SOIL SURVEY OF PONTOTOC COUNTY, MISSISSIPPI.

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DESCRIPTION OF AREA.

Pontotoc County lies in the north-central part of the State of Mississippi and comprises an area of 318,720 acres or 498 square miles. The boundaries run north and south and east and west, and would form a rectangle 21 by 24 miles if it were not for a row of sections extending east and west in the township lying in the northeastern corner, which belong to Union County. Pontotoc County is bounded on the north by Union County, on the east by Lee County, on the south by Chickasaw and Calhoun counties, and on the west by Calhoun and Lafayette counties.

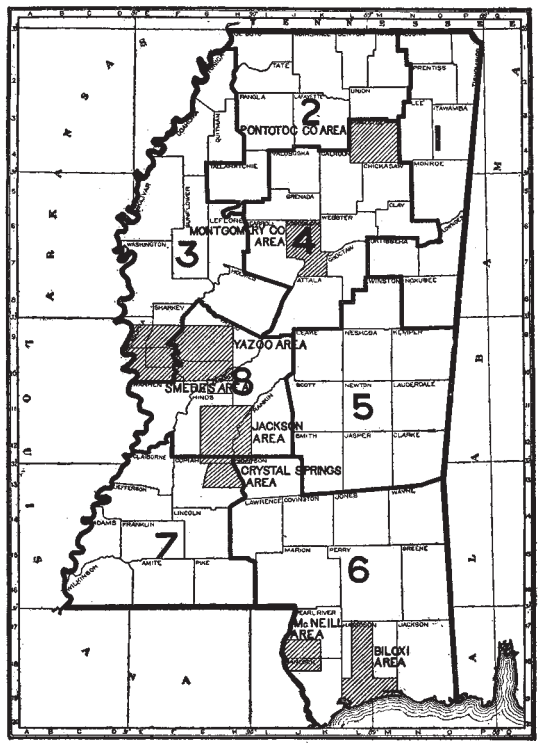

FIG. 13.—Sketch map showing location of the Pontotoc County area, Mississippi.

The topography varies from rolling to very flat. There are two broad ridges running north and south across the county, one, known as the Pontotoc Ridge, lying in the eastern part, and the other in the extreme western part. The ridges are frequently very rough and broken, and often form steep bluffs along the stream courses. Between these two ridges is a broad basin or poorly drained valleylike area known as the "Post-oak Flats." The Pontotoc Ridge occupies almost half of the entire county. In the

extreme southeastern corner of the county this ridge gradually slopes off, becoming apparently more level in the adjoining counties. The Mobile, Jackson and Kansas City Railroad in a general way follows the boundary line between the ridge and the "Post-oak Flats." The ridge along the western border of the county is not so extensive nor so rough and broken as the Pontotoc Ridge. It varies in width from 3 to 6 miles.

There is a slight elevation in the central part of the Post-oak Flats in the form of a ridge extending east and west. South of this ridge the drainage outlet is Scoona River, while north of it the streams flow into the Tallahatchie River. The streams are small, and practically all have their source within the county limits.

The town of Pontotoc has an elevation of 478 feet and is the highest known elevation in the county. Ecru is 375 feet and Algoma 430 feet. These elevations are at the respective railroad stations, but there are other points in the county that appear to be higher than these.

The first settlers of Pontotoc County were American born and came principally from the Carolinas. As the county has not experienced any great rush of immigrants since it was first settled the greater number of the present inhabitants are direct descendants of the first settlers. The population is of a sturdy, honest, industrious character, encouraging educational and industrial progress.

Pontotoc, the county seat, has between 1,200 and 1,500 inhabitants, and is the largest town in the area. It is located almost in the center of the county. Sherman, Ecru, and Algoma are small towns located on the railroad. Toccopola, Randolph, and Troy are the most important interior towns.

The Mobile, Jackson and Kansas City Railroad passes almost through the center of the county north and south, and the St. Louis and San Francisco Railroad crosses the extreme northeastern corner, having only 2 miles of its road within the county.

CLIMATE.

The climate of Pontotoc County is temperate and well suited to agricultural pursuits. Being located in the north-central section of a Gulf State, it is subject to very few sudden or extreme variations in temperature. The summers are comparatively long and hot, with an average normal temperature of about 78°. The winters are short and comparatively mild, with an average normal temperature of 44°, though occasionally there are short cold spells with freezing weather and snow.

