to have been products of some importance at one time. With the invention of the cotton gin cotton immediately became the principal money crop, and it has since held this place.

The type of farming existing before the Civil War was an expansive type of the early plantation system. Extensive areas of hard-

wood-pine forest lands were cleared. When the fields deteriorated to a point where crops became unprofitable they were abandoned and new ground was put in cultivation. Little attention was given to the maintenance of soil productiveness by the present-day methods, although efforts were made on some plantations to check erosion on the slopes by running the rows with the contours, and wet lands were drained by canalling and ditching. Throughout the county there are now many areas supporting a large growth of old-field pine that were formerly cultivated, as evidenced by still distinguishable lines of old cotton and corn beds.

The large plantations that existed until the Civil War were operated by the owners, who laid out the general plans of farm procedure and had them carried out by overseers. The plantations were practically self-supporting. All the meat, milk, butter, and feed consumed were produced on the farm, and much of the clothing worn was homemade. Leather was tanned for the making of shoes and harness, and most of the farming implements used were manufactured and kept in repair by the plantation carpenters and blacksmiths. Every farm had its horse-operated cotton gin and screw compress (see Pl. XV, fig. 1), and flour and meal were ground by water-power either on the farm or at mills on neighboring streams.

The following table gives the census statistics covering the principal farm products of the county for the census years 1840, 1860, and 1870. The falling off in crop production between 1860 and 1870 shows in some measure the disastrous effects upon agriculture following the demoralization of labor conditions and the loss of capital occasioned by the Civil War.

Agricultural statistics, census years 1840, 1860, and 1870.

	1840	1860	1870
Per cent of farm land improved.....		33	25
Wheat.....bushels..	39,991	56,435	39,928
Corn.....do....	416,102	303,921	149,726
Oats.....do....	25,528	41,463	46,851
Rye.....do....	467	416	369
Potatoes.....do....	32,744	69,599	29,153
Peas and beans.....do....		20,547	5,513
Cotton.....400-lb. bales..	7,566	9,378	4,311
Tobacco.....pounds..	3,210	2	579
Hay.....tons..	25	1,304	1,247
Horses and mules.....number..	4,008	2,855	1,771
Neat cattle.....do....	15,461	7,197	5,167
Sheep.....do....	10,401	6,638	3,269
Hogs.....do....	28,492	17,247	9,230
Value of animals sold or slaughtered.....		\$130,986	\$103,182
Value of dairy products.....	\$18,837		
Butter produced.....pounds..		51,529	74,829



OLD-FIELD PINE ON WADESBORO FINE SANDY LOAM SOUTHWEST OF WADESBORO, ALONG CAMDEN ROAD.
This is a graded and gravel-surfaced road.

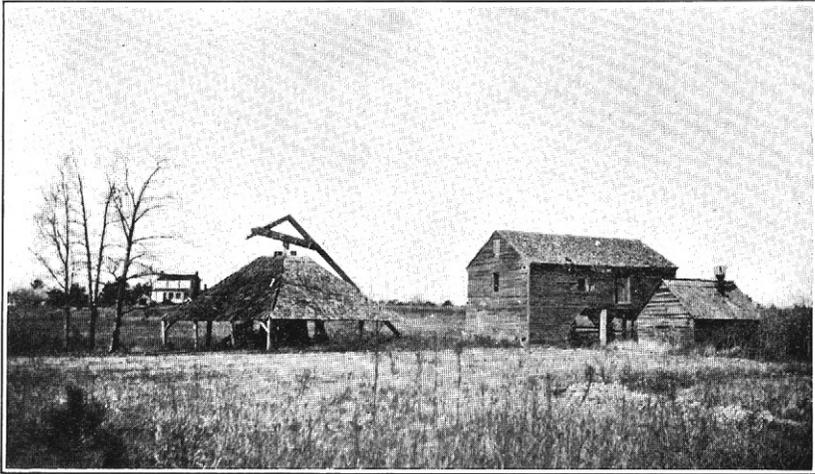


FIG. 1.—OLD TYPE OF HORSEPOWER COMPRESS ("SCREW") AND GINHOUSE.

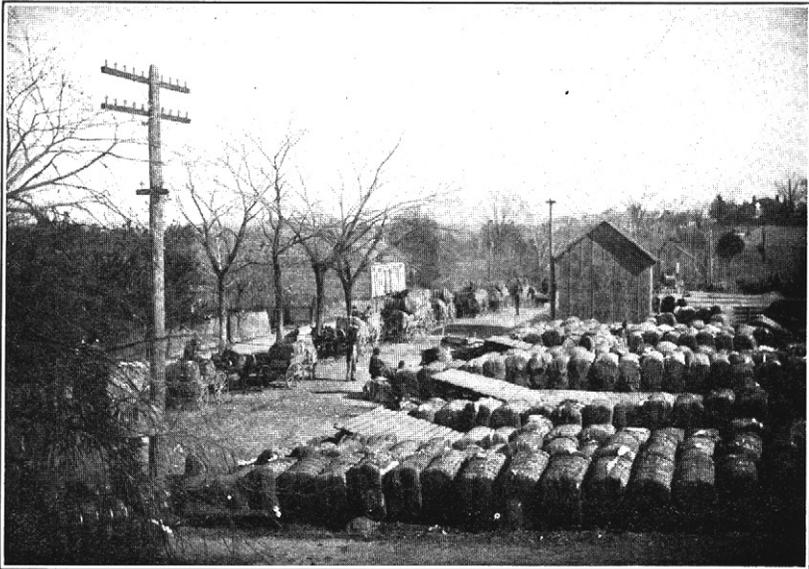


FIG. 2.—MARKETING COTTON AT WADESBORO.



YOUNG COTTON ON NORFOLK SANDY LOAM.
The smooth surface of much of this type is shown.



CORN ON NORFOLK SANDY LOAM, NEAR MORVEN.

So far as can be determined from the census the maximum cotton production prior to 1870 was in 1849, when 10,864 bales of 400 pounds each were harvested. This amounted to one-fifth the total production of the State; and Anson County was at that time the first county in the State in the production of this commodity, Mecklenburg County being next with 4,219 bales. After the recovery from the effects of the Civil War the production of cotton increased steadily. The largest crop in the history of the county was that of 1911, when 27,961 bales of 500 pounds were produced. The average yield of cotton for the county is one-half bale per acre, which is considerably higher than the average for the cotton belt as a whole. The production of corn also increased, but slowly, and now the production only equals that of 1839, when 416,102 bushels were grown. There has been a marked decline in the production of wheat, while the production of crops of lesser importance, such as oats and sweet potatoes, remains about stationary.

The prevailing type of agriculture in Anson County is that which prevails throughout the cotton belt—that is, the growing of cotton as the important money crop. (See Pl. XV, fig. 2, and Pl. XVI.) The most important difference between the present type of agriculture and that which existed before the time of the Civil War, aside from the difference in the labor system, is that the farms now are not generally self-supporting with respect to food products, where formerly they were almost entirely self-supporting. This is not because the land is less capable of producing these foodstuffs, but because, under the changed labor conditions, it has been found more profitable and satisfactory to grow cotton.

It is not to be expected that the production of cotton will be materially diminished so long as it brings the good prices that have prevailed in the past, but the history of the agriculture of the county, considered in connection with the soil and economic conditions, points to the advisability of giving more important places to other crops, and within the last four or five years there has been a tendency toward a better balanced type of agriculture. The yield of corn has been increased materially by the introduction of better methods of tillage and manurial treatment, the number of hogs and beef cattle raised has increased and the breeds have been improved, and more soil-improving crops are grown. Local merchants report that much more seed of clover and other soil-improving crops is sold than a few years ago and that the quantity is steadily increasing.

Rye is almost the only winter cover and green manuring crop used. Bur clover, crimson clover, and vetch are used for improving the soil and for pasturage. In 1914 much more wheat was sown than in any of the last 10 or 15 years, a fact attributable, however, directly

to the prevailing low price of cotton and the high price of wheat at that time.

Corn is the crop of second importance (see Pl. XVII). In 1909 the production was 322,159 bushels, and it is estimated that the production for 1915 will exceed 400,000 bushels. Local wholesale merchants and freight agents¹ estimate that on an average about 100,000 bushels of corn and meal (about one-third meal) have been imported annually in the last 5 years. The corn is mostly fed to work stock and hogs, but is used to some extent for making meal. The meal shipped in is largely for table use.

The census reports 9,905 acres in oats in 1909, with a production of 144,336 bushels. The crop is fed unthreshed to the work stock. The average annual importation of oats for the last 5 years is estimated at 75,000 to 100,000 bushels, about one-third of which was used for seed.

Hay and forage crops are becoming increasingly important. A few farmers sell some forage and native-grass hay (broom sedge and wet-land grasses) locally; but some hay is still imported. It is estimated that on the average 500 to 600 tons have been brought in annually during the last 5 years. The production of all hay and forage for the year 1909, according to the census, amounted to 3,343 tons. A vast quantity of wild grasses annually goes to waste, largely on account of lack of cattle to graze the land. Cowpeas are grown in many fields to improve the soil. The vines, when tall enough, are usually mowed for hay.

Only 2,624 acres of wheat were grown in 1909, but in 1914 and 1915 the acreage was increased considerably, probably to 10,000 acres or more. The county as a whole, however, does not produce nearly enough flour to meet the local demand, and the average annual importation of flour for the last 5 years is estimated at 30,000 to 40,000 barrels.

Sorghum is grown in small fields by many farmers for manufacture into sirup on the farm. The yields are good. One farm in the southern part of the county grew sorghum as the principal money crop in 1915, producing about 5,000 gallons of sirup. In some years a few carload lots of sirup and molasses are shipped into the county.

The most important of the minor crops are sweet potatoes, Irish potatoes, early apples, peaches, Scuppernong grapes, cantaloupes, watermelons, soy beans, velvet beans, red clover, vetch, crimson clover, bur clover, rye, Bermuda grass, orchard grass, herd's-grass (redtop), peanuts, and tomatoes, and other vegetables for canning and home use. In 1914 some bright tobacco was grown for market on a farm in Gullede Township. A little market gardening is done near Wadesboro, cabbage being the principal crop.

¹ Estimates of foodstuffs imported, where not otherwise credited, are from this source.

The county at present produces a little more beef than is required for home consumption, about 8 or 10 cars of beef cattle having been shipped out annually in recent years. No beef cattle are imported other than those intended for improving the grade of cattle in the county and an occasional car of feeders. There are a number of farms on which stock raising is important as an adjunct to the growing of cotton and other crops. Nearly all the work stock is bought outside the county.

The majority of the farmers raise hogs for home use, and many of them sell pigs, hams, and occasionally a dressed hog. The county produces about two-thirds of its pork supply, about 10,000 hogs being sold or slaughtered annually. It is estimated that at least 250,000 pounds of lard and lard substitutes and 1,000,000 pounds of pork have been imported annually for the last five years.

Dairying is carried on near Wadesboro and only in a small way. Most farmers keep one or more milch cows and many of them sell some butter. A considerable quantity of butter is imported. A number of merchants ship poultry and eggs bought from the farmers.

A study of the soils of the county leads to the belief that all the meat, lard, hay, and corn meal, and much of the flour, at present imported could easily be produced without a very large increase in the acreage now cultivated. This could be accomplished by the exercise of more care in the preparation of the seed bed and in the cultivation and fertilization of the crops, and the growing of more leguminous crops in conjunction with the keeping of a larger number of animals and the return of the manure to the land.

The 1910 census reports 116,379 acres, or 40.1 per cent of the area in farms, as improved land, the remainder being woodlots, forested¹ areas, and old abandoned fields. The greater part of this unused land is covered with a second growth of pine, much of which is of merchantable size. Probably more than 75 per cent of it is cultivable, and all of it is well suited for pasturage. If all the unused bottom lands along the principal streams, such as Brown Creek, were cleared and drained they could easily be made to produce more than half as much corn and oats as is now shipped into the county, or if used for hay there would be a large surplus over present requirements. Exclusive of the narrow strips of bottom land along the small streams not shown on the map, 37,952 acres of bottom soils were mapped. It is estimated that something like 15,000 acres of these lands are not used at the present time. Even without drainage it is possible to

¹ The timbered areas of the uplands are occupied by (1) second-growth loblolly and shortleaf yellow pine, and (2) loblolly and shortleaf yellow pine, longleaf pine (on the sandy lands of the southeastern part of the county), red, white, and post oak, hickory, dogwood, cedar, black gum, sweet gum, redbud, and elm. On the bottoms, willow, sweet gum, sycamore, hickory, swamp white or overcup oak, poplar, elm, dogwood, and ash are the principal trees.

use these lands for hay and pasturage crops, such as lespedeza, Bermuda grass, and the native meadow grasses, which are not injured by ordinary overflows.

The farming methods and crops grown are comparatively uniform throughout the county, although there are some local differences resulting from the character of the soil. Relatively more small grain and corn are grown on the slate lands in the northwestern part of the county, and the farmers there in general produce more sustenance crops than those in other sections. On the sandy Coastal Plain soils in Morven, Gulledge, and Lilesville Townships relatively more cotton is grown than elsewhere and heavier average yields are obtained, and at the present time a higher state of general development seems to exist on these lands than in other parts of the county. On the bottom lands of the rivers and larger tributaries corn is the principal crop.

Cotton has held the attention of the farmers so tenaciously that until recently little thought has been given other crops. The result is that the adaptation of soils to certain crops has been followed to only a slight extent, and cotton, corn, oats, and cowpeas are grown indiscriminately on all kinds of land. However, the bottom lands have been more generally used for corn and hay than have the uplands, and where sandy land is available on a farm it is generally selected for the patches of sweet potatoes, watermelons, and other garden vegetables. Specialized farming has been practiced in a small way on the sandy Norfolk soils of the southeastern and southern parts of the county, cantaloupes, tobacco, and watermelons being grown for market in small fields. These soils are known to be well suited to these crops.¹ The sandy lands in the Lilesville section have been used to some extent for the commercial production of Scuppernong grapes. Wild blackberries produce abundantly on nearly every soil type, and these berries are extensively used on the farm and sold on the local markets. Wild plums grow abundantly, but are not used much. The persimmon and muscadine grape are other native fruits.

There is a tendency on the part of a few farmers to plant the early maturing varieties of cotton, such as the King, on the late stream-bottom soils and the late maturing big-boll varieties on the early upland soils, but in general a large number of varieties are grown indiscriminately on all the soils. Some soils, as the yellow-subsoil slate types (Alamance), are reputed to produce little seed of cowpeas, with the exception of varieties like the Whip-poorwill, and to some extent these lands are avoided for this crop where the production of seed is desired. The red clay loam soils, the Cecil and

¹ See Soil Survey reports of Thomas County, Ga., and Jefferson County, Fla., F. O. Bureau of Soils, 1908 and 1907, respectively.

Georgeville in particular, are recognized as being good for red clover, wheat, and orchard grass, and they are selected for these crops where available. The sandy soils are said to give best average results with velvet beans and crimson clover, but these crops are grown on a great variety of soils with varying degrees of success. It is known that strawberries and raspberries will succeed on the better drained upland soils, particularly the clay loams, loams, fine sandy loams, and gravelly loams, but these crops are very sparingly grown, no attempts at commercial production being made. The same is true with respect to summer varieties of apples and some late apples, as the winesap, and also with peaches, several varieties of pears and plums, and with pecans, which crops are recognized as successful on certain types of soil, in fact, on most of the well-drained soils. Some have grown small fields of alfalfa on the well-drained soils, but few have selected the more promising soils for this crop, such as the Cecil clay loam. Little effort has been made to grow such crops as sweet clover (*melilotus*) and dark tobacco on any soils.

The clearing of land as ordinarily done is not considered a difficult or expensive task. It usually consists simply of removing the merchantable timber and better firewood and of burning the limbs and undergrowth. This accomplished, the land is ready for breaking and immediate cropping. New ground is largely used for cotton and corn.

As a rule land is broken in the fall, winter or early spring to a depth of about 4 or 5 inches in case of the heavy soils and 5 to 8 inches in case of the light sandy lands. One-horse and two-horse turning plows, ranging from light to moderately heavy, are used for this purpose, the former predominating. It is on the better managed farms that the deeper plowing with heavier plows and teams is done. Cultivation of the intertilled crops is generally shallow, being performed mostly with shallow-running implements, such as sweeps or shovels, and to some extent with side harrows, each drawn by a single mule. The preliminary cultivation of cotton, that is, the siding-off process, is frequently done with turning plows. The inter-row tillage of corn is frequently too deep, the middles often being plowed out deep late in the growing season in such a way as to break many of the rootlets. The general prevalence of crab grass, which springs up abundantly everywhere after rains, necessitates rather frequent cultivation of crops.