The following tables, taken from the records of the Weather Bureau stations at Pontotoc, Okolona, and Tupelo, show the first and last killing frosts and the normal monthly and annual temperature and precipitation, so far as data are available.

Pontotoc is the only station located in the area, but Okolona and Tupelo are in adjoining counties.

Normal monthly and annual temperature and precipitation.

Month.	Pontotoc.		Okolona.		Tupelo.
	Temperature.	Precipitation.	Temperature.	Precipitation.	Precipitation.
	°F.	Inches.	°F.	Inches.	Inches.
January	43.7	5.29	41.3	4.63	5.37
February	44.4	4.69	44.0	3.90	3.58
March	53.3	6.41	53.5	4.45	6.28
April	62.4	3.83	61.4	2.87	4.24
May	69.7	3.39	72.0	3.65	2.52
June	76.9	4.39	80.2	3.42	4.54
July	79.4	4.95	82.2	3.62	3.78
August	78.8	4.20	80.6	2.58	4.08
September	73.4	3.19	74.0	2.60	1.84
October	62.5	1.43	61.3	1.51	2.60
November	52.5	3.54	51.6	.....	3.09
December	45.5	4.72	43.9	.....	4.63
Year	61.9	50.03	62.2	.....	46.55

Dates of first and last killing frosts.

Year.	Pontotoc.		Okolona.	
	Last in spring.	First in fall.	Last in spring.	First in fall.
1898	Apr. 8	Oct. 23	Apr. 7	Oct. 27
1899	Apr. 9	Oct. 30	Apr. 9	Nov. 3
1900	Apr. 1	Nov. 9	Apr. 2	Nov. 9
1901	Mar. 21	Nov. 13	.....	Nov. 5
1902	.....	Oct. 29	.....	Oct. 29
1903	Mar. 25	Oct. 24	Mar. 1	Oct. 25
1904	Apr. 5	Oct. 21	Mar. 28	Oct. 24
Average	Apr. 1	Oct. 30	Mar. 28	Oct. 31

AGRICULTURE.

The territory now lying within the limits of Pontotoc County was ceded to the United States by the Choctaw and Chickasaw Indians in 1834, and the county was organized shortly afterwards. The original boundaries took in part of what are now Union and Lee counties, which were cut off later and deprived Pontotoc County of some of her most fertile soils.

The first land to be sold was in the eastern part of the county on Pontotoc Ridge, the western part and the bottom lands being considered almost worthless. The majority of the people who attended the Government land sales did not come as permanent settlers or tillers of the soil, but as speculators or adventurers.

The principal crops grown were cotton, corn, and wheat, cotton being the only product of any importance that was carried to market. The great drawback, until about 1850, was the distance to market. The most of the cotton was hauled to Memphis, though some was carried to Aberdeen and floated down the Tombigbee River to Mobile. Much of the merchandise was purchased in Philadelphia and New York, shipped to Memphis, and hauled from there to the county.

Between 1854 and 1858 the Illinois Central and the Mobile and Ohio railroads were completed, making Oxford and Tupelo the nearest railroad points, distant about 30 and 20 miles, respectively. It was not until 1888 that Pontotoc became a railroad point, a narrow-gauge road extending from Middleton, Tenn., to Pontotoc being completed during that year. This great improvement in transportation facilities made available the vast forests of timber, and lumbering was an important industry for several years. The first timber to be cut was hardwood, such as walnut, white oak, and hickory, the less valuable woods being cut later.

There has been very little change in the crops since the early days. Until about 1875 or 1880 all products necessary for home consumption were produced on the farms. Wheat was grown on a large acreage and produced good yields. Wheat growing has been gradually abandoned, however, until at the present time none is grown and there is not a flour mill in operation in the county. All of the flour used and large quantities of corn and meat are now shipped into the county.

The western part of the county was practically unsettled thirty years ago, and it has been within the last fifteen or twenty years that the greater proportion of the land has been cleared and put in cultivation. Conditions in this section of the county have improved rapidly and the land has doubled in value during the last ten years. Cotton and corn are the principal crops grown at present, both being well distributed over the county and being planted on all of the soil types. The eastern part of the area probably produces more corn than the western.