Cotton is planted on beds, which are frequently made by breaking out the old beds with plows, the soil being thrown over the old middle. Some farmers break the land broadcast before bedding. When a good stand of cotton is up the beds are generally "barred off" with a turning plow, the earth being thrown away from the

plants. Subsequent cultivation consists mostly of plowing alongside the plants, after they have been thinned with hand hoes, and through the middle with sweeps and shovels, until the cotton is "laid by" about August 1. Grass is removed from between the plants with hoes. Corn usually is handled in about the same way as cotton, with somewhat less intensive cultivation. The crop is planted on beds or in water furrows. In either case the corn is generally laid by on beds; some corn, however, is cultivated level. Where small grain and clover are grown the land frequently is not harrowed sufficiently. Much of the grain and clover is sown broadcast by hand on a rough, poorly prepared seed bed, and this lack of care in seeding obviously has much to do with the usually low yields.¹

Some grain harvesters and drills are in use through the county, but riding plows and plows turning more than one furrow have not yet come into use, except on a few farms. Other implements, especially those employed in the cultivation of crops, are in general inadequate. Heavier implements and teams for breaking the clay lands and more harrows for pulverizing the soil before planting are most needed. There is a tendency toward the use of heavier plows, especially in breaking land.

Little is being accomplished in the matter of keeping open the channels of the small streams, and nothing toward reclaiming the swamp land along the large streams. The artificial drainage so far accomplished consists mainly of ditching wet lands. Not enough of even this reclamation has been done, and in some cases the ditches installed have not been kept properly cleared. Some farmers are installing tile drains in order to have more permanent drainage, to avoid the waste of land, and to avoid making the fields of undesirable form, as is frequently necessary where open ditches are used.

The barns are small, but sufficient to house the work stock and shelter the seed cotton, corn, and fodder. Hay is usually stacked in the open. Corn is usually pulled by hand, sometimes after the blades have been removed or the tops cut, and much valuable roughage is left in the field, which could be saved if the corn stalks were harvested whole. There are a half dozen or more silos of recent construction in the county, and some of the corn is used in filling these. Cattle, hogs, and mules are frequently grazed in the corn fields and in fields of rye, oats, vetch, bur clover, and crimson clover during the winter.

The farmers do not practice a systematic crop rotation, but an increasing number are planting the legumes, such as cowpeas, clovers, vetch, velvet beans, and soy beans as soil improvers, and rye, oats,

¹ Those interested in the production of oats in the section should consult Circular No. 30, N. C. Agr. Exp. Sta., Oats for North Carolina.

vetch, and clover as winter cover crops. The essential feature of a large number of rotations that have proved beneficial on the soils here, as on similar soils over a wide territory in the South, is the growing of legumes and winter cover crops in rotation with the clean-cultivated summer crops. Grain is usually followed by corn or cowpeas or both planted together. Cotton is frequently grown for many years without a change to other crops, but the practice of putting in winter cover crops after the cotton crop, or at least the greater part of it, has been picked is coming into use.

Corn, oats, and cowpeas are the usual crops with which cotton is rotated. The Nebraska College of Agriculture states that a crop rotation should contain a legume, a feeding crop, a cash crop, a cultivated crop, and an uncultivated crop. Two or more of these requirements may be combined in a single crop, such as alfalfa, which is both a legume and a feeding crop, and wheat, which is an uncultivated and a cash crop.¹ A rotation such as that suggested is particularly suited to farming conditions in Nebraska, where much more stock is kept than here, and where grain, corn, hay, hogs, and beef are produced for market, but it is undoubtedly advisable for the farmers of this region to follow a similar rotation as far as possible, particularly in connection with an expansion of stock raising. The North Carolina Experiment Station recommends the following three-year rotation for the eastern part of the State and for the part of the Piedmont section in which cotton is grown: First year, corn; second year, oats and vetch or crimson clover, with cowpeas; third year, cotton with crimson clover.

The census reports \$264,363 spent for commercial fertilizers in Anson County in 1909. According to local merchants, approximately \$400,000 was spent for fertilizers in 1914, when 26,440 bales of cotton were produced. The cotton crop is almost invariably fertilized, the applications ranging from about 200 to 400 pounds per acre and the mixtures, varying in analysis from 8-1.65-2² to 10-4-6. The low grades are by far the most commonly used. The heavier applications are more generally made on the sandy lands of the southeastern part of the county, but good farmers in other parts of the county also make heavy applications of medium to high-grade mixtures. Corn is usually fertilized, but not so generally nor so heavily as cotton. The greater part of the fertilizer consists of commercial mixtures, and most of this is applied in the bed just before planting, although some farmers apply part at this time and the remainder later as a side dressing. Many farmers, however, mix their own fertilizers or apply various fertilizer ingredients at different times, part as a side dressing and part as a top-

¹ Extension News Service, Univ. of Neb., Vol. 3, No. 18.

² Fertilizer formulas are given in the order, phosphoric acid, nitrogen, and potash.

dressing, the latter consisting mostly of sodium nitrate. Acid phosphate, kainit, sulphate of potash, bonemeal, tankage, cotton seed, and cottonseed meal are the more common fertilizer materials used. Barnyard manure is generally saved and carefully applied to the land, but the quantity is small.

There is much variation in the fertilizer treatment from year to year, because of the fact that the best treatment for the varied soils is not understood by the average farmers. Some farmers, however, have studied the effects of various mixtures and quantities of fertilizer on the different soils and use those preparations which experience has demonstrated give the best average results. There are instances where potash is left out of fertilizers used on the granite lands (millstone grit), a practice that accords with the manurial requirements of soils of this kind as shown by tests.¹ Many of the sandy-land farmers use mixtures relatively high in potash, another practice that follows the results of experiment-station tests.²

From time to time burnt lime and ground limestone have been used in a small way, and their use is apparently increasing. In the soils of Anson County liming³ has generally proved beneficial.

The South Carolina Agricultural Experiment Station⁴ finds that " * * * the soils of the Coastal Plain section of the State require more potash than those of the Piedmont region; also that better results are obtained where the application is made to cotton." This station found little profit in applications of potash to small grain and corn on the Coastal Plain soils (represented in Anson County by the Norfolk series). The Piedmont soils (represented in Anson County by the Cecil series) gave no response from potash used on cotton.

The Clemson experiments show identically the same yield for three years without potash as with potash. At Clemson College where twice the normal quantity of potash was used the yield was lower than where no potash was used, probably due to the fact that potash shows a decided tendency to lengthen the growing season of cotton.

In recent years there has been an increasing use of the legumes as soil improvers. Experience shows that expenditures for nitrogen can be materially reduced by growing the legumes in rotation with other crops and by plowing under winter cover crops. This practice, at the same time, makes the soil more retentive of moisture, less inclined to wash, and generally more productive. There remains much to be done in the matter of ascertaining the best fertilizers for different types of soil.

¹ See Buls. Nos. 227 and 229, N. C. Agr. Exp. Sta.

² See The Bulletin, Vol. 35, No. 4.

³ For further information see Cir. No. 28, N. C. Agri. Exp. Sta., "Use of lime on the farm."

⁴ See Bul. No. 182, S. C. Agr. Exp. Station, on Potash.

With the present acreage cultivated there is sufficient labor throughout the county. Practically all hired hands are negroes. In the slate belt most of the farm work is performed by the families of the landowners, and in other parts of the county many farms are worked in this way or by the families of renters. Plow hands usually receive \$12.50 to \$15 a month and board, and day laborers 50 to 75 cents.

The census of 1910 reports the average size of farms of Anson County as 87 acres.¹ There are many farms that contain 200 to 300 acres, and some that contain from 1,000 to over 2,000 acres. In the slate belt the farms are generally small. The percentage of farms operated by owners and tenants is, respectively, 36 and 64 per cent. A common practice in renting is for the tenant to furnish labor, teams, and fertilizer and give for the use of the land 1,000 pounds of lint cotton for each 20 to 30 acres of land used. Some tenants pay a cash rental of \$125 on the same basis. Where the landlord furnishes stock, tools, and one-half the fertilizer and the tenant all labor and one-half the fertilizer, each takes one-half of all crops. Still another plan is for the landlord to furnish all fertilizer and the tenant the stock, labor, implements, and seed, each receiving half the crops grown.

There has been a general advance in the price of farm lands within recent years. The prevailing prices range, according to soil, farm improvements, and location, from about \$20 to \$100 an acre, the latter valuation applying to the better grades of bottom land and the sandy soils, as those in Morven Township. There is little land that can be bought for \$10 or less an acre, the badly washed tracts at a considerable distance from towns bringing the lowest prices.

One cause of the moderate prices of land here is the large area of unused land. Most of this is good farming land, but there are not enough farmers to cultivate it.

SOILS.

As regards origin of material, the upland soils of Anson County fall into two broad divisions—(1) residual soils and (2) sedimentary soils. The former division, comprising the Piedmont Plateau section of the county, or that part directly underlain by granite, diorite, sandstone, slate, shale, and other rocks, includes soils which have been formed through the decay of the underlying rocks, the resultant products here varying with the character of the original rocks and in case of some of the soils with the character of the internal drainage and the degree of erosion to which the decomposed material has been subjected.

There are four principal groups of rocks, each possessing markedly different characteristics, and each giving rise to markedly different

¹ The census tabulates each tenancy as a farm.

groups of soils. These are (1) the granitic rocks of the Jones, Smiths, Island, and Mill Creek sections; (2) the sandstone and shale rocks of Triassic age crossing the central part of the county through Wadesboro; (3) the slates (Carolina slates) occupying the northwestern part of the county, with several important outliers in the southern, southwestern, and eastern parts; and (4) the diorite rocks scattered throughout the county. Veins of quartz are of frequent occurrence in the slate belt, but this rock, owing to its resistant nature, contributes little soil material, although fragments of it are

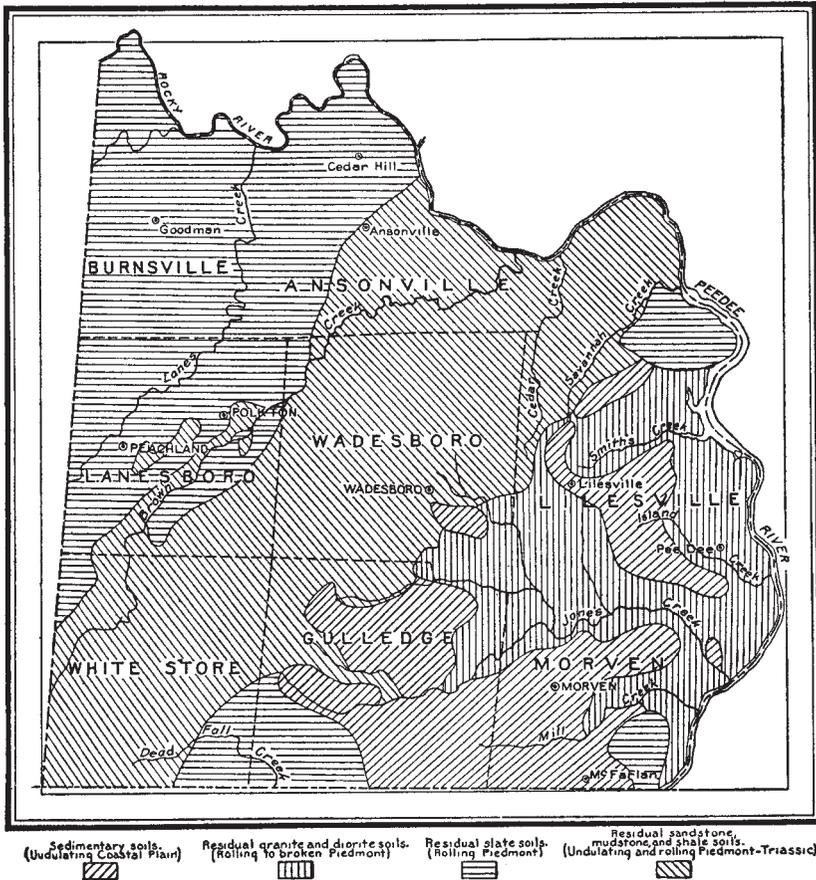


FIG. 13.—Sketch map showing soil divisions of Anson County.

plentiful over the surface of many areas in the slate belt. Figure 13 shows the areas underlain by these rocks, as well as the distribution of other soil-forming materials in the county.

The granite, locally known as millstone grit, is a coarse-grained biotitic granite, high in content of orthoclase feldspar—a potassium aluminum silicate. Locally it contains enough biotite mica to give a somewhat greasy feel to the derivative soil. Under the influence of the agencies of weathering the granite disintegrates and decays to

give rise to a red clay (Cecil material) containing numerous small fragments of partially decomposed feldspar. The diorite, a dark-colored, fine-grained, tough rock, locally known as iron rock, contains, among other minerals, plagioclase feldspar—a silicate of soda, lime, and alumina. This rock, for the most part, weathers into a sticky, plastic, yellowish or greenish-brown clay classed by the Bureau of Soils as Iredell material. Both diorite and granite are igneous rocks, that is, rocks which have crystallized from a molten mass which in this territory appears to have been forced through fissures in other rocks, such as slate, sandstone, and shale, mainly in the form of dikes. Conspicuous examples of diorite dikes are those which give rise to the long, narrow strips of Iredell soil, such as that west of Goulds Fork and that just east of Cox Bennett Siding.

The slates consist of fine-grained rocks, which in the unweathered state have a grayish, bluish or olive color. These rocks are believed to consist of varied mixtures of sedimentary materials¹ which, following deposition, were consolidated and metamorphosed. This group includes rocks of the novaculite and felsite order. The material subsequently formed through the decay of these slates consists largely of silt and clay, the color in the subsoil varying from pale yellow to red, the latter color apparently representing an advanced stage of oxidation resulting from better drainage.

The Triassic rocks (the Newark formation) consist of Indian-red or purplish-red sandstone, mudstone, and shale, with some conglomerate. These rocks are composed of material which was washed from the uplands and deposited in an ancient sea that occupied depressions (probably erosional troughs) in the Piedmont Plateau, and subsequently consolidated by cementation of the particles with compounds of iron. They include some coal beds, such as the thin seam in Boggan's Cut and others encountered in digging wells. The Triassic rocks are developed in a disconnected belt extending from the vicinity of the lower Hudson River to the southwestern corner of Anson County. Upon decay these rocks give rise to sandy and clayey soils, varying in color according to local drainage, the principal subsoil colors being brick red (Wadesboro material), dark red or mottled red and gray (White Store material), and yellow (Granville material). Near the diorite dikes which have cut through the Triassic rocks there has been some change of the sandstone, mudstone, and shale by contact metamorphism, resulting in the development of bluish and grayish colors; but the areas of such altered rocks are of small extent and the patches of soil derived from them are not outlined on the map.

The Triassic rocks have, on the whole, decayed deeper than the other rocks, the depth to bedrock ranging from about 4 to 25 feet or

¹ Bul. No. 22, N. C. Geol. and Econ. Survey.

more. On some of the steeper slopes the soil has been washed off, exposing small outcrops of the rock. The average shallowest layer of soil material is encountered in the slate belt, where the depth to bedrock ranges from only a few inches on the slopes to 5 or 6 feet, as a rule, over the more nearly level areas. There are in the slate belt many rock exposures on the washed slopes, and fragments of slate and quartz occur in many places on the surface. In the granite lands the depth of the more thoroughly weathered red clay ranges from about 3 to 10 or 15 feet, although the disintegrated granite may extend downward to 30 feet or more before hard rock is reached. There are here, also, outcrops of rock on the washed slopes, and large granite boulders are conspicuous features over many parts of these soils. In many places there is a layer of soft, partially decomposed rock between the red-clay soil layer and the bedrock. The diorite has weathered to an average depth of about 4 or 5 feet.

The Coastal Plain soils are derived from sedimentary material, consisting of wash from the older land areas, laid down over the border of the Piedmont rocks as deposits in the ancient sea that covered all eastern North Carolina. With exposure to the air this material underwent the same weathering processes as those which have caused the rocks of the Piedmont to decay. Much of the original fine material has been washed away, leaving only the larger water-rounded pebbles and cobbles. This process is still going on, with the result that the area of sedimentary soils is being diminished while that of the residual soil is being correspondingly increased. In other words, the unconsolidated Coastal Plain material is being washed off the slopes and ridges of the Piedmont. In many places the surface material has been swept down over the lower slopes to form deep layers of soil there, leaving clay, gravel, and rock at the surface on the eroded slopes above. In other places the fine particles of clay and silt have been washed out, leaving behind a surface mantle of sandy soil. The remains of vegetation have contributed material to the soil in sufficient quantity in places to impart a darker color and a somewhat loamy character to the surface layer. The sedimentary soils are very sandy and are predominantly yellow in the subsoil (Norfolk material) with many gravelly areas, especially where Coastal Plain material forms the surface soil and residual material the subsoil (Bradley material)

The stream-bottom soils, the most recently formed soils of the county, are derived from alluvial material, that is, material that has been washed down from the uplands and deposited over the flood plains of the rivers and creeks. During every overflow additional material is spread out over the bottoms, so that the soils are still in the process of formation. This alluvial material naturally varies greatly in origin from place to place, depending on the char-

acter of the soils occurring on the slopes of the drainage basins. It also varies according to the condition of drainage in the bottoms between the periods of overflow, the better drained bottom soils being brown to reddish and the more poorly drained soils grayish or mottled grayish, yellowish, and bluish. Along the Peedee and Rocky Rivers, Jones Creek, and certain other streams the alluvial soils are brownish to reddish and have a considerable content of mica flakes washed from upland granitic formations. These are classed in the Congaree series. Along creeks of the Triassic belt, Goulds Fork, for instance, the bottom soils are brownish and reddish and do not contain mica flakes, the derived soils being grouped in the Bermudian series.

There are some small, scattered strips of second-bottom or stream-terrace soils, representing old alluvium which was deposited when the streams were flowing at higher levels than at present, that is, before the streams had cut their channels to the present depth.

The soils are classified into gravelly loams, sands, sandy loams, loams, silt loams, and clay loams, according to the content of gravel, sand, silt, and clay. They are further grouped into series, based upon topography, drainage, color, and origin of the various soils.

The Cecil series includes residual soils derived mainly from granite, although much of the clay loam type is from a dense, dark-colored rock, probably diorite. The subsoil is a brittle red clay, that derived from the granite containing a considerable quantity of incompletely decomposed rock fragments, such as feldspar and quartz. The clay loam has a reddish-brown surface soil and the gravelly loam a pre-vaillingly brown surface soil. These soils are rolling to steeply sloping and are well drained. Two types represent the series in this county—the gravelly loam and clay loam.

The Iredell series includes residual soils derived from diorite, locally called "iron rock." They have grayish-brown to brown surface soils and yellowish-brown or greenish-brown, sticky clay subsoils. Small, black concretions, known locally as "buckshot," are of common occurrence in these soils. The areas occupy flat to undulating country. The drainage ranges from fairly good to rather poor, except on the steeper slopes, where the rapid run-off is inclined to cause erosion. Only one type—the Iredell loam—is mapped in Anson County.

The types included in the Wadesboro, White Store, and Granville series are residual soils derived from the Triassic sandstone, mudstone, and shale.

The Wadesboro series is characterized by the dark-red color and moderately friable structure of the clay subsoils. The surface material is grayish in the case of the lighter textured types and reddish in the case of the heavy soils, such as the clay loam. The substratum

in many places shows the purplish or Indian-red color of the true Penn soils,¹ but material of this color is seldom encountered within the 3-foot section. The subsoil of the Wadesboro often shows the brick-red color of the Cecil series, the absence of the purplish or Indian-red color possibly being the result of leaching or of some peculiar condition of oxidation. The soil material is not so stiff or so calcareous as the Penn material. The topography is undulating to rolling or hilly, and the drainage is well established. The Wadesboro series is represented in Anson County by four types—the gravelly sandy loam, fine sandy loam, loam, and clay loam.

The White Store series is characterized by the dull-red to dark chocolate red surface soils and by the plastic, sticky nature of the subsoil, showing in many places mottlings of gray and yellow. The surface soil is grayish in the case of the lighter textured types and reddish in the case of the heavy types. The subsoil is much more plastic and sticky than that of the Wadesboro series, the lower subsoil approaching closely the characteristics of the Susquehanna clay.² The topography is nearly level to undulating or rolling; the surface drainage is well established. The mottling of the subsoil is probably due to imperfect oxidation resulting from the dense, impervious character of the clay. The soil material washes readily on slopes where shallow plowing and clean cultivation are practiced, deep gullies forming rapidly. Efficient cultivation is limited to a narrow range of moisture conditions, the soil being sticky when wet and compact when dry. In the White Store series two types are mapped—the fine sandy loam and clay loam.

The Granville soils are gray in the surface portion and yellow and friable in the subsoils, with heavier, mottled grayish, yellowish, and reddish lower subsoils. The drainage of the undulating types is good, but that of the more nearly level types is not so well established. In Anson County the Granville series is represented by three types—the sandy loam, fine sandy loam, and silt loam.

The soils included in the Georgeville and Alamance series are residual from slate rocks.

The Georgeville series includes those types having grayish to reddish surface soils and red, compact clay subsoils. The surface is rolling and the drainage is good. Four types are mapped in this county—the Georgeville gravelly loam, slate loam, silt loam, and clay loam.

The Alamance series includes light-grayish, silty surface soils and yellow, compact silty clay subsoils, in many places mottled with

¹ The Penn soils are derived from Triassic rocks and occur extensively in this belt in northern Virginia, in Maryland, Pennsylvania, and New Jersey.

² An extensive soil of the Susquehanna River region and of southern Georgia and Alabama, of Mississippi, western Louisiana, and eastern Texas.

grayish and reddish colors in the lower part. The surface is smoother than that of the Georgeville soils. The drainage is prevailingly good, but in the flat areas not so good as that of the Georgeville types. The Alamance series is represented in Anson County by the slate loam and silt loam types.

In the following table are given the results of chemical analyses by the fusion method of representative samples of several soil types:

Chemical analyses¹ of Cecil, Iredell, Granville, Wadesboro, and White Store soils:

Soil.	Sample number and location.	Depth of sample.	Potash K ₂ O.	CaO.	P ₂ O ₅ .	N.
		Inches.	Per cent.	Per cent.	Per cent.	Per cent.
Granville fine sandy loam.	233813, ½ mile SE. Smiths Ferry.	0-5	0.12	0.18	0.11	0.06
	233814, ½ mile SE. Smiths Ferry.	5-15	.43	.15	.11	.04
	233815, ½ mile SE. Smiths Ferry.	15-36	.45	.14	.12	.06
Granville silt loam...	233816, ¾ mile S. Smiths Ferry..	0-5	.61	.13	.09	.07
	233817, ¾ mile S. Smiths Ferry..	5-12	.24	.14	.08	.04
	233818, ¾ mile S. Smiths Ferry..	12-36	.35	.08	.07	.03
Cecil gravelly loam..	233819, 2 miles N. Lilesville.....	0-12	4.03	.20	.18	.04
	233820, 2 miles N. Lilesville. . .	12-36	2.74	.17	.16	.06
Iredell loam.....	233854, 1½ miles NW. Hornes School.	0-5	.68	.89	.13	.13
	233855, 1½ miles NW. Hornes School.	5-36	.22	2.56	.17	.08
Wadesboro fine sandy loam.	233860, ½ mile SW. Wadesboro.	0-10	.40	.12	.11	.06
	233861, ½ mile SW. Wadesboro.	10-30	2.20	.11	.20	.07
White Store clay loam.	233864, 1 mile NE. Union Church.	0-4	.84	.51	.15	.07
	233865, 1 mile NE. Union Church.	4-36	1.28	.46	.13	.07

¹ Complete analysis.

The Bradley series has surface soils corresponding to those of the Norfolk, but the subsoil consists of red residual clay from Piedmont rocks. The Bradley series represents Coastal Plain material overlying Piedmont material. The surface is rolling and the drainage is thorough. The Bradley gravelly sandy loam and coarse sandy loam are mapped in Anson County.

The Norfolk soils are derived from unconsolidated Coastal Plain material. They are gray and loose textured in the surface soil and yellow and friable in the subsoil. Their surface is undulating and the drainage is good to excessive. These soils can be cultivated almost immediately after heavy rains. Two types are mapped in the county—the Norfolk sand and sandy loam.

The Congaree, Bermudian, Wehadkee, and Altavista soils are derived from alluvial (stream-bottom) material.

The Congaree series includes brown to reddish-brown soils containing mica flakes. The material is of varied origin, but includes consid-

erable wash from granitic soils. The Congaree soils are well drained between periods of overflow. The series is represented in this county by the fine sandy loam and silt loam types.

The Bermudian series includes reddish-brown, friable soils, derived wholly or to a considerable extent from material washed from the Wadesboro, White Store, and Granville soils. The drainage is fairly well established between periods of overflow. Two types are mapped in Anson County—the Bermudian loam and silty clay loam.

The Wehadkee soils are derived mainly from wash from the slate soils. They are grayish in the surface portion and mottled grayish and yellowish and often bluish in the subsoil. The drainage is poor, even between periods of overflow. The Wehadkee silty clay loam is the only type of this series mapped in the county.

The Altavista soils occur on the second bottoms of streams, and are no longer subject to overflows. The material is derived from old alluvium of varied origin. The surface soils are gray and the subsoils are mottled yellowish and grayish. The drainage is only fair. One type, the Altavista fine sandy loam, is mapped in this county.

The following table gives the name and the actual and relative extent of the various soil types mapped in the county:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Georgeville silt loam.....	38,592	11.2	Bradley gravelly sandy loam.....	10,048	2.9
Cecil gravelly loam.....	36,160	10.5	White Store fine sandy loam.....	9,280	2.7
Norfolk sandy loam.....	23,360	6.8	Bermudian silty clay loam.....	7,936	2.3
Alamance silt loam.....	20,608	6.0	Wadesboro gravelly sandy loam..	6,400	1.9
White Store clay loam.....	19,200	5.6	Iredell loam.....	6,016	1.7
Granville fine sandy loam.....	17,792	5.2	Bradley coarse sandy loam.....	4,864	1.4
Alamance slate loam.....	17,536	5.1	Georgeville clay loam.....	4,480	1.3
Wadesboro fine sandy loam.....	16,832	4.9	Granville silt loam.....	4,160	1.2
Norfolk sand.....	15,040	4.4	Cecil clay loam.....	3,904	1.1
Wadesboro loam.....	12,992	3.8	Wadesboro clay loam.....	3,712	1.1
Congaree silt loam.....	12,800	3.7	Wehadkee silty clay loam.....	2,752	.8
Georgeville slate loam.....	12,416	3.6	Congaree fine sandy loam.....	2,240	.6
Bermudian loam.....	12,224	3.5	Altavista fine sandy loam.....	1,856	.5
Granville sandy loam.....	7,744	3.1	Total.....	344,960
Mixed phase.....	3,264				
Georgeville gravelly loam.....	10,752	3.1			

CECIL GRAVELLY LOAM.

The surface soil of the typical Cecil gravelly loam consists of a light-brown gravelly loam to gravelly sandy loam, passing at about 5 to 8 inches into a yellow or reddish gravelly loam which extends to a depth of about 10 to 15 inches. The subsoil is a red, brittle clay.

Where the soil is shallow its color is reddish in places. Small, angular fragments, chiefly whitish, partially decomposed feldspar from the parent rock, a coarse-grained granite, are abundant in the surface soil and are present to a less extent throughout the subsoil. Also, partially decomposed mica is frequently plentiful through the 3-foot section, but the clay does not, as a rule, possess the characteristic greasy feel of the Louisa soils, mapped elsewhere in the Piedmont region.

Some rounded gravel particles consisting of quartz and quartzite are present in many places over the surface, these representing the remnants of an earlier covering of Coastal Plain material, the finer particles of which have been washed off. Some of these gravel fragments range up to about 3 inches in diameter. In places large granite rocks of a roundish shape are conspicuous over the areas of this land. The more completely weathered material, as represented by the red-clay layer, extends to a depth of about 3 to 15 feet, but often a mass of partially decomposed granite extends to a depth of 30 feet or more before hard bedrock is encountered.

This soil is locally styled "millstone grit." The type as mapped includes spots of Cecil clay loam and Bradley soils too small to map separately.

The Cecil gravelly loam is confined to the eastern and southeastern parts of the county. It is developed in a broad belt along the Peedee River from Ingrams Level nearly to Buchanan Ferry, with large strips extending up Smiths Creek Valley to Lilesville, up Mill Creek Valley nearly to Parsons Mill, and along Jones Creek to a point south of Wadesboro.

The topography is prevailingly rather strongly rolling, with the steepest slopes near the streams, which flow in deep-cut valleys. Many of the slopes are so steep that erosion is a serious factor in cultivation. Underdrainage is good, but the soil holds moisture well.

The Cecil gravelly loam is an important soil in the agriculture of the county, both on account of its extent and from the standpoint of productiveness. Probably 60 per cent of the type is under cultivation. The remainder is occupied by old-field pine or is lying idle as old fields.

Cotton is the principal crop, with some corn, oats, and cowpeas grown for hay and as means of improving the soil. Crops mature early. Cotton yields¹ from one-fourth to about three-fourths of a bale per acre, according to the condition of the land, the manurial treatment, and seasonal conditions. The quality and color of the

¹ The statistics of yields given in this report are based upon statements of farmers, field observations, and the census figures.

fiber are good, especially the color, and usually better prices are received for the product than for that from some of the other soils of the county. Corn yields about 25 bushels per acre, and oats and cowpeas do comparatively well. Of the crops of less importance, garden vegetables, vetch, sorghum, sweet potatoes, Scuppernong grapes, peaches, and early apples succeed very well.

This soil is handled in about the same way as the other upland soils of the county. Plowing is ordinarily about 4 or 5 inches deep, and cultivation of the growing crops is shallow and frequent. One-horse implements are generally used. Light turning plows are employed in breaking land, while light-running shovels, sweeps, and cultivators are the principal implements used in the cultivation of crops.

Commercial fertilizers are nearly always applied to cotton and corn. For cotton applications of 250 to 400 pounds per acre of a mixture analyzing 8-2-2 are generally made. Smaller quantities are used for corn. Some farmers use no potash on this land.

The present value of land of the Cecil gravelly loam ranges from about \$10 to \$35 an acre, according to location, topography, and improvements.

Perhaps the most difficult problem in handling the Cecil gravelly loam is the prevention of erosion on the steeper slopes. While many farmers maintain terraces and all of them run the plant beds with the contours, that is, along a line of approximately equal elevation, there are too many instances where terraces are not kept up properly or have not been built at all, and there has been a tendency to use areas of too steep a gradient for clean-cultivated crops. The steeper slopes should either be properly terraced or used only for soil-binding crops, such as Bermuda grass, clover, and vetch-oat mixtures for pasturage and hay. There are some slopes which are too steep for satisfactory cultivation, and these should be allowed to grow up in old-field pine or be used for pasture land.

The experiences of the better farmers show that cowpeas or other legumes should be used in rotation with such crops as corn and cotton to supply organic matter and otherwise to improve the soil. Fall plowing is beneficial on land of this kind, but following this operation all sloping areas should be seeded to some winter cover crop such as wheat, oats or vetch to prevent washing.

It is generally believed that this land does not need much potash for the crops now grown, although it is said that cotton may rust to some extent unless some potash is used. Tests made by the North Carolina Agricultural Experiment Station on the Cecil sandy loam, a soil which is closely related to this type, indicate that cotton requires very little potash, that corn shows practically no benefit from

it, and that little benefit is derived from the use of lime alone for either cotton or corn.¹

Owing to the ease with which good yields of a large variety of forage crops and of grazing crops such as lespedeza and Bermuda grass are produced, it would seem that more stock should be raised, especially cattle and hogs. With an increase in the number of animals kept, more manure would be available for use on the soil, and this is one of the best materials that can be used for building up the type. Dairying could be made a successful industry if market conditions were favorable. The Cecil soils have proved to be well suited to peaches in several parts of the Piedmont Plateau Province, and there is little doubt that this fruit could be successfully grown on a commercial scale on this type provided easy access to markets could be found. Summer varieties of apples and the winesap, a late variety, succeed on it, but little attention is given to fruit growing, the trees are seldom sprayed, and there are no large orchards. The Cecil soils are extensively used for growing plug tobacco in the north-central part of the State and in southern Virginia.

It would apparently be inadvisable to abandon the production of cotton on this type. Development of the other lines of farming suggested and the devoting of greater attention to the other crops mentioned would make possible the establishing of a more balanced type of agriculture to take the place of the essentially one-crop specialized system of farming which is practiced at present.

CECIL CLAY LOAM.

The Cecil clay loam in its typical development consists of a reddish-brown to dark-red clay loam, underlain at about 3 to 6 inches by brittle red clay. Frequently there is a surface layer of sandy loam or loam, but in most of these patches the soil becomes a clay loam with plowing. In a number of the areas mapped there are spots where the surface soil has been washed away, leaving the red clay exposed. There are also included patches of Cecil gravelly loam and Bradley gravelly sandy loam which were too small to map separately.