The Twelfth Census gives the number of acres in cotton as 32,763, and of corn as 35,088, but it is likely that there is a greater acreage of cotton than of corn at the present time. The value of farm lands and improvements (except buildings) in 1900 was $1,172,560; of farm buildings, $407,530, and of farm implements and machinery, $102,620. Expenditures for labor amounted to $18,730. The expenditures for fertilizers was only $300. Although the quantity has increased since that date, there is still comparatively little used.

There are 240,326 acres in farms in the county, the average size of each farm being 71.4 acres.[a] Of these, 42.6 per cent, or almost half,

[a] The census classified each tenancy as a farm. The individual holdings are doubtless much greater than the figure given here.

are operated by the owners, the remainder being rented either for a certain quantity of cotton or else worked on shares. Under the latter method the owner of the land furnishes everything except the labor, and the tenant receives in return for his year's work one-half of the crops produced. The tenant is usually furnished his necessary supplies in advance by the landowner. A lien is taken on his half of the crop as security and in an unfavorable year and when the price of cotton is low this frequently fails to pay for the supplies. In favorable years and with a fair price for cotton the tenant usually makes a little money.

There is noticeable improvement in the homes and farm buildings, which as a rule are comfortable and ample. This is more especially true of the landowners, as the houses occupied by tenants are usually small one-story buildings containing from 2 to 4 rooms only. As a general rule the most prosperous farmers own land along the stream courses, their farms containing both bottom and upland soils. The bottoms are usually planted to corn and the uplands to cotton, although cotton is frequently planted along the edges and on the more elevated parts of the bottoms. The bottom land is also used for hay land or pasture. These farmers usually raise more hogs and cattle than those farming upland soils solely.

The uncultivated upland is frequently covered by a growth of Japan clover, which furnishes fair grazing during the summer months and could be used more extensively than it is.

No systematic rotation of crops is practiced over the greater part of the area. Generally cotton is grown for a few years, then corn for several seasons, and then cotton again. A great many fields have been planted in cotton alone for the last ten years or more. Some of the best farmers employ a rotation of cotton, corn, and oats. After the oats are harvested cowpeas are sown, generally being cut for feed.

The use of the 1-horse plow in preparing the soil for planting is very general. In cultivating the crops the 1-horse plow is also used to do the bulk of the work.

The greater part of the farm labor is colored and requires constant supervision. The greater number of the laborers are hired by the month or year at a rate of from $12 to $20 a month. Frequently during the rush of the harvesting season day labor has to be employed at $1 to $1.25 a day, and it is often hard to secure it even at this price. Much of the labor has left the rural districts for the near-by towns and cities.

The present available supply of labor is about exhausted, and its cost has reached the limit which the farmer can pay and realize any profit. To overcome this serious difficulty the agricultural methods will have to be changed. The first step should be to increase the

productivity of the soil, as it costs as much and sometimes more to cultivate an unproductive soil as a productive one.

Instead of planting cotton year after year on the same land a systematic rotation of crops should be practiced. Cowpeas should be planted more extensively. The soils of the uplands are very shallow, and their depth should be increased by plowing a little deeper each year. Terracing has been neglected, and hundreds of acres of good land have been ruined by erosion within a few years after being placed in cultivation. In years past, when land and labor were cheap, the farmer could better afford to allow the soils to wash and then clear up fresh land than he can at present.

There is a considerable proportion of the county so rolling that labor-saving machinery could not easily be used. On the other hand, there are many farms where modern farming machinery could be used to a great advantage. Its introduction is one of the means by which the planter can improve his condition. Another matter needs attention. The county roads are very poor, and some of them are almost impassable during the winter months. No one step could be taken that would do more for the advancement of agriculture than the building of better roads.

The soils of the Pontotoc Ridge, which were mapped as Orangeburg clay and Orangeburg sandy loam, seem especially well adapted to the growing of peaches, pears, and plums, and much interest has been taken in this industry during the last two or three years. There are a few young peach orchards that contain several thousand trees not yet in bearing.

The price of land in the county ranges from $3 to $40 an acre, and the greater proportion of farm lands could be bought for $7 to $15 an acre.

SOILS.

Seven types of soil are found in Pontotoc County, namely, Orangeburg clay, Orangeburg sandy loam, Lufkin clay, Lufkin silt loam, Monroe silt loam, Houston clay, and Congaree loam. Each of these types contains some areas that are either too small in extent to be represented on the map as a separate type or else vary from the main type so slightly as to constitute phases rather than distinct soils. The Orangeburg clay, Orangeburg sandy loam, and Houston clay are found east of the Mobile, Jackson and Kansas City Railroad, while the Lufkin clay, Lufkin silt loam, and the Monroe silt loam occur west of it.