The Cecil clay loam is an inextensive type. It occurs principally in the eastern and southeastern parts of the county, the most important areas being those about Ingrams Level, west of Buchanan Ferry, and along Jones Creek.

The topography is undulating to sloping and the drainage is good, some of the steeper slopes being subject to erosion.

Owing to its small extent, this is not an important soil type, although most of it is under cultivation. Cotton is the chief crop

¹ See Buls. Nos. 227 and 229, N. C. Agr. Expt. Sta.

grown and corn ranks second. Small grains and cowpeas are grown to some extent. At least one farm on this type is devoted to the raising of sheep, cattle, and hogs. Cotton yields, with the best treatment, 1 bale per acre and corn 20 to 30 bushels.

Heavy teams and implements are necessary for the most efficient breaking of this land. It can not be safely cultivated when wet. The soil is naturally low in organic matter, and unless this constituent is replenished, it is difficult to work up a good seed bed. While deeper plowing is advisable, it is not a good plan to increase the depth of plowing more than 1 or 2 inches in a single year. Applications of lime have proved very beneficial on this type of soil in various parts of the Piedmont region, improving its tilth and increasing yields, especially of red clover and alfalfa. Probably not much potash is needed for crops other than tobacco.

Dark "export" tobacco of the chewing type is successfully grown on this soil in northern North Carolina and in Virginia. Orchard grass, wheat, oats, red clover, and soy beans have proved successful here or elsewhere on this type of soil, and alfalfa has been grown with good results in a small way. This crop is favored on this soil by the comparative absence of crab grass, a plant that is in many places able to crowd alfalfa out. The winesap apple has been successfully grown on this soil on a commercial scale in some parts of North Carolina, Virginia, and Maryland.

IREDELL LOAM.

The Iredell loam consists of a brown to dark-brown or nearly black loam, underlain at about 5 to 12 inches by a yellowish-brown or greenish-brown, sticky clay. In places the subsoil is somewhat bluish. Small black concretionary pebbles, probably composed chiefly of iron compounds, are in many places present in the soil and subsoil. There are, as mapped, some included areas of Iredell stony loam and clay loam, the larger stony areas being shown by stone symbols. Locally this type is known as "bull-tallow" land.

This type occurs mostly in long, narrow strips in the northeastern part of the county and to the west, northwest, and southwest of Wadesboro, following dikes of diorite cutting through the Triassic sandstone belt. Some of these strips are not more than 100 to 300 yards wide for a distance of 5 or 6 miles. In some of those areas shown on the map as continuous strips the soil may be found to pinch out occasionally for short distances. In Burnsville Township and elsewhere there are areas in which diorite rocks are scattered over the surface, such as that 1 mile east of Burnsville Church. A number of patches were too small to map separately on the scale employed.

With the exception of occasional strips and patches on stream slopes and hillsides, the surface is nearly flat. Underdrainage is poor, owing to the impervious nature of the dense clay subsoil, and in places the surface run-off is slow.

Owing to its relatively small extent this type is not of much importance. Less than 20 per cent of it is under cultivation. The land is used chiefly for cotton, but to some extent for corn and small grain. When the season is favorable, neither very dry nor very wet, fair to good results are had with these crops. As much as a bale of cotton per acre is obtained in some years.

The Iredell loam is a difficult soil to plow deeply, especially where the sticky clay is near the surface. If it is plowed when wet clods are formed which are difficult to pulverize. The type is handled and fertilized in about the same manner as the soils with which it is associated.

The heavy Iredell soils are generally considered as being best suited to the production of shallow-rooted crops, such as wheat and grass, but on the whole this soil constitutes rather good cotton land. There is some lime in the soil (samples analyzed show .89 and 2.56 per cent in the soil and subsoil, respectively), and it is possible that sweet clover (*melilotus*) would succeed. Additions of lime to this soil may not be needed.

WADESBORO GRAVELLY SANDY LOAM.

The Wadesboro gravelly sandy loam consists of a grayish to yellowish-brown, coarse to medium sandy loam, containing an abundance of rounded and angular quartz and quartzite gravel, and underlain at 6 to 10 inches by a brick-red friable clay. In places there is a layer of yellowish coarse sandy loam or sandy loam between the grayish surface soil and the red subsoil, and here the subsoil is often of a lighter red color. Numerous spots of Granville gravelly sandy loam too small to be mapped separately are included with this type.

The Wadesboro gravelly sandy loam is inextensive. Its principal development is in the vicinity of Wadesboro, about 1½ miles north-west of Lilesville, and to the southeast of Ansonville.

The topography is rolling to hilly and the drainage is excessive.

The type is unimportant. Cotton is the principal crop, producing lower yields than on the Wadesboro fine sandy loam. Cowpeas fruit well. Judging from the results on similar soils, peaches should give good results on this type. Peanuts probably would do well.

The following table gives the results of mechanical analyses of fine-earth samples of the soil and subsoil of the Wadesboro gravelly sandy loam:

Mechanical analyses of Wadesboro gravelly sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
233838.....	Soil.....	7.3	13.9	6.5	25.9	15.5	24.2	6.7
233839.....	Subsoil.....	.7	1.9	1.0	8.4	8.8	31.4	47.7

WADESBORO FINE SANDY LOAM.

The surface soil of the Wadesboro fine sandy loam is a grayish to light yellowish brown fine sandy loam, underlain at about 3 to 5 inches by pale-yellow, heavier fine sandy loam. The subsoil, beginning at a depth of 6 to 12 inches, is a brick-red, moderately friable clay, showing in some places yellowish mottlings. The color of the soil is lightest where the sand content is greatest. The subsoil is not quite so friable as that of the Orangeburg fine sandy loam, which is an important soil in many parts of the Coastal Plain, but is a little more friable than that of the Cecil fine sandy loam. Rounded and occasionally angular quartz and quartzite gravel particles are of frequent occurrence, but the soil is very gravelly only in patches, and these were not separated, owing to their small extent. There are some small included areas of Granville fine sandy loam.

The largest area of the Wadesboro fine sandy loam is that extending from Wadesboro to Birmingham School. There are many other small to fairly large bodies in the sandstone belt. These occur mostly northeast and southeast of Wadesboro.

The topography is prevailingly rolling or gently rolling, but there are some steep slopes which have been rather severely eroded. Considerable areas also are undulating. (See Pl. XVIII, fig. 2.) The surface run-off on the steeper slopes is too rapid for safe cultivation, without terracing, otherwise the drainage features are good.

The Wadesboro fine sandy loam occupies 26.3 square miles in Anson County, and the greater part of the land is in cultivation. The uncleared areas support dogwood, hickory, oak, pine, and cedar in the virgin growth, and pine and cedar in the second or third growth. (See Pl. XIV.)

Cotton is the chief crop. Some corn, oats, and cowpeas are grown, and there are a few apple and peach trees. The yields are about the same as on the Wadesboro loam. Cotton fruits well, and it is not difficult to produce a bale per acre with moderate fertilization or manuring. There is less inclination of cotton to rust on this soil than on the sandy soils with yellow subsoils, and with the same manurial treatment slightly heavier yields may be expected.

The price of the land corresponds closely to that of the loam type.

The type is handled in about the same way as the loam and apparently requires about the same treatment. On slopes of equal gradient it does not wash so readily, is easier to plow, and can be cultivated under a wider range of moisture conditions. The soil is easily cultivated and only light teams and implements are required for good tillage.

In Georgia, Texas, and other parts of the South the Orangeburg fine sandy loam, which resembles this type in physical properties, is extensively used for the commercial production of peaches and strawberries. In southwest Georgia, western Florida, and southern Alabama the sandy Orangeburg soils are used for the production of cigar-wrapper tobacco, grown from seed imported from Sumatra.¹

Experience of farmers in the county shows that bur clover, crimson clover, velvet beans, soy beans, peanuts, rye, and sweet potatoes are well suited to the Wadesboro fine sandy loam.

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

Mechanical analyses of Wadesboro fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
233860.....	Soil.....	1.9	6.0	3.9	20.6	24.2	37.6	5.9
233861.....	Subsoil.....	.6	1.6	1.4	6.4	8.4	36.7	44.8

WADESBORO LOAM.

The typical Wadesboro loam consists of about 6 inches of brownish-gray or light-brown fine loam, overlying yellowish to slightly reddish silt loam or silty clay loam, which passes at an average depth of about 10 inches into brick-red, friable silty clay. There are numerous small knolls or hillocks and ridges through the type where the surface soil to the depth of about 6 inches is a brown to reddish-brown loam, containing small, angular, reddish, fine-grained sandstone gravel, the loam being underlain by brick-red, friable silty clay or clay. Occasionally partially disintegrated bedrock is encountered within the 3-foot section.

There are areas of more nearly level topography where the surface soil is deeper than usual, being a brownish-gray, floury loam to silt loam to a depth of about 6 inches, passing through a pale-yellowish silt loam or silty clay loam into yellowish-red, friable silty clay. This yellowish-red material is reached at a depth of

¹ See Soil Survey reports of Grady County, Ga., Jefferson County, Fla., and Baldwin County, Ala., F. O. Bureau of Soils, 1908, 1907, and 1909, respectively.

about 15 inches and generally becomes brick red in the lower part of the 3-foot section. Another variation occurs in which the surface soil is a brownish to yellowish or reddish silty loam, underlain at about 5 to 10 inches by a red, friable clay. Some areas of Granville silt loam too small to be separately outlined on the map are included with this type.

The principal area of the Wadesboro loam is a strip extending west from Wadesboro to Goulds Fork and thence northeasterly to Dumas Ferry on the Peedee River. There are a considerable number of areas of less importance.

The surface is characteristically undulating to gently rolling (see Pl. XVIII, fig. 1), with some fairly prominent ridges and knolls in the more rolling areas. The drainage is good, and the soil holds moisture satisfactorily. The steeper slopes are subject to gullying with continued clean cultivation of crops unless properly tended and terraced.

This is an important agricultural soil, the type being fairly extensive. Probably 50 per cent of it is under cultivation, the remainder being for the most part occupied by second-growth forest, principally pine, with a scattering of cedar in many places. It is a medium-early soil for cotton and corn, the principal crops.

Cotton ordinarily yields about one-half to 1 bale to the acre, much depending upon the fertilizer treatment. Corn, under the prevailing system, yields about 25 bushels per acre. Oats, which are grown in small, scattered fields, yield about 30 bushels per acre in good years. Cowpeas do well.

This type is handled in the same way as the other soils of the uplands and is used for the same crops. The land is commonly broken about 4 or 5 inches deep with only moderately heavy plows, drawn usually by one mule. A fertilizer mixture analyzing 8-3-4, in applications of 400 to 600 pounds per acre, has given a bale of cotton per acre, but lighter applications of lower grade mixtures are the rule.

At present this land can be bought for \$20 to \$40 an acre, depending on the location and improvements. There are some highly improved farms, composed chiefly of this type, which are held at considerably higher prices.

Deeper fall plowing would provide a better seed bed for all crops, although with liberal applications of fertilizer good results with cotton are obtained under the present methods of tillage. Another and perhaps more important need is a systematic crop rotation including the legumes, such as cowpeas, soy beans, vetch, bur clover, and crimson clover. Such treatment may be expected to give much better yields of corn and oats, and also better average yields of

cotton. The soil may be improved with moderate applications of lime, say 1,000 pounds of burnt lime or 2,000 pounds of ground limestone per acre. Even heavier applications may be advisable. Litmus-paper tests indicate an acid condition, at least in places, and this is generally considered as an indication of the need of lime.

Wheat, summer apples, peaches, and strawberries are occasionally grown on this type for home use. The Orangeburg soils and others somewhat similar to this type have been successfully used in Georgia, Texas, and other Southern States for the commercial production of peaches and strawberries.

WADESBORO CLAY LOAM.

The Wadesboro clay loam consists of a brownish-red or reddish-brown clay loam which passes at an average depth of 5 or 6 inches into rather compact, moderately friable, brick-red clay. In places the lower subsoil is somewhat plastic. Often there is considerable sand in the immediate surface soil, but on the whole the soil when plowed is a clay loam. There are also places where rounded gravel of quartz and quartzite is rather plentiful over the surface, and occasionally the bedrock of Indian-red sandstone or mudstone outcrops in eroded areas. The substratum frequently shows the Indian-red color of the Penn soils, a series of soils derived from Triassic rocks in Virginia, Maryland, and Pennsylvania, but above this the color is more like that of the Cecil soils.

The principal area of the Wadesboro clay loam is found southwest of Wadesboro on the Camden Road. Small areas occur elsewhere in the "brownstone belt."

The surface is gently rolling and the drainage is good (see Pl. XIX). When wet the soil is sticky, and it can not be cultivated under as wide a range of moisture conditions as the sandy soils. On drying the soil tends to harden and moisture evaporates from the surface rapidly.

Although inextensive, this soil is locally important, and it is nearly all under cultivation. Cotton is the principal crop; some oats, cowpeas, corn, and wheat are grown. All these crops do well, cotton yielding as much as a bale per acre, and corn 25 bushels or more where the land has been deeply plowed and cowpeas or other legumes have been grown. The improvements on this land in the way of tenant houses and hillside terraces are generally good.

Land of the Wadesboro clay loam is valued at \$25 to \$40 an acre, with some higher priced farms where the improvements are exceptionally good.

For proper breaking heavy teams and plows are required. The soil is handled at present in about the same way as the other upland

soils, but deeper plowing should be practiced and light-running implements should be more generally used in cultivation in order that moisture may be stored and preserved. Green manuring crops, preferably the legumes, should be grown in rotation with cotton, corn, and small grains.

Judging from the results obtained with red clover and alfalfa on the Penn clay loam, a closely related type found in other sections of the Piedmont Plateau province, it would seem that these crops could be successfully grown on the Wadesboro clay loam, although liming would probably be necessary. Beef cattle and hog raising, as well as dairying, should also prove profitable, although it would be necessary to harvest much of the feed for roughage and ensilage, as such clayey land is not well suited to grazing in wet weather. The soil tends to become puddled if trampled too much when wet and sticky, and subsequently to become hard and intractable. Orchard grass and red clover probably would do well.

WHITE STORE FINE SANDY LOAM.

The White Store fine sandy loam differs from the White Store clay loam principally in that the surface soil is a fine sandy loam instead of a loam or clay loam. The subsoil of the two types is essentially the same. The most typical areas of the fine sandy loam type consist of a grayish to pale yellowish brown fine sandy loam, becoming yellowish at a depth of 3 to 5 inches and overlying a brownish-red, stiff clay at 5 to 10 inches. The subsoil is sticky and plastic in the lower part and in places is mottled. It was found impracticable to separate many small patches of the White Store clay loam, which are included with this type.

The White Store fine sandy loam occurs in scattered areas in association with the clay loam of the same series, chiefly in White Store Township and the southern part of Lanesboro Township.

The surface is, on the whole, smoother than that of the clay loam member of the series. The type occupies the gentler slopes and flat areas where the surface soil has not been washed off. Surface drainage is good and ditching is never necessary, although water percolates slowly through the dense clay subsoil. On the steeper slopes, when used for such crops as cotton and corn, the surface soil is readily washed away where the land is not properly terraced; and if the erosion is not checked, gullies are soon formed.

Probably half of this type is in cultivation, the remainder being mostly reforested with old-field pine. It is a soil of considerable local importance, a much larger proportion of it being cultivated than of the White Store clay loam. It is not so extensive, however, as the clay loam.

This soil is handled and fertilized in the same way and used for the same crops as the White Store clay loam, although it is easier to cultivate and to protect against erosion, and plowing can be done over a wider range of moisture conditions. It is considered more productive than the clay loam. Cotton frequently yields as much as three-fourths bale per acre in the most favorable seasons with intensive methods, and a bale per acre has been obtained in many instances. Corn suffers less in dry weather than on the clay loam. The yields of this crop range from about 10 to 30 bushels per acre, according to treatment and seasonal conditions.

In price land of this type ranges from \$15 to \$35 an acre.

For its improvement this soil requires about the same treatment as the White Store clay loam. It is suited to a wider range of crops, and gives better results with such crops as vegetables, sweet potatoes, watermelons, peanuts, and cowpeas. Beef cattle, hogs, and sheep could be successfully raised. More attention would have to be given to forage crops and grasses if cattle and hog raising should be attempted on a large scale.

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

Mechanical analyses of White Store fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
233821, 233858.....	Soil.....	0.9	3.3	2.1	18.5	28.2	37.4	9.5
233822, 233859.....	Subsoil.....	.0	.3	.6	5.7	12.4	27.1	53.8

WHITE STORE CLAY LOAM.

The White Store clay loam consists of a grayish or pale-yellow to brownish-red loam or reddish clay loam, passing at 2 to 4 inches into a dull-red or chocolate-colored, stiff, heavy clay, which becomes plastic and sticky in the lower part. In many places the lower subsoil and the substratum are mottled with grayish, yellowish, whitish, and purplish colors, the material here resembling closely the subsoil of the Susquehanna soils of the Chesapeake Bay region and of southwest Georgia, southern Alabama, eastern Mississippi, western Louisiana, and eastern Texas. Occasionally some mottling extends almost to the surface, and again the upper subsoil is mottled and the lower subsoil uniformly reddish. The soil is sticky when wet and is inclined to harden when dry, the subsoil exposures cracking in the manner of "joint clay."

As mapped there are included with this type many small eroded areas of White Store clay and patches of White Store loam, fine

sandy loam, and Granville fine sandy loam, as well as occasional spots of Wadesboro soils, all of which are too small or too irregular in outline to justify separate mapping.

The White Store clay loam is commonly spoken of as "lime land," a term which probably has its origin in the whitish color of the mudstone, sandstone or clay frequently seen in exposures of the substratum, as in gullies, and in the fact that the well water is often brackish. It is not a limestone soil, nor is the content of lime unusually high, samples analyzed showing .51 and .46 per cent of calcium oxide.

The type occurs in an almost continuous belt through the central part of White Store Township and across the northwestern corner of Gullede Township, the southeastern corner of Lanesboro Township, and for several miles into the southwestern part of Wadesboro Township. Probably one-half of White Store Township is occupied by this type. The surface is undulating and rolling to rough and broken along some of the streams and slopes where gullying has not been checked. A considerable part of the type, perhaps 10 per cent, has been allowed to wash and gully to such an extent that it can not be cultivated. The surface drainage is good, but the dense nature of the subsoil is obviously unfavorable to rapid internal movement of moisture and air. Usually cultivation can not be performed for several days after rainy periods, as the soil dries out slowly.

The White Store clay loam is one of the most extensive upland soils in Anson County. It is estimated that at the present time not more than 20 per cent of it is in cultivation, notwithstanding probably 80 or 90 per cent of the total area has at one time or another been under cultivation. There are now many areas supporting old-field pine, with trees frequently 18 or 20 inches or more in diameter, where 50 or 75 years ago there were prosperous farms. Cedar is quite common in places in both the virgin and old-field forests. The type is now the least important of the extensive soils of the county, owing principally to the comparative abundance of locally eroded slopes and gullied areas. Settlement in the sections in which the type occurs is sparse. This condition is in some measure a result of the destructive erosion which has been allowed to ruin the fields, but is also due to some extent to the poor railroad, and until recently poor highway, facilities that have been available to farmers on the type.

Cotton is the principal crop. Corn, oats, and cowpeas are grown on most farms, but as yet they are of relatively little importance. Cotton yields from about one-fifth to three-fourths bale per acre, depending on the cultivation and fertilization and the condition of the land; that is, whether it is in an impoverished or eroded condition as a result of injudicious use. As yet stock raising has not been

taken up seriously, most farmers keeping one or more cows and raising a few hogs for home consumption, as is the case throughout the county.

The White Store clay loam is a medium-late soil, and planting is sometimes retarded in the spring by the wet condition of the land. Under the prevailing system of farming the soil is plowed to a depth of 3 to 5 inches with light 1-mule turning plows. Cultivation is done at rather frequent intervals, in the case of cotton particularly, with 1-mule plows, chiefly shovels and sweeps. Less attention is given to corn and still less to oats, these crops often being seeded on hastily and imperfectly prepared cloddy land. As elsewhere, little attention is given to the rotation of crops, except in the comparatively small fields where cowpeas are sometimes sown. Fertilizers are in common use, 200 to 400 pounds per acre of the ordinary 8-2-2 mixture being applied to cotton, and smaller quantities to corn. The barns on this land are small but sufficient to house the work stock. There are some farms, including considerable tracts of this soil, on which exceptionally good methods are practiced and on these good crops are obtained.

This land can be bought at the present time for \$6 to \$25 an acre, according to location, the extent of erosion, the topography, improvements, and forest growth. Pine timber reproduces rapidly on this soil, although the trees as a rule do not grow so rapidly or so large as on the other Piedmont soils.

Erosion is the most serious hindrance to cultivation on the slopes of the White Store clay loam. Usually the slopes that are subject to erosion should be either terraced and used chiefly for soil-binding crops, such as Bermuda grass and small grain, or allowed to grow up in old-field pine, which is the most efficient means of arresting erosion on such land. (See Pl. XX.) A method of making erosion less destructive is to increase the supply of organic matter in the soil by plowing under vegetation, such as cowpeas and winter cover crops like vetch and small grain.

More live stock could profitably be kept and the manure applied to the land. There are many extensive areas that could be better used for raising beef cattle, sheep, and hogs than for other purposes. Broom sedge, lespedeza, and, in the low places, various moisture-loving native plants afford excellent pasturage from early spring to fall, while Bermuda grass, cowpeas, vetch, sorghum, and other forage plants can be grown for roughage and corn for ensilage. With inoculation red clover probably can be successfully grown on this soil if it is not seeded on freshly exposed clay. Orchard grass also should succeed.

The liberal incorporation of vegetable matter and manure and deep preparation of the seed bed have a much more permanent

beneficial effect upon the soil than the application of commercial fertilizer, but it is not likely that farmers will make any reduction in the quantity of fertilizer used as long as they can purchase the materials at prices that are not prohibitive. With a deeper soil, better supplied with organic matter, the fertilizer that is used unquestionably would give largely increased yields. Mixtures containing about 8 to 10 per cent phosphoric acid, 2 to 4 per cent nitrogen, and 4 per cent potash probably approach closely the fertilizer requirement of the type under the ordinary methods of handling, but less nitrogen is required for crops like cotton, corn, and grain when grown after a leguminous crop, and probably less potash would be needed if lime or ground limestone were applied at the rate of a ton of the former or 2 tons of the latter per acre. Less nitrogen is required when the soil contains enough vegetable matter to give it a loamy structure and less nitrogen and potash when manure is used.

Some farmers believe that cowpeas fail to improve "clay land" in this part of the county, but results that have been obtained in some cases disprove this, except, of course, in the case of the intractable, unweathered clay of gully sides and freshly washed areas, where the crop makes very poor growth.

Average results of mechanical analyses of samples of soil and subsoil follow:

Mechanical analyses of White Store clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay
		<i>Per cent.</i>						
233823, 233865.....	Soil.....	0.7	2.5	1.3	10.9	20.7	44.4	19.5
233824, 233866.....	Subsoil.....	.1	.3	.3	2.5	4.6	31.5	60.7

GRANVILLE SANDY LOAM.

The Granville sandy loam is a grayish to light-brown or yellowish-brown sandy loam, passing at 3 to 5 inches into a pale-yellow to brownish sandy loam. This is underlain at a depth of 10 to 20 inches by a yellowish, friable sandy clay. The subsoil usually becomes stiffer in the lower part and in many places is mottled with red and gray. In places red clay occurs within the 3-foot section.

There are included with this type, mostly in the vicinity of Ansonville, patches which are quite gravelly, the larger of these being shown on the map by gravel symbols. The gravel consists of rounded and angular fragments of quartz. Also there are some included coarse sandy loam patches too small to show on the map.

The Granville sandy loam is developed chiefly south of Ansonville, but there are scattered areas throughout the sandstone belt.

The topography is for the most part undulating to gently rolling, being a little more rolling than that of the fine sandy loam. The drainage is well established except in a few flats.

While the Granville sandy loam is not very extensive, it is considered a valuable soil, and more than three-fourths of it is cultivated. It is used chiefly for the production of cotton, and is handled in the same way as the Granville fine sandy loam, giving about the same yields. It is suited to the same crops.

Farm land of this type has a value of \$25 to \$50 an acre.

The Granville sandy loam is physically quite similar to the Norfolk sandy loam, and probably would give equally good results with vegetables, sweet potatoes, melons, and peanuts. In the northeastern part of the Piedmont it is used with marked success in the production of granulated-smoking, cigarette, and plug-wrapper tobacco.

Granville sandy loam, mixed phase.—The Granville sandy loam, mixed phase, consists predominantly of Granville sandy loam having a heavy, plastic clay subsoil, of a brownish-yellow or mottled reddish, yellowish, and grayish color. This heavy subsoil is encountered at a depth of 15 to 24 inches, or much nearer the surface than in the typical Granville sandy loam. Otherwise there is no difference, the surface soil being a grayish to yellow sandy loam and the upper subsoil a yellow, friable sandy clay. In addition, the phase includes patches of Wadesboro gravelly sandy loam and clay loam, White Store sandy loam, and Iredell loam, which were considered too small to map satisfactorily. Some of the included Wadesboro soil has conspicuous outcrops of sandstone and conglomerate, occurring as ledges along stream slopes.

This phase occurs in a large body extending from the vicinity of Russellville nearly to the confluence of Brown Creek with Goulds Fork. The topography is undulating to level, the level areas being imperfectly drained.

About 60 per cent of the area is under cultivation, cotton being the principal crop. Crops on this phase are said to suffer both from too little and from too much moisture more severely than on most of the other upland soils of the county. This is undoubtedly due to the impervious nature of the lower subsoil, which retards the movement of moisture and air. Cotton yields from one-fourth to one-half bale per acre, depending upon the methods of cultivation and the seasonal conditions. The land is plowed to a shallow depth and fertilized rather lightly, mostly with the ordinary grades of ready-mixed fertilizers. This land is held at about \$25 to \$30 an acre.

The flat, poorly drained areas of this phase need artificial drainage. The land should be plowed deeper and kept supplied with organic matter, or fertilized with 400 to 600 pounds per acre of a

mixture analyzing about 8-3-5. The nitrogen requirement can be reduced to a minimum by growing legumes in rotation with other crops.

Results of mechanical analyses of samples of the soil, subsoil, and lower subsoil of the typical Granville sandy loam are given below :

Mechanical analyses of Granville sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
233842.....	Soil.....	9.3	17.6	6.5	18.6	10.8	30.6	6.5
233843.....	Subsoil.....	14.4	17.8	6.3	16.4	7.5	29.9	7.7
233844.....	Lower sub-soil.	12.4	14.2	4.6	13.0	7.6	28.1	20.0

GRANVILLE FINE SANDY LOAM.

The surface soil of the Granville fine sandy loam is a grayish to light-brownish fine sandy loam, becoming yellowish brown at a depth of 3 to 5 inches. This is underlain at a depth of about 8 to 15 inches by a yellow, friable sandy clay, which in many places passes at a depth of 26 to 30 inches into a stiff, plastic, yellow clay, mottled with gray or yellow or both. In places the lower subsoil is almost solid red, frequently of an Indian-red color like that of the Penn soils, and there are some spots in which the red or mottled clay lies near the surface.

The soil is easily cultivated, and plowing can be done safely within about 24 hours after heavy rains, except where the surface is low or flat. The content of organic matter is rather low in the virgin soil. In cultivated fields where vegetable matter has been worked into the soil it has a brownish color.

This type occurs in scattered areas throughout the sandstone belt, extending from the South Carolina line, in the southwestern part of the county, northeasterly to the Peedee River.

The topography is characteristically undulating to gently rolling, and in places flat. Except for the occasional flat areas, the drainage is good enough for satisfactory results with crops.

This is an important soil type. More than half the land is cultivated, cotton being the principal crop. Some farmers produce enough corn for the work stock and the few hogs commonly raised. Oats, cowpeas, sorghum, and sweet potatoes are grown in a small way. This is an early soil, except where the drainage is imperfect.

Cotton yields from one-half to 1 bale per acre on the better managed farms, and corn 30 bushels or more. Cowpeas fruit well and generally produce a good growth of vine. Oats do fairly well, and sweet potatoes, watermelons, peanuts, and vegetables very well.

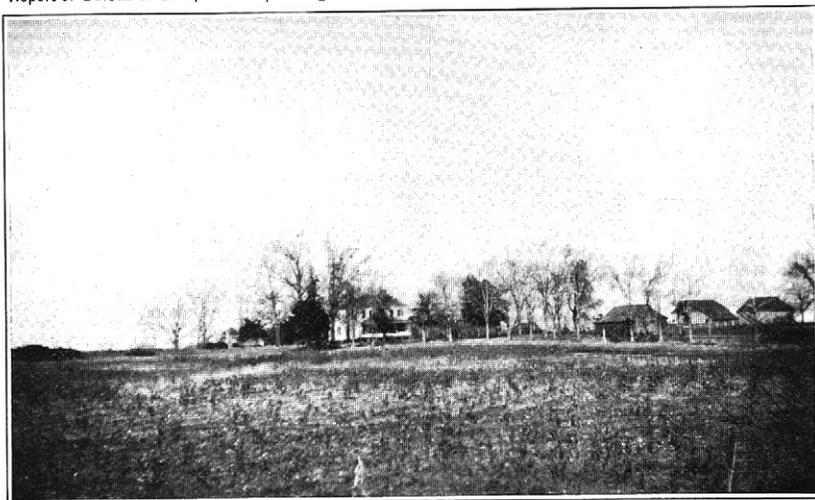


FIG. 1.—RESIDENCE AND FARM BUILDINGS ON WADESBORO LOAM.
Showing the undulating topography of much of this type.