The greater part of the eastern side of the county forms what is known as Pontotoc Ridge, and consists principally of the Orange sands and clays. It is from this formation that the Orangeburg clay and Orangeburg sandy loam are principally derived, though a few

areas were found where they were derived from greensand marl. The weathering of this marl is indicated by the texture and color gradually changing from a greensand at lower depths to a red sandy clay at the surface. There is some doubt as to whether these soils may not be derived entirely from the greensand formation. This could not be determined, as the greensand marl was only found in a few places, but it is possible that where it was not found it had been changed into soil by the process of weathering. It is thought most likely, though, that the Orangeburg soils are derived from both the Orange clays and sands and the greensand marl.

The "rotten limestone," or black prairie, which is more extensively developed in Lee County, adjoining Pontotoc County on the east, outcrops in a few places along the eastern border of the county, giving rise to the Houston clay. The Houston clay was at one time covered by the Orangeburg clay or the Orangeburg sandy loam, and this is true of a few areas at the present time. In most cases, however, the Orangeburg material has been removed by erosion and the yellow clay which is derived from the "rotten limestone" is left exposed. The yellow clay had at one time a thin covering of black loam, but this has been washed off, and instead of the typical Houston clay, which has a black loamy soil, the type as mapped here is really the subsoil of the Houston clay. It is frequently the case that a heavy, tenacious, greenish-yellow, intractable soil appears on hill tops or slopes of the Pontotoc Ridge, where clay marls come to or near the surface and have predominated in the formation of the soil. Very few of these areas were large enough to be shown on the map, but where they could be shown they were classified with the Houston clay. The soil in these areas is very tenacious and is rarely ever cultivated.

Along the western edge of the county is found the Monroe silt loam, locally known as the "pine ridges." Between this and the Pontotoc Ridge is the Post-oak Flats, and it is in these flats that the Lufkin clay and Lufkin silt loam are developed. This section of the county is underlain by strata of heavy gray clay belonging to older Tertiary time. The soils here are derived almost directly from this formation and often merge into it by almost insensible degrees within a few feet of the surface. This is more noticeable in the case of the Lufkin clay than of the Lufkin silt loam. The latter type is a broad gradation from the Lufkin clay to the Monroe silt loam. It is more elevated than the Lufkin clay, the elevation gradually increasing until the rolling topography of the Monroe silt loam is reached.

The rolling topography of the Orangeburg clay, Orangeburg sandy loam, and Monroe silt loam give to these types excellent natural drainage, while the Lufkin silt loam has only moderately good drain-

age. The Lufkin clay and Congaree loam have to be artificially drained before they can be used for agricultural purposes.

The Congaree loam is formed almost entirely of local material, as every stream, with the exception of a few small ones in the extreme northwestern and northeastern corners of the county, has its source within the county. Owing to this fact the character of the material is to a large extent governed by the nature of the adjoining uplands. The soil is formed both from stream deposits and wash from the hills. Some of the settlers state that thirty or forty years ago the bottom lands, mapped as Congaree loam, were elevated only a few feet above the normal height of the streams and large areas were covered by water the greater part of the year. These bottoms have been built up several feet within that period by material washed from the uplands, together with the stream deposits. This rapid sedimentation is due to the clearing of the forests from the uplands and the careless methods of cultivating the lands, with the result that erosion has rapidly washed the soils of the hills into the bottoms. These heavy silt deposits are not so noticeable in the southwestern part of the county, where the topography is not so rolling and the larger proportion of the uplands is uncleared.

At Ecru and west of this point artesian water is found. The depth at which the flow is reached is between 100 and 125 feet and increases to the westward until the depth is from 250 to 300 feet. So far this is the only portion of the county in which artesian wells have been sunk.

The following table gives the names and areas of the several types of soil. The distribution of these types over the county is shown in the accompanying map:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Orangeburg clay	88,256	27.7	Orangeburg sandy loam	21,568	6.8
Monroe silt loam	64,896	20.3	Houston clay	11,008	3.4
Congaree loam	53,760	16.9			
Lufkin silt loam	47,104	14.8	Total	318,720	
Lufkin clay	32,128	10.1			

MONROE SILT LOAM.