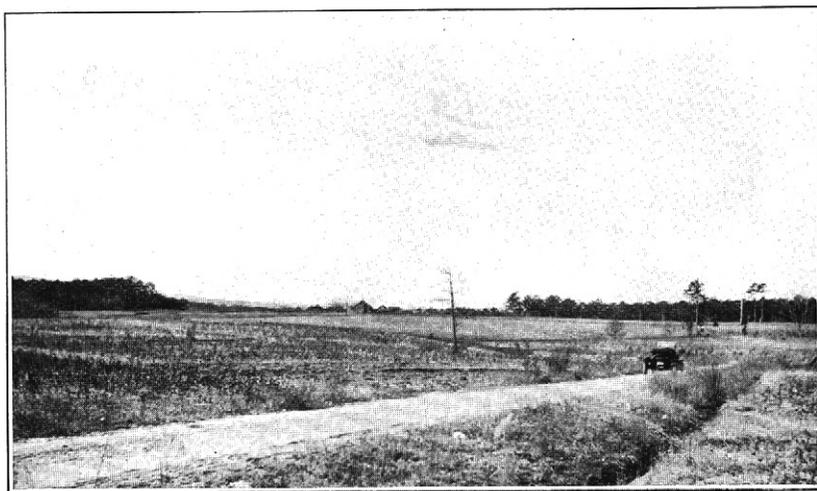
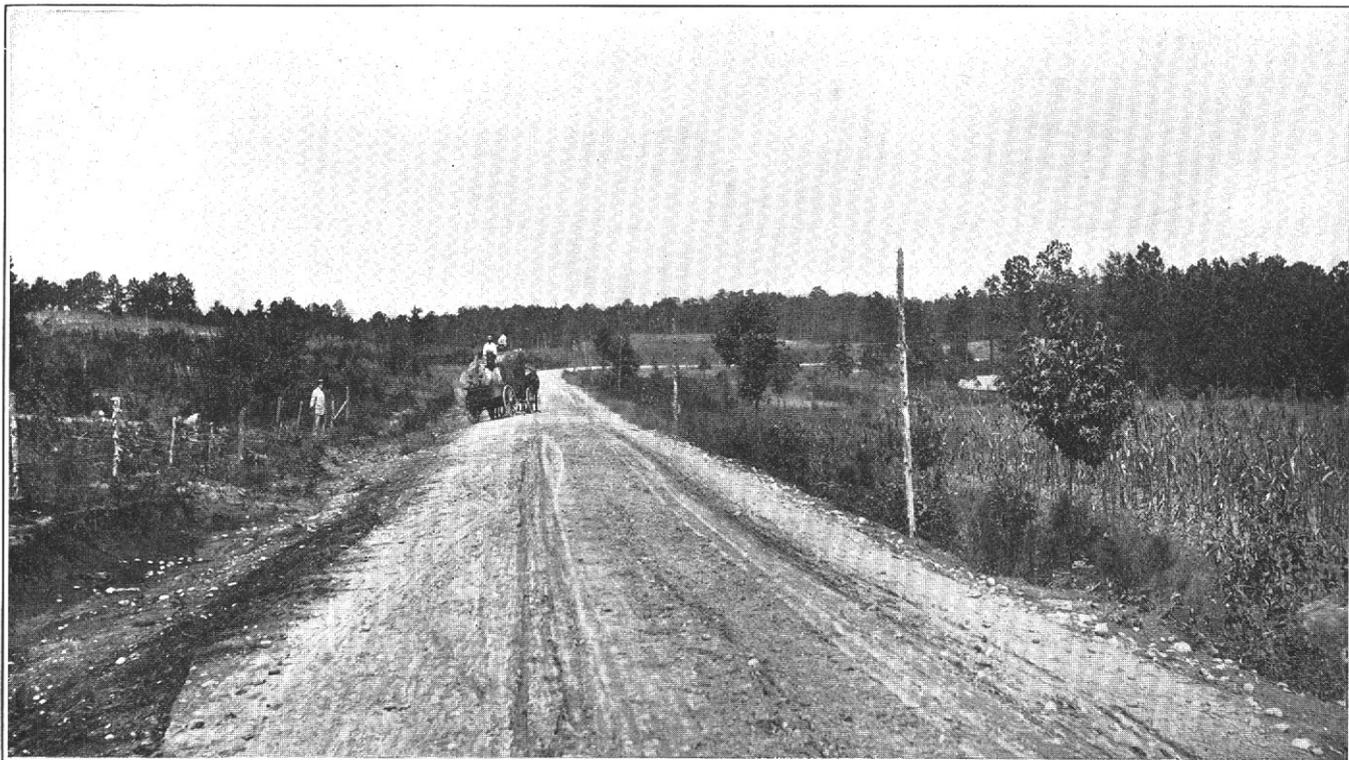
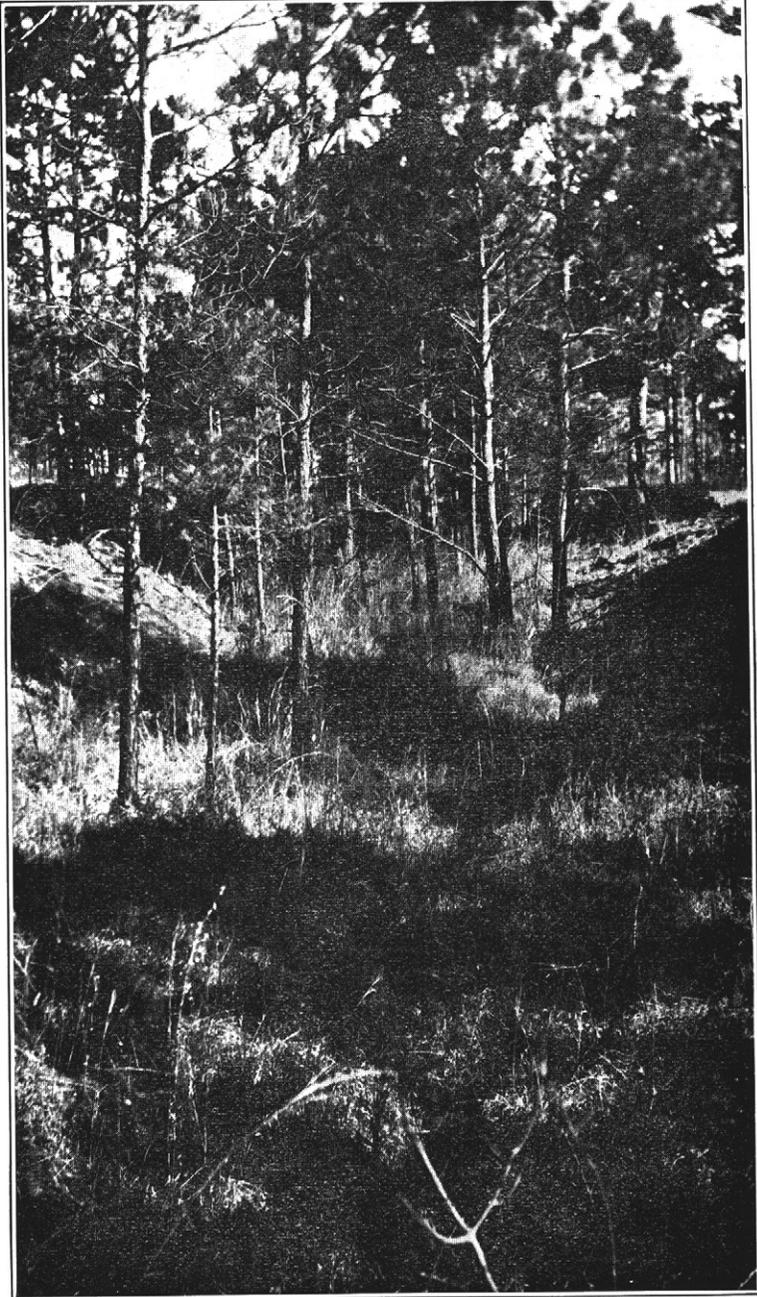


FIG. 2.—UNDULATING TOPOGRAPHY OF MUCH OF THE WADESBORO FINE SANDY LOAM.



SURFACE FEATURES OF THE WADESBORO CLAY LOAM.



GULLY EROSION ON WHITE STORE CLAY LOAM ARRESTED BY OLD-FIELD PINE.

Light plows, drawn by one mule, are generally used on this land. Commercial fertilizer is in general use for cotton and to a somewhat less extent for corn, a mixture analyzing about 8-2-2 being commonly applied. One of the best farmers of the county produces a bale of cotton per acre on this land in favorable years with an application of about 600 pounds per acre of fertilizer materials, including kainit, acid phosphate, and tankage, so mixed as to give 8 per cent phosphoric acid, 3 per cent nitrogen, and 4 or 5 per cent potash. In addition he uses 15 to 20 bushels of cotton seed per acre.

The present valuation of this land ranges from about \$25 to \$40 an acre, with some highly-improved farms held at higher figures.

To keep this soil in a productive condition the legumes, such as cowpeas, crimson clover, and soy beans, should be grown in rotation with crops like cotton and corn, and the supply of organic matter should be augmented by plowing under stable manure and occasional crops of cowpeas, clover, rye or oats. Good yields can be obtained by simply applying high-grade fertilizers in liberal quantities, but this method would apparently be less profitable and less likely to effect permanent improvement of the soil.

Experience of the better farmers on this type of soil indicates that fertilizer mixtures carrying a relatively high percentage of potash—4 to 6 per cent—are advisable. With such mixtures there is less likelihood of damage from frencing and rusting. Litmus-paper tests indicate a need of lime. An acreage application of 1,000 to 2,000 pounds per acre of burnt lime, or twice this quantity of ground limestone, very likely would give considerable benefit.

In Granville County, N. C., land of this kind is used with much success in the production of bright tobacco, of the granulated-smoking, cigarette, and plug-wrapper type. Peanuts, crimson clover, velvet beans, and soy beans have given good results on this type of soil and soils very similar to it in various parts of the south. In crop adaptation this type compares closely with the Norfolk soils.¹

Peanuts, especially the Spanish variety, could be grown on land of this kind between the rows of corn, or even of cotton, with but little additional cultivation and only light fertilization, and the nuts hogged off after the crop is gathered. The growing of peanuts improves the land and the stirring of the soil in the rooting up of the nuts improves its structure.

GRANVILLE SILT LOAM.

The surface soil of the Granville silt loam is a grayish silt loam, underlain at 3 to 5 inches by a pale-yellow silt loam, which abruptly passes into a yellow silty clay loam, extending to a depth of 8 to 12

¹ See Norfolk sandy loam, p. 411.

inches. The subsoil is a yellow, compact, friable clay, usually becoming red or mottled red, grayish, and yellow, and stiffer in the lower part. Often the lower subsoil has the Indian-red color which characterizes the Penn soils. In places there is a noticeable content of fine and very fine sand in the surface soil. The soil when dry has a floury feel, and it is locally referred to as "floury land." It is deficient in organic matter and compacts when dry.

This type occurs chiefly in the vicinity of Peedee Church and southeast of Ansonville. The topography is level to gently undulating, and the drainage is fair to poor.

This is not a very important soil type, as it is inextensive and only a small proportion of it is in cultivation. It is a cold-natured soil on which crops mature comparatively late. Cotton and corn are the chief crops.

For its improvement, this land requires artificial drainage, deep plowing, and the incorporation of large quantities of organic matter in the form of stable manure or green manuring crops, such as cow-peas or rye. The depth of plowing should be increased an inch or two a year until a depth of 6 to 8 inches is reached. Litmus-paper tests indicate that the soil is in need of lime. Fertilizer mixtures high in phosphoric acid would probably give good results, especially with cotton.

Among the crops that generally succeed on land of this kind are lespedeza, sorghum, oats, soy beans, and herd's grass (redtop)

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

Mechanical analyses of Granville silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
233816.....	Soil.....	0.6	2.0	1.6	15.7	20.1	54.5	6.0
233817.....	Subsoil.....	.8	1.6	1.4	13.9	19.2	54.0	9.3
233818.....	Lower sub-soil.	.6	1.2	1.1	11.5	15.6	49.0	20.9

GEORGEVILLE GRAVELLY LOAM.

The surface soil of the Georgeville gravelly loam to a depth of 4 to 8 inches consists of a grayish loam or silt loam containing an abundance of white, angular quartz fragments and usually a fair percentage of slate fragments. The subsoil is a red, brittle, compact clay. In places the surface soil is somewhat sandy. Bedrock is seldom encountered within the 3-foot section. The type compacts less than the other Georgeville soils.

The largest area of Georgeville gravelly loam occurs in the southeastern part of White Store Township and in the southwestern part of Gullledge Township. Other smaller areas are widely scattered throughout the slate lands. The type occupies rolling country, with rather prominent hills and slopes. The drainage is good, but there is comparatively little erosion.

This is a rather unimportant soil type, as it comprises only 16.8 square miles. About 25 to 30 per cent of it is under cultivation.

The Georgeville gravelly loam is used chiefly for the production of cotton. It produces better yields than the Georgeville slate loam, and is not so difficult to cultivate. With an acreage application of about 400 pounds of a 10-3-3 fertilizer mixture and efficient handling of the soil cotton may be expected to yield about one bale per acre in favorable seasons.

GEORGEVILLE SLATE LOAM.

The Georgeville slate loam differs from the Georgeville silt loam chiefly in its higher content of slate fragments, the shallower depth to bedrock, and the steeper or more rolling surface. In places about 50 per cent of the soil material consists of small chips and fairly large fragments of slate, with some quartz fragments. The former tend to make the soil looser and more open than that of the Georgeville silt loam. Bedrock lies generally at a depth of less than 3 feet, and on the steeper, eroded slopes it is exposed at the surface in places. The type is locally called "slate land."

This type is encountered throughout the slate belt in the northwestern part of the county, the largest area occurring along Rocky River. It is largely confined to the stream slopes and the narrow ridges. Drainage is thorough. The slate fragments are valuable in the prevention of erosion, and many steep slopes have been worked for years without serious washing. However, the fine particles are gradually washed down the slopes by sheet erosion, so that with the continuous use of the slopes for clean-cultivated crops the soil becomes increasingly slaty.

The Georgeville slate loam covers an area of 19.4 square miles, and it is estimated that about 20 per cent of it is cultivated. The type is used for the same purposes and handled and fertilized in practically the same way as is the Georgeville silt loam, although more of it is used for pasture land and the proportion of cotton to corn is perhaps a little greater. It is not so easy to cultivate, owing to its slaty character. The quality of the cotton produced is good, the lint being of a good white color and bringing the top prices on the local market. The yields of cotton, as well as of other crops, are less than on the silt loam. The selling price also is a little lower.

Lespedeza, broom sedge, and other native plants supply good pasturage on this type, and there seems to be no reason why beef cattle, sheep, and hogs should not be raised extensively. Continuous clean cultivation of the steep slopes is obviously inadvisable unless liberal additions of vegetable matter are made.

GEORGEVILLE SILT LOAM.

The surface soil of the Georgeville silt loam is a gray to grayish-brown silt loam, passing at 2 or 3 inches into a pale-yellow to reddish, compact silt loam, which extends to a depth of 5 to 14 inches. The subsoil is a dull-red to bright-red, compact, brittle clay. In cultivated fields the soil is generally yellow to reddish yellow. Small fragments of slate are of common occurrence through the soil. The organic-matter content is low. There are included patches of Georgeville slate loam, too small to map separately.

The Georgeville silt loam is extensively developed throughout the slate belt in the northwestern part of the county in Ansonville and Burnsville Townships, and there are some large as well as small areas in White Store, Gulledge, Morven, and Lilesville Townships. The topography is undulating to gently rolling, and even rolling in places, much of the type occurring on the smoother, upper parts of divides whose lower, steeper slopes are occupied by the Georgeville clay loam. The drainage is good. Most of this land is susceptible of cultivation without danger of being seriously eroded, except on the occasional steep slopes.

The Georgeville silt loam is an important soil in the agriculture of the county, being the most extensive of the types. It comprises a total area of 60.3 square miles, about 70 per cent of which is cultivated.

Crops mature from one to two weeks later on this type than on the sandy soils. Cotton is the principal crop, but relatively more corn and small grain are produced upon it, especially in the northwestern part of the county, than on the soils east of the slate belt. Red clover and soy beans do well, but so far little attention has been given these crops. A few farmers raise beef cattle in a small way, and most of them raise enough hogs for their own requirements. On this type and the associated slate soils in this part of the county the farmers are more nearly self-supporting with respect to meat, flour, meal, and feed for work stock than elsewhere. Cowpeas are grown to some extent for seed and hay and to improve the land.

Cotton yields from one-third to three-fourths bale per acre, and corn 15 to 50 bushels on the best handled tracts. Wheat ordinarily yields about 10 bushels per acre, but better yields are made where the soil is handled with exceptional care. Cowpeas yield 10 to 12 bushels of seed and a ton of hay per acre.

This soil is usually plowed only to a shallow depth with light plows drawn by one or two mules. Crops are given frequent shallow cultivations. Fertilizers analyzing 8-2-2 are used for cotton and corn, about 200 to 400 pounds per acre being applied to cotton and less to corn. The change of crops in most common practice consists of growing an occasional crop of cowpeas, sown either alone or with corn.

The present acreage valuation of land of this type ranges ordinarily from about \$15 to \$30, higher prices being asked for some of the more highly improved and best located farms.

Deep fall plowing and the incorporation of vegetable matter are necessary to improve this soil. Such crops as cowpeas and bur clover can be used to advantage as soil builders, an occasional crop being turned under. Such treatment is effective in counteracting the tendency of this soil to bake in dry weather. When small grain is sown more harrowing to reduce the clods should be done before seeding. Experience indicates that phosphoric acid is especially beneficial on the compact soils derived from slate.

GEORGEVILLE CLAY LOAM.

The surface soil of the typical Georgeville clay loam consists of a red clay loam about 3 to 6 inches deep, while the subsoil consists of a rather compact, brittle red clay. In places the surface inch or two consists of grayish silt loam. Small fragments of slate and small and large angular quartz fragments are scattered over the surface in places. The soil has exactly the same appearance as the Cecil clay loam, but it is derived from slate, while the Cecil is derived from diorite and granite.

The largest area of this type occurs near Old Sneysboro. Other areas are scattered through the slate lands, being most numerous in the northwestern part of the county. The topography is gently rolling to rolling, with rather steep slopes along the streams. The drainage is good. The steep slopes are subject to erosion where the land is continuously planted to crops like cotton and corn.

The Georgeville clay loam is not very extensive, but is of considerable local importance, as most of it is cultivated. Cotton is the chief crop. Some good crops of red clover have been grown on this type where the fields were inoculated, over a ton of hay to the acre having been harvested by many farmers. Soy beans and orchard grass also have succeeded. There are a number of farms on this type which are self-sustaining in the production of meat, butter, meal, flour, and feed for work stock. Under good management and with an application of 300 to 400 pounds of fertilizer per acre, the

best fields yield as much as 1 bale of cotton, 30 bushels of corn, 10 to 15 bushels of cowpeas, or 15 bushels of wheat per acre. Fertilizers analyzing about 8-3-3 or 10-3-4 may be expected to give good results.

The present price of the better farm land of this type ranges from about \$30 to \$40 an acre.

This land should not be plowed when wet enough to be sticky as it compacts and clods badly if disturbed in this condition. Heavy teams and implements should be used in order to work up a seed bed 6 to 8 inches deep. The growing of crops like cowpeas, vetch, and bur clover in rotation with other crops will go far toward building up the soil, increasing its moisture-holding capacity, and improving its physical condition. The slopes should be terraced and used only for soil-binding crops, such as small grain and grasses. With good management it would seem that considerably better yields of wheat and other crops could be obtained. More orchard grass and red clover could be advantageously grown.

ALAMANCE SLATE LOAM.

The Alamance slate loam, locally referred to as "slate land," differs from the Alamance silt loam in its high content of slate fragments, its more uneven surface, and its shallower depth to bedrock. It is much more easily kept in a desirable structural condition than the silt loam on account of its slaty nature. In places quartz fragments are scattered plentifully over the surface.