This type is closely related to the Lufkin silt loam, especially as regards the texture of the surface soil. The main difference between the two is in the topography and in the color and texture of the subsoil.

The soil of the Monroe silt loam to a depth of from 6 to 8 inches is a gray very fine sandy loam, generally containing a high percentage of silt, though on some of the more elevated ridges the proportion of silt is very small. For the first 2 or 3 inches the soil is a little darker

and more loamy than the remaining depth to the subsoil, owing to the decay of organic matter. The subsoil is a reddish-yellow silty clay, friable rather than tenacious, containing a high percentage of reddish-brown iron concretions. These concretions are also occasionally found in the soil. They are quite numerous on the knolls and frequently cause both the soil and subsoil to be gravelly. The concretions vary in size from small gravel to masses several inches in diameter. In several small spots a sandstone in the form of bowlders, 1 or 2 feet in thickness, was found. In some places the large quantity of ferruginous material has imparted a much brighter color to the subsoil than that of the main part of the type. It is almost red and appears to be very similar to the subsoil of the Orangeburg series. While such spots are quite numerous, they rarely ever exceed a few acres in extent.

There are many areas of Lufkin silt loam, too small to be represented on the map, scattered through the Monroe silt loam. These are most numerous along the eastern edge, being found in depressions and along the slopes near stream courses. Some trouble was experienced in drawing the boundary line between the Lufkin silt loam and the Monroe silt loam, as the gradation is broad, gradual, and very irregular.

As a rule the Monroe silt loam has not been subjected to any great erosion, but occasionally local areas are found where the soil is thin and the subsoil is sometimes exposed, thus giving rise to a soil that is a clay or clay loam. This was especially noticeable to the west and southwest of the village of Mud Creek.

The Monroe silt loam is found in the extreme western part of the county and borders the entire western boundary. It occurs as one continuous strip with an average width of from 3 to 4 miles running north and south, being broken only by the Congaree loam. The broadest point is at Randolph, where it is about 6 miles in width, while the narrowest part is in the extreme southwestern corner of the county, where it is only about 2 miles wide.

The topography of this type is gently rolling uplands, occurring in the form of irregular ridges with occasional flat areas. It is more rolling along the western edge. It borders the Lufkin clay and Lufkin silt loam on the east. The elevation gradually increases toward the west, and the soil becomes more sandy and the subsoil brighter in color.

Owing to the rolling topography and the fairly open texture of this type it has good natural drainage. One of the most characteristic features is the growth of the shortleaf pine, and it is known as the "shortleaf pine uplands," being the only soil of the area that supports any great extent of forest of this species.

Taking into consideration the fact that no fertilizers are used nor any systematic rotation of crops practiced, the Monroe silt loam produces good yields of cotton and corn.[a] Cotton yields from one-fourth to three-fourths bale per acre and corn from 15 to 30 bushels. These two crops are the only ones of any importance grown on this type. The value of the type varies from $5 to $10 an acre, depending on the location and the improvements.

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

Mechanical analyses of Monroe silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
14552, 14554	Soil	0.4	0.6	0.3	13.9	18.1	54.3	11.3
14553, 14555	Subsoil	.1	.4	.3	14.9	29.1	25.4	30.1

HOUSTON CLAY.

The soil of the Houston clay is a brownish-yellow or yellowish clay loam with a depth of from 3 to 6 inches. Under this to a depth of 36 inches is a light-yellow stiff and impervious clay subsoil. Both the soil and the subsoil contain a high percentage of lime nodules and fragments of fossil shells. These, however, are much more abundant in the subsoil, which frequently rests on a partially decomposed shell limestone. This limestone is often within 1 or 2 feet of the surface.

[a] This soil was subjected to a test by the wire-basket method to determine its manurial requirements. The field from which the sample was taken has been under cultivation for about fifteen years, yielding about one-half bale of cotton and from 20 to 30 bushels of corn per acre. It is on a gentle slope and has been fairly well cared for to prevent washing, though some erosion has taken place. It is well drained and can be worked soon after rains. A 1-horse turn plow is used, breaking the soil from 3 to 5 inches, and this and the harrow constitute the only implements used in preparing the ground for planting. Cotton and corn are grown in alternate years, and peas are planted every four or five years to be cut for forage. No commercial fertilizers are used—the pea stubble and a light sprinkling of stable manure being the only manurial substances ever applied.

Upon this soil cowpea vines, to which lime at the rate of 2,000 pounds to the acre has been added, gave a very good increase, largely exceeding all other treatments except manure and being considerably better than it. Nitrate of soda, alone and in combination with acid phosphate and with sulphate of potash, showed an increase, but when used alone or in combination with each other, neither acid phosphate nor sulphate of potash gave results warranting their application.

Lime alone was slightly beneficial, and applications of complete fertilizer and complete fertilizer with lime, while showing increases over the untreated soil, were far inferior either to manure or cowpea vines.

The results of this test, while held to be strictly applicable to the field from which the sample was taken, are probably indicative of the better methods of fertilization for this type of soil throughout the area.

Along the bluffs bordering the bottom lands and on hillsides it is frequently exposed and is visible at some distance, presenting the appearance of chalky or white hills. Below this limestone is usually a blue clay, which, as seen in gullies and road cuts, appears at from 10 to 30 feet below the surface.

This type is very difficult to cultivate, especially when the soil is so shallow as to allow the plow to reach the tenacious subsoil. Cultivation must be carried on at exactly the right time, when the soil is neither too wet nor too dry. When wet it is exceedingly sticky, but dries rapidly and bakes very hard. It is the least important soil of the county and forms only a very small proportion of its area. It occurs in small bodies, the largest of which is found in the southeastern part of the survey as a narrow strip from one-half mile to 1 mile in width, bordering the Congaree loam along Chiwapa Creek. It is generally found on slopes bordering the stream courses, though occasionally it occurs as a small series of knolls. Areas of only a few acres, too small to be shown on the map, were found outcropping throughout the Pontotoc Ridge.

This type has excellent drainage, and on account of its impervious nature, which causes most of the rainfall to run off the surface, erosion is severe, and the greater proportion of the type is a network of gullies. The Houston clay is derived from Cretaceous sediments. There is very little of it that has any timber growth, and this consists of scrubby black-jack oak and post oak.

As this type is in a badly eroded condition and is difficult to cultivate, little attempt is made to use it for agricultural purposes. Only a few patches were seen under cultivation, and they were not typical. Its one practicable use is as pasture land, and it is very poor even for this purpose, as the grass is usually very scattering. The price of the Houston clay is very low, and it is generally owned as small areas occurring in other soil types.

The following table gives the results of mechanical analyses of samples of the Houston clay:

Mechanical analyses of Houston clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
14534	Soil	0.3	1.9	2.3	18.0	19.9	33.9	23.6
14535	Subsoil	.1	.9	1.0	13.0	10.3	28.3	46.4

The following samples contained more than one-half of 1 per cent of calcium carbonate ($CaCO_3$) No. 14534, 27.9 per cent; No. 14535, 28.7 per cent.

LUFKIN CLAY.

The soil, which has a depth of from 2 to 4 inches, is a very dark yellow clay or clay loam containing a high percentage of silt. The subsoil is a mottled yellow tenacious clay, frequently spotted with iron stains and extending to a depth of 3 feet or more. There is often a comparatively broad zone of gradation between this type and those adjacent to it in which the soil is a very heavy silt loam lighter in color than the main type. The subsoil of this gradation phase is also a little lighter than the typical subsoil both in color and texture. This same phase occasionally occurs on narrow ridges slightly elevated above the adjacent soil, the soil here being very shallow.

A very small percentage of this type is under cultivation and only on the lighter phase. When wet it is very sticky, and when dry it is very hard; hence cultivation must be carried on at just the right time or it will clod and bake very hard. When in a high state of cultivation the soil breaks up easily and becomes quite loamy.

Practically all of the Lufkin clay is found in one broad area occurring in the southwestern part of the county. It is locally known as the "Flatwoods" and runs north and south on each side of Scoona Creek. The surface is almost level, with only an occasional slight elevation. The streams are very crooked and have shallow channels. The drainage is therefore exceedingly poor, and during the winter rains much of the type is covered by a slowly moving sheet of water. This sluggish drainage, together with the tenacious nature of the soil, renders the area almost impassable in the winter and frequently far into the spring. For the same reasons the soil frequently remains untillable until the planting season is almost over. The type will be of very little agricultural value until some system of artificial drainage is introduced.