This type has an extensive development in Lanesboro and Burnsville Townships. It occurs, for the most part, as rolling and sloping areas near streams. The drainage is everywhere well established. Probably one-fourth of the type is in cultivation at present. A much larger proportion has been farmed in the past, part of which is now lying idle or is covered with a second growth of old-field pine.

This is an important soil in the agriculture of the slate belt. It is used for the same crops and is handled in about the same way and given about the same manurial treatment as the Alamance silt loam, and the yields average about the same under the existing methods of cropping.

Cotton produced on this land is of exceptionally white color and brings the highest prices on the local markets. Cowpeas, with the exception of such varieties as Whippoorwill, are said to fruit poorly on this and other Alamance soils.

While erosion is not so serious on this type as on less slaty lands having similar topography, there is a continual washing out of the fine particles of silt in those fields where cotton and corn are grown year after year without restoration of organic matter. This process is especially destructive in the case of soils such as this, in which

bedrock lies near the surface. There are fields, now unused and some grown up in old-field pine, which have been damaged considerably from erosion of this character.

The value of land of this type (except in some of the better improved farms) is lower than that of the Alamance silt loam.

The topography of this type and its tendency to erode indicate the advisability of raising more stock, preferably beef cattle.

ALAMANCE SILT LOAM.

The surface soil of the Alamance silt loam is a light-gray, floury silt loam, passing at 3 to 5 inches into a pale-yellow silt loam which extends to a depth of 8 to 10 inches. The subsoil is a yellow, compact, brittle silty clay, usually containing some small fragments of yellowish and reddish, partly decomposed slate, and frequently mottled with gray in the lower part. In many places there is an intermediate layer of pale-yellow silty clay loam between the surface soil and the deeper subsoil. In dry weather the surface soil compacts on account of its low content of organic matter and its silty texture.

The largest areas of the Alamance silt loam lie between Diamond Hill and Harmony Churches and north of Polkton, extending along the Ansonville Road. A rather large area occurs east of the main slate belt, south of the confluence of Savannah Creek and the Peedee River. Small areas occur throughout the slate belt.

The topography is level to undulating. The undulating areas are generally well drained, but water stands on the surface of the level tracts for some time after rainy periods, so that ditching or tiling is necessary for the establishment of good drainage. All the type, however, can be farmed every year, although on the more nearly level areas planting may be delayed and crop growth retarded by unusually heavy precipitation in the spring. If the land is plowed when wet clods are likely to be formed.

The Alamance silt loam is a soil of considerable importance in the slate belt. About 65 or 70 per cent of its area is under cultivation, the remainder being mostly forested with virgin oak and pine or old-field pine.

Cotton is the chief crop, but considerable corn and some wheat and oats also are grown. The farms on this land are practically self-sustaining. Most farmers, however, raise only enough stock to supply meat for their own use. Crops mature about 10 days or two weeks later than on the sandy soils of the southeastern part of the county. Cotton yields about one-fourth to three-fourths bale per acre, and corn from 15 to 25 bushels, depending on the cultural methods and the season.

The prevailing methods of plowing, cultivation, and fertilization are employed on this type, light implements drawn by a single mule being used.

The present value of land of this type is practically the same as that of the Georgeville silt loam.

The principal needs of the Alamance silt loam, as shown by the experience of farmers and as indicated by the physical characteristics of the soil, are deeper plowing, the incorporation of larger quantities of vegetable matter, and the growing of more legumes, such as cow-peas and soy beans. With such treatment and with an acreage application of about 400 pounds of fertilizer analyzing about 10-3-3, farmers in various parts of the slate belt of North Carolina have produced on this type of soil 50 bushels or more of corn, 20 bushels of wheat or a bale of cotton per acre. For cotton, which is sometimes late in maturing, soil of this kind seems to need a fertilizer relatively high in phosphoric acid, and one containing about 12 per cent of this constituent would likely give better results than the present commonly used low-grade mixtures. The physical properties of this soil are such as strongly to indicate a need of lime. An acreage application of 1,000 pounds of burnt lime or twice this quantity of ground limestone would, it is believed, have a decidedly beneficial effect. Heavier applications, possibly, would be advisable.

Over the wider areas of the Alamance silt loam, as in the counties to the north and west of Anson, the soil ranks high as a small-grain and grass soil. Lespedeza generally does well on it. Herd's grass (redtop) usually finds soil of this kind very well suited to its requirements. It would seem that more live stock, especially beef cattle and hogs, could be raised to advantage on this type.

BRADLEY GRAVELLY SANDY LOAM.

The Bradley gravelly sandy loam differs from the Bradley coarse sandy loam chiefly in its gravelly nature, its more rolling topography, and the shallow depth to clay, which is generally reached at 5 to 12 inches. The soil is deeper and less gravelly in the more nearly level areas. As with the coarse sandy loam, the clay subsoil is residual mainly from granite, but in part from slate. The gravel consists of quartz and quartzite fragments ranging in size from that of small marbles to pieces 3 or 4 inches in diameter. There are included patches of the Cecil gravelly loam and clay loam and, on the flat areas, of Bradley coarse sandy loam.

The Bradley gravelly sandy loam occurs in the southern and southeastern parts of the county. The principal areas are those on the ridges extending southwest from Ingrams Mountain, in the vicinity of Clarks Mountain, and along Island, Jones, and Mill Creeks. The surface is rolling to hilly and ridgy, and the drainage is good, the

surface run-off on some of the ridges being so rapid that destructive washing is likely, unless there is proper terracing or the land is used for soil-binding crops.

The Bradley gravelly sandy loam is a fairly extensive soil type, with probably 50 or 60 per cent of its area under cultivation. It is of considerable local agricultural importance.

Cotton is the principal crop. Some corn, oats, and cowpeas are grown. In favorable seasons and with good cultural methods, cotton yields as much as 1 bale per acre in the best areas. The type is about equal in productiveness to the Bradley coarse sandy loam. About 300 to 400 pounds per acre of fertilizer of the ordinary grades is applied to cotton and a little less to corn. Mixtures analyzing about 8-3-3 seem to be well suited to the soil, especially in growing cotton and corn. Land of this type is valued at about \$30 to \$40 an acre.

Deep plowing and the growing of legumes such as cowpeas, bur clover, and vetch, in rotation with other crops, have proved very helpful in building up this soil. Among the crops which have proved successful on this type of soil are red, bur, and crimson clover, soy beans, velvet beans, and rye.

BRADLEY COARSE SANDY LOAM.

The surface soil of the Bradley coarse sandy loam consists of a grayish to light yellowish brown, loamy, coarse sand, merging at 2 to 3 inches into a yellowish coarse loamy sand, which passes abruptly into a yellowish or reddish coarse sandy loam, the latter material extending to any depth between 6 and 30 inches. The subsoil is a red, brittle clay, resembling the subsoil of the Cecil and Georgeville series. Rounded quartz and quartzite gravel is of common occurrence in the surface soil, but is not present in the subsoil. The surface soil is of the same material as that forming the Norfolk soils, while the subsoil is residual from granite and, to a less extent, from slate. Patches of Bradley gravelly sandy loam too small to map are included in this type.

The Bradley coarse sandy loam is developed in the southeastern part of the county. The principal areas occur in the vicinity of Parsons Mill and near Jones and Island Creeks.

The topography is prevailingly rolling and the drainage is good.

This type is not extensive, but nearly all of it is cultivated. It is used mainly for cotton, which yields from one-half to 1 bale per acre.

The soil is suited to the same crops and responds to the same treatment as the Norfolk sandy loam. Where the red clay comes within 6 to 12 inches of the surface the Bradley soil probably would

not produce as bright colored tobacco or as early vegetables as the Norfolk type. Somewhat lighter applications of fertilizer are required than on the Norfolk sandy loam, and the soil is easier to build up and to maintain in a productive condition. Efficient cultivation is easily performed.

NORFOLK SAND.

The Norfolk sand consists of a grayish to light-brownish loose sand, passing at about 5 inches into a pale-yellow sand which becomes slightly more compact in the lower part of the 3-foot section. In places there is present some rather small, rounded quartz gravel. As mapped there are a few low, wet places including small areas of dark-colored soil, which has been classified as Portsmouth sand in extensive areas of the flatwoods in the eastern part of the State and southward into Florida. Also, there are some included small areas of Norfolk coarse sand. This soil works up easily into a deep, loose sand, requiring only the lighter tools and work stock for its efficient tillage.

This type occurs in Morven, Lilesville, and Gullede Townships in association with the Norfolk sandy loam. The largest areas are those about Bethel Church, between Cason Old Field and Morven, and around Forestville Church. The surface is undulating to flat, the type occurring mostly on the higher parts of the stream divides. The drainage is thorough to excessive, crops suffering from lack of moisture in long dry periods. The soil warms up early in the spring, and it is this feature that has made the Norfolk sand one of the leading truck soils of the South Atlantic States.

The Norfolk sand is of considerable importance in the agriculture of the county, most of it being under cultivation. Blackjack and other oaks, shortleaf pine, and an occasional longleaf pine left from the original heavy growth, occupy the wooded areas. Cotton is the principal crop, the yields varying considerably with the seasonal conditions and the quantity and kind of fertilizer applied. As much as 1 bale of cotton per acre is made in good years with large applications of fertilizer. Without manure or fertilizer the yield is likely to drop to an unprofitable point. Corn and oats give low yields, but cantaloupes, watermelons, sweet potatoes, and other vegetables yield well when heavily manured or fertilized. The grade of fertilizer used is about the same as that applied on the Norfolk sandy loam. Best results are obtained with mixtures containing relatively high percentages of potash and nitrogen as compared with phosphoric acid.

This land can be bought at a somewhat lower price than that of the Norfolk sandy loam, as it is considered more difficult to maintain in a productive state.

In many sections of the South the Norfolk sand is used for special crops, such as extra early sweet potatoes, Irish potatoes, watermelons, cantaloupes, cabbage, radishes, garden peas, and other vegetables. It is naturally a poor general-farming soil, but such crops as those mentioned can be profitably grown with the use of commercial fertilizer. By plowing under cowpeas, velvet beans or other legumes, the productiveness of this soil can be materially increased.

NORFOLK SANDY LOAM.

The surface soil of the Norfolk sandy loam is a light-brown to grayish-brown, loose loamy sand, passing at an average depth of about 5 inches into a pale-yellow loamy sand. The subsoil, consisting of a yellow, friable sandy clay, is encountered at depths ranging from 12 to 30 inches. In the virgin or timbered areas and in fields that have not been in cultivation for some time the surface soil is characteristically lighter gray than is typical. The depth to the sandy clay is least on the slopes, where the surface soil has been partly washed off in some areas. In the substratum, as seen in road cuts, the clay is often compact and usually shows whitish and reddish mottling.

In its natural condition the soil contains little organic matter. Owing to its loose structure it is very easy to cultivate, requiring only light teams and implements.

There are included with the Norfolk sandy loam as mapped a few poorly drained low places including dark-colored soil (Portsmouth),¹ and several small knolls having a reddish subsoil (Ruston),² which were not mapped, on account of their small size.

The Norfolk sandy loam is extensively developed in Morven and Gulleage Townships and to a less extent in the southern part of Lilesville Township. Its topography is prevailingly nearly level to undulating, with some rather steep slopes near streams. Drainage is thoroughly established. Water percolates through the sandy clay so rapidly that plowing can be safely done within a few hours after heavy rains. In fields that have deteriorated most, crops suffer in protracted dry spells, but little damage results from lack of moisture where a good supply of organic matter is maintained.

The Norfolk sandy loam is an extensive and important soil type. Probably 75 per cent of it at present is in cultivation, and the cultivated area is increasing. There are probably more highly improved farms on this type than on any other soil in Anson County. The

¹ The Portsmouth soils are black types, rich in vegetable matter, occurring in poorly drained depressions and flats of the Coastal Plain region.

² The Ruston series includes types with grayish to light-brownish soils overlying light-red or yellowish-red, friable subsoils. These types occur in well-drained situations in the Coastal Plain region.

uncultivated areas are mostly covered with a second growth of pine or with a virgin growth of pine, oak, and dogwood.

Cotton is the principal crop (see Pl. XVI). A considerable number of farmers produce sufficient corn (see Pl. XVII) to feed the work stock and hogs, enough of the latter usually being raised to supply the needs of the farm. Cowpeas are grown to a considerable extent for hay and as a soil improver, and to some extent for seed. Among the other crops grown for use on the farm or as soil improvers are sweet potatoes and other vegetables, oats, rye, peanuts, soy beans, crimson clover, velvet beans, and sorghum. Many farmers have small patches of watermelons and cantaloupes, and frequently melons are sold in the local markets. Near Morven at least two farmers grow cantaloupes on a small acreage for shipment. From time to time tobacco has been grown in a small way for sale.

This is an early soil for all crops. It is possible to produce very early vegetables, although the most tender of these may be hurt by late spring frosts unless means for protection is provided. Turnips, cabbage, collards, and mustard do particularly well in the winter.

Cotton¹ yields from one-half to more than one bale per acre, depending in a large measure upon the quantity of fertilizer or manure used. Corn yields about 20 to 35 bushels per acre with ordinary treatment, and sweet potatoes, with liberal fertilization, 200 bushels or more per acre. The yields of all crops are low where fertilizer or manure is not used.

In general, the land is broken flat in the fall or winter to a depth of 5 to 8 inches with turning plows drawn by one or two mules. Cultivation is done at frequent intervals with shallow-running implements, such as sweeps, shovels, weeders, and harrows.

Fertilizers are always used for cotton and corn and generally for the less important crops. Applications ranging from about 300 to 1,000 pounds per acre are made for cotton and lighter applications for corn. The better farmers use higher grade mixtures than are generally used in other parts of the county, some of the preparations analyzing about 8-4-5. Sodium nitrate is frequently used as a top-dressing. Cowpeas are grown in rotation with other crops and occasionally turned under to replenish the supply of organic matter.

The percentage of farms operated by tenants is smaller than on the other soils of the county, with the exception of those of the slate belt, and the farms average smaller in size.

The present selling price of this soil ranges from about \$30 to \$100 an acre, according to location and improvements.

As a whole, this soil seems to give a better margin of profit than any other extensive type in the county. It is on this soil that the best yields of the cotton belt are made, with the use of heavy appli-

¹ For a discussion of cotton varieties see Bul. 4, N. C. Dept. of Agr.

cations of high-grade fertilizer, as in Scotland and Robeson Counties, N. C., and Marlboro County, S. C.

Experience indicates that in plowing only about an inch of the yellow subsurface material should be turned up to the surface in a single year, and that this should be done in the fall, owing to the improvement resulting from the exposure of the freshly turned soil to the action of winter weather. It is probable that a broadcast acreage application of 1,000 pounds or more of lime after plowing would be of material benefit where much fresh subsurface soil is plowed up.

The most promising means of increasing the profits on the Norfolk sandy loam in Anson County apparently are: (1) to reduce the fertilizer expenditure, particularly for nitrogen, by growing more legumes, such as cowpeas and velvet beans, in rotation with the clean-cultivated crops; (2) to increase the supply of organic matter by occasionally plowing under a crop like cowpeas, velvet beans or rye; and (3) to increase the acreage of land cultivated by owners.

The diversification of crops on this type would undoubtedly be successful, as the soil is well suited to a large number of crops which are not now grown extensively in Anson County, but it is problematical whether a more varied type of agriculture would give better returns than the present system, since it is so easy to produce large yields of cotton. The future farming practices will depend largely upon the price of cotton.

The Norfolk sandy loam is extensively used in southeastern Virginia and eastern North Carolina and South Carolina for the production of bright tobacco, which is used for cigarettes, granulated smoking tobacco, and plug wrappers, and it is probable that an equally good leaf can be grown in Anson County. In western Florida and northeastern Georgia this soil is very successfully used in the production of cigar-wrapper tobacco of the Sumatra type. In southwestern Virginia and eastern North Carolina the large Jumbo variety of peanuts is extensively grown on the Norfolk sandy loam and fine sandy loam, while in southern Georgia, western Florida, southern Alabama, and to some extent in the eastern Carolinas, these soils are used profitably for the smaller Spanish peanut, which is grown as a field forage crop for hogs, being planted in rows separately and between the cotton and corn rows.

In the Coastal Plain province, from Virginia to eastern Texas, the Norfolk sandy loam is used in places for the commercial production of sweet potatoes, watermelons, cantaloupes, cucumbers, pecans, cabbage, garden peas, radishes, tomatoes, Irish potatoes, asparagus, lettuce, and other vegetables. It has been found possible to sell these products early and at good prices where proper attention is given to marketing, as through cooperative organizations. It may not be ex-

pected that as early vegetables can be grown here as on the same soil nearer the coast, owing to the moderating influence of the ocean upon the climate there, but the date of maturity would be in advance of the more northerly trucking sections. Hogs are raised for market on the Norfolk sandy loam in other counties, especially in southern Georgia, under a system in which oats, cowpeas, sorghum, peanuts, and corn constitute important food and field-forage crops.

Experience has generally pointed to a need of considerable potash in the fertilizers used for most crops grown on land of this kind, especially for vegetables.¹

CONGAREE FINE SANDY LOAM.

Congaree fine sandy loam consists of a grayish-brown to brown fine sandy loam which passes beneath into yellowish-brown fine sandy loam. Small particles of mica are plentiful from the surface downward. In places the soil is dark brown throughout the 3-foot section.

This type occurs in the bottoms of the Peedee and Rocky Rivers, mostly as narrow strips immediately along the stream banks. The type characteristically occupies a faint ridge or natural levee, built up along the banks of the river. Away from the river bank it grades into the Congaree silt loam, which lies between the fine sandy loam type and the foot of the uplands. The drainage between overflows is thorough.

The Congaree fine sandy loam is not a very important soil, on account of its small extent, although there are some river farms on which it is important. Nearly all of it is cultivated, corn and cotton being the chief crops. The yields are good, but they do not average quite so large as on the silt loam. The soil is very easy to till. Practically no fertilizer is used.

Among the other crops that have proved successful on this soil in this or other parts of the South are sorghum, oats, watermelons, sweet potatoes, and various vegetables. The growing of legumes may be expected to improve this soil.

CONGAREE SILT LOAM.

The surface soil of the Congaree silt loam, where typically developed, consists of a brown to reddish-brown, mellow silt loam, from 10 to 20 inches deep. The subsoil is a yellowish-brown, heavy silt loam to silty clay loam. In the lower, poorly drained situations mottlings of gray and rusty brown are noticeable in the lower subsoil. Small flakes of mica are disseminated through the soil section. There are some included patches of Congaree silty clay loam in the lower places, with a heavier surface soil and a silty clay subsoil mottled yellow and gray.

¹ See Bul. No. 4, Vol. 35, N. C. Dept. of Agr.

The Congaree silt loam occurs principally as long, narrow areas in the bottoms of the Peedee and Rocky Rivers, Jones Creek, and several other streams flowing through the granite lands (Cecil soils) and the red lands of the slate belt (Georgeville soils).

The topography is level or nearly so. All the type is subject to inundation, but between overflows most of it is well drained. The drainage of the lower subsoil is in many places imperfect but not poor enough to interfere seriously with crop production. Some included low areas are poorly drained.

Locally this type is important, although it covers only a small part of the county. It is estimated that 75 per cent of it is in cultivation, the remainder being largely timbered, chiefly with water, overcup, and willow oak, shagbark hickory, sweet gum, birch, and willow. Relatively more of the type along the Peedee River and Rocky River is in cultivation than along the smaller streams.

The crops grown are corn, cotton, oats, and wheat, with corn far in the lead. The yields vary with the seasonal conditions, being lowered by late, wet springs, and occasionally by overflows. There have been reported yields of 75 bushels of corn per acre, and in favorable years the yields average high. Oats sometimes yield 60 bushels per acre, cotton nearly 1 bale, and cowpeas 1 to 2 tons of hay. Sorghum gives good yields of sirup and on at least one farm on this type it is grown commercially.

This soil is plowed deeper than the upland types, 2-horse plows being commonly used. The soil is mellow and easily tilled. Very little fertilizer is used.

The present price of land of this type ranges from \$20 to \$50 or more an acre, although probably little of it could be bought separately from the upland areas usually included in farms in which it occurs.

The Congaree silt loam is generally handled in an efficient manner. Some improvement could be made by ditching or tiling the lower places. Crops that give good results on this soil elsewhere in the South are lespedeza and Bermuda grass. On the better drained areas which are least susceptible to overflows alfalfa probably could be successfully grown, with proper inoculation and preliminary cultivation of a year or two to some intertilled crop kept free from crabgrass and weeds, so that no plants would be allowed to go to seed. Lime would be beneficial to this crop.

BERMUDIAN LOAM.

The Bermudian loam consists of a reddish-brown to chocolate-brown, mellow loam which shows but little change in the 3-foot section, except that the lower subsoil is somewhat more compact than

the surface soil and frequently of a darker brown color. In some places the subsoil is a grayish or mottled grayish and brownish silty clay loam, containing dark concretionary material. There are some included patches of fine sandy loam too small and irregular to be outlined separately on the soil map.

The type as mapped consists of first bottoms along the streams draining the Triassic belt. The principal areas lie along the upper part of Brown Creek, upper Goulds Fork, Deadfall Creek and its tributaries, Flat Fork, and Savannah and Cedar Creeks. The topography is level and the drainage good except between periods of overflow.

Although not very extensive, this is a valuable and highly prized soil, almost all of it being under cultivation. It is easy to plow and to keep in a good condition of tilth. Cotton and corn, the principal crops, occupy about equal acreages. Good yields are obtained nearly every year. In favorable seasons 1 bale of cotton and 40 bushels or more of corn per acre are obtained. Good yields of other crops, such as cowpeas, hay, oats, and sorghum, also are obtained.

Light applications of fertilizer are frequently made, but with thorough, deep plowing there seems little need of fertilization, except, perhaps, for moderate applications of phosphatic fertilizer to hasten the maturity of cotton, as there is a tendency on such a highly productive soil for this plant to produce vegetative growth at the expense of fruit. It might also be advisable to sow cowpeas occasionally, with corn or alone, especially where overflows are infrequent, to insure the maintenance of a proper supply of organic matter. It would seldom be necessary to plow under the cowpea vines, since the roots would add a large quantity of organic material and also nitrogen. At each inundation of the bottoms fresh alluvial material is deposited over the surface, which has the effect of renewing the productiveness of the soil, except where neighboring slopes are so neglected as to allow excessive quantities of gravel, sand, and clay to be swept down over the bottoms during heavy rains. Occasionally crops are damaged by overflow.

Where the stream channels are kept from filling up, so as to prevent overflow, the land in the wider cleared bottoms is valued at as much as \$100 an acre. Usually this soil is sold with upland soils, as few farms are composed wholly of this type.

With thorough plowing there is no reason why this soil should not give heavy yields indefinitely with very little fertilizer, especially where a legume is occasionally used in the rotation. Among other crops that can be successfully grown are wheat, grasses, such as meadow-oat grass, herd's grass (redtop), and Bermuda grass, soy beans, bur clover, and Irish potatoes. Applications of lime would probably improve this soil, especially for alfalfa, which prob-

ably could be grown on the better drained area not subject to long continued overflows.

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

Mechanical analyses of Bermudian loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
233825.....	Soil.....	3.3	11.9	5.3	20.2	21.4	29.6	8.4
233826.....	Subsoil.....	1.4	7.5	4.8	13.1	9.7	48.7	14.8

BERMUDIAN SILTY CLAY LOAM.

The Bermudian silty clay loam differs from the Bermudian loam chiefly in the more clayey texture of the surface soil and its greater tendency to clod when plowed. The typical soil is a reddish-brown to chocolate-brown silty clay loam which shows little change within the 3-foot section, except that the lower subsoil is more compact than the surface soil and is not uncommonly mottled with gray. There are some included spots of Bermudian fine sandy loam and loam and also of the grayish Wehadkee silty clay loam in the wet depressions and flats.

The Bermudian silty clay loam is developed in the bottom lands of the streams flowing through the sandstone region. The surface is level, and the drainage is not so good as that of the loam type, partly because the stream channels are not so open. Overflows are more frequent and deeper than over the loam type.

Most of the type is timbered, the trees consisting of willow, sweet gum, oak, ash, hickory, birch, and swamp maple, with an undergrowth of blackberry bushes. This type is less extensive than the loam, and under present conditions not so important agriculturally, as much less of it is cultivated. Very little of the large body along Brown Creek, which in places is nearly 1 mile wide, is used, except as pasture and hay land.

Native hay and corn are the principal crops produced, although there are some small fields of cotton. The yields are heavy where the cultivation is good. Occasionally crops are ruined by high water.

This land has a somewhat lower value than the loam. Some of it supports a forest in which there is considerable merchantable timber. This affects its value.

A soil of such high productiveness as this merits more attention than it has received. To protect it against damaging overflows it would be necessary to straighten and deepen the channels of streams,

but most of the type could be used as hay land by cutting the trees low so that mowers could be used, as is done in Arkansas, where timbered lands are thus cleared and used for producing rice and Bermuda-grass hay. A variety of nutritious native grasses that are not injured by overflows flourish in these bottoms, and in many places good yields of hay are cut regularly. Lespedeza succeeds on this soil, and could be sown for hay, even without ditching the land. All of this type could be used as pasture land.

There is little doubt that this soil could be ditched and put in condition for profitable use for cultivated crops, as has been done elsewhere in the Piedmont section of North Carolina, and very extensively on soils no more productive in Mississippi and other parts of the country. Floating dredge boats working downstream perform such work effectively. Were this land drained and used for corn, the production would probably equal one-half the present importation. Little or no fertilizer would be required in growing the crop.

WEHADKEE SILTY CLAY LOAM.

The Wehadkee silty clay loam consists of a brownish-gray silty clay loam, passing at about 2 to 5 inches into a compact, light-gray or mottled grayish and yellowish silty clay loam, which in turn grades into a gray or mottled grayish, bluish, and yellowish, rather plastic silty clay containing dark concretionary material. In many places the surface soil ranges to a silt loam. Small black and brown concretions are present throughout the soil section in places.

The Wehadkee silty clay loam is most extensively developed in the bottoms along streams of the slate belt. There are also scattered areas in wet situations in the bottoms of a number of other streams outside this belt. The surface is level and the drainage between overflows is characteristically poor.

This soil is not very important; it is comparatively inextensive, and only about 20 per cent of it is in cultivation. It is used chiefly for the production of native hay and corn. Good yields of hay are obtained, but the average yield of corn is not large. Better drainage, more organic matter, liming, and deeper plowing appear to be the most important needs of this soil. These would put it in good condition for growing the general farm crops.

ALTAVISTA FINE SANDY LOAM.

The surface soil of the Altavista fine sandy loam typically consists of a grayish fine sandy loam, passing at about 3 to 5 inches into a pale-yellow or mottled yellowish and grayish compact fine sandy loam, which extends to a depth of 8 to 15 inches. The subsoil is a yellow, compact sandy clay, mottled usually with gray, particularly

in the lower part. Small, brownish concretions are common on the surface and through the 3-foot section. As mapped the type includes some patches of Altavista loam.

The largest areas of the Altavista fine sandy loam occur along Goulds Fork on the west, about a mile west of Salem Church, and near Polkton. There are smaller bodies along the lower course of Brown Creek and elsewhere. The type occurs as flat second bottoms; that is, as low stream terraces consisting of material which apparently was deposited over former flood plains at a time when the stream overflows reached higher levels than at present. It is no longer overflowed. The surface drainage and underdrainage are fair to rather poor.

This type is of no general importance, owing to its small extent. Most of it is cultivated. Cotton, the leading crop, yields from one-half to three-fourths bale per acre. Corn yields upwards of 40 bushels per acre, and oats do well. With deep plowing and a good supply of organic matter large yields are made with moderate fertilizer treatment. By ditching or draining the flatter, more poorly drained areas all of this type can be used profitably.

SUMMARY.

Anson County, comprising 539 square miles, or 344,960 acres, is situated in central-southern North Carolina. The topography is pre-vaillingly rolling to hilly, with some level areas of alluvial land along the streams.

Approximately 82 per cent of the upland area is in the Piedmont Plateau province, the remainder being in the Coastal Plain.

Anson County was organized in 1748. The county had in 1910 a population of 25,465, about equally divided between whites and negroes. Wadesboro, the county seat and largest town, has a population of 2,376.

The railroad transportation facilities are good, and there is a large mileage of graded and surfaced wagon roads.

The climate is mild and healthful. Cover crops and a number of vegetables grow throughout the winter. The rainfall is ample and well distributed. The length of the normal growing season is about 190 days.

Since the early settlement of the county, nearly 200 years ago, agriculture has been the principal industry, followed by lumbering. Cotton is the principal crop and the money product. Corn is the crop of second importance. It is estimated that 400,000 bushels were produced in 1915, or about three-fourths of the quantity required by the county. Probably 10,000 acres were devoted to oats and as much to wheat in 1915. Hay and forage crops are becoming increasingly important.

The most important of the minor crops are sweet potatoes, Irish potatoes, early apples, peaches, scuppernong grapes, cantaloupes, watermelons, soy beans, velvet beans, red clover, vetch, crimson and bur clover, rye, Bermuda grass, orchard grass, peanuts, tomatoes, and other vegetables. Some tobacco is also grown.

The county produces its own beef supply and a small surplus for market, and about two-thirds of its pork supply. There is opportunity for the extension of stock raising. Many of the soils are well suited to the production of forage and pasture crops.

Little attention has been given in the past to the special crop adaptations of soils. Systematic crop rotation is not often followed, but an increasing number of farmers are growing the legumes and winter cover crops.

According to local merchants, about \$400,000 was spent for fertilizers in 1914. Cotton is almost invariably fertilized and corn usually, though not so heavily as cotton land.

Labor is plentiful. Wages range from \$12 to \$15 a month, with board.

The census of 1910 gives the number of farms in Anson County as 3,332, with an average size of 87 acres.¹ The percentages of farms operated by owners and tenants are 36.2 and 63.6, respectively.

There has been a general advance in the price of farm lands within recent years. The prevailing prices range from \$20 to \$100 an acre.

The upland soils are either residual (Piedmont) or sedimentary (Coastal Plain). The residual soils are derived from four principal groups of markedly different rocks. Granite rocks give rise to the Cecil series; sandstone, mudstone, and shale (Triassic) rocks to the Wadesboro, White Store, and Granville series; slates to the Georgeville and Alamance series; and diorite largely to the Iredell series.

The Coastal Plain division includes the Norfolk and Bradley series. The Norfolk soils have predominantly yellow subsoils, while the Bradley types have red residual material in the subsoil.

The alluvial soils include the Congaree, Bermudian, and Wehadkee series in the first bottoms, and the Altavista series on the terraces, or second bottoms.

The Cecil gravelly loam is an important type, but the clay loam is inextensive. Cotton is the leading crop on these soils. Corn, other grains, and forage crops do well.

The Iredell loam occurs mainly in long, narrow strips. It is generally considered best for shallow-rooted crops, but cotton yields as much as 1 bale an acre in good years.

The Wadesboro gravelly sandy loam is an inextensive soil, of rolling or hilly topography, and is excessively drained. The fine

¹ Each tenancy is tabulated as a "farm."

sandy loam and loam are rolling, well-drained types, well suited to cotton, corn, oats, and forage crops. The clay loam is largely under cultivation. It is suited to about the same crops as the sandy members of the series, but is more difficult to handle.

The White Store fine sandy loam and clay loam have heavy red clay subsoils. The latter is extensive, but is not so largely cultivated as the other important soils of the county. Cotton is the chief crop grown. These soils are much subject to erosion.

The Granville sandy loam and fine sandy loam are, in general, well-drained, easily cultivated soils. Cotton, corn, peanuts, vegetables, and melons are well suited to these soils. The silt loam is an inextensive type, best suited, without improved drainage, to grass and grain crops.

The Georgeville gravelly loam and slate loam occupy areas of rolling or hilly topography. Drainage is thorough, but the land is only slightly eroded. These soils are productive, used mainly for cotton. The silt loam and clay loam types are mostly in cultivation, used for cotton, corn, and small grains, and give good yields.

The Alamance slate loam is everywhere well drained, but the silt loam in places requires ditching. These soils produce cotton of a desirable white color.

The Bradley gravelly sandy loam and coarse sandy loam are fairly extensive soils, of rolling or hilly topography, well drained, and largely in cultivation. Cotton is the principal crop.

The Norfolk sand and sandy loam are mostly cultivated. The sand is suited to early vegetables. Yields depend largely upon the fertilization. The sandy loam is used for cotton, corn, cowpeas, and cantaloupes. This type is well suited to truck crops and bright tobacco.

Good yields of cotton and corn are produced on the Congaree fine sandy loam and silt loam. Grass and forage crops do well on the silt loam, and alfalfa probably would succeed in places.

The Bermudian loam is well drained between overflows, but the silty loam without canalling is best suited for use as pasture and hay land. The loam gives heavy yields of cotton, corn, forage crops, and oats.

The Wehadkee silty loam is poorly drained and is best suited to the production of grass.

The Altavista fine sandy loam occupies terraces lying above overflow. The type is of small extent, but is mostly under cultivation. It gives good yields of cotton, corn, and oats. In places it is poorly drained.

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