The Lufkin clay is derived from the older Tertiary formations. As a very small proportion of the type is under cultivation and as crops are so uncertain, it would be hard to estimate the yields. In a favorable year, however, the yield will be about one-half bale of cotton and from 15 to 20 bushels of corn per acre.[a] The soil

[a] The results of tests to determine the manurial requirements of this soil are available. The sample used was collected from a field which has been under cultivation for about fifteen years, being devoted during the time wholly to the production of corn and cotton. The field is level and naturally very poorly drained, and the land is valued at $2 to $5 an acre. No fertilizers of any kind have ever been used, nor have the leguminous crops been grown. Cotton and corn have been the sole crops grown in alternate years, the yield of the former being about 500 pounds of seed cotton and 15 bushels of corn to the acre.

Tests by the wire-basket method indicate that nitrate of soda, alone or in combination with sulphate of potash and acid phosphate, give a good increase, the greatest being observed when this first salt is used in combination with either of the others, together with lime. The result with this combination was a little in excess of that

bears almost throughout its extent a moderately dense growth of post oak, interspersed with shortleaf pine and black gum, and with occasional belts of small-sized black jack where the soil is excessively heavy. Near the streams, however, the growth becomes larger and other oaks and hickory appear to some extent. The type is almost entirely free from undergrowth in many places, but is only fair for grazing purposes. This soil type is of less value than any other in the area with the exception of the Houston clay. Its price ranges from about $2 to $5 an acre.

The following table gives the average results of mechanical analyses of samples of this type:

Mechanical analyses of Lufkin clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
14205, 14522, 14524	Soil	0.9	1.6	0.9	1.7	4.7	59.2	31.4
14206, 14523, 14525	Subsoil	.2	.9	.7	1.3	3.6	50.8	42.0

ORANGEBURG SANDY LOAM.

The soil of the Orangeburg sandy loam, which has a depth of from 6 to 8 inches, is a heavy reddish-brown sandy loam, occasionally containing a small percentage of iron concretions. The sand content is mainly of medium or fine grades. The subsoil to a depth of 3 feet or more is a red sandy clay, practically of the same character as that of the Orangeburg clay. The difference between the two types is found in the soils; if the sandy loam showed a depth of 6 inches or more it was mapped as the sandy loam, and where less than this it was mapped as Orangeburg clay. Frequently a field containing a few acres will be so spotted with Orangeburg clay and Orangeburg sandy loam that it is difficult to determine which of the two types predominates. It is seldom that any large area of this type is found that does not show many spots of Orangeburg clay.

The topography of the Orangeburg sandy loam is very rolling and the soil is most typically developed on some of the highest ridges of the county. Having been long subjected to severe erosion, the type shows wide variations in depth and marked irregularity in occurrence. Very few areas of any size have escaped destructive erosion. Those

obtained by using a combination of nitrate of soda, sulphate of potash, and acid phosphate without the lime.

The largest increase of all was obtained from the use of cowpea vines and lime, though the effect of the lime when used alone was slight.

Sulphate of potash and acid phosphate, used singly and in combination, gave small increases over the untreated soil.

that have escaped are the broader areas capping the ridges, or the newly cleared slopes. Under present methods of cultivation it is merely a question of time before these areas will also be badly eroded.

The type usually occurs as a series of ridges and when cultivated the soil gradually becomes thinner down the slope until it merges into the Orangeburg clay. At the base of the slopes and in depressions where the eroded material has accumulated the soil is much deeper, heavier in texture, and more productive than the main type. The subsoil of this phase is a reddish-brown loam or clay loam instead of the red sandy clay of the main type.

The Orangeburg sandy loam is found principally in the southeastern part of the county, in the vicinity of Troy. Areas too small to be represented on the map were found scattered over the entire eastern section of the county on the Pontotoc Ridge. These small areas were more frequently encountered in the southern than in the western part of the survey. The origin of this type is probably the sands and clays of the Lafayette formation. Undoubtedly at one time the type extended over the greater part of the Pontotoc Ridge, but the forces of erosion have removed it and given rise to the Orangeburg clay. Below this type at a depth varying from only a few feet to 30 or 40 feet are found the Orange sands. These sands are of a medium texture and contain enough clay to give them a slightly tenacious character. The Orangeburg sandy loam areas are indicated to a certain extent by the sandy nature of the roads, but this feature is often very misleading, since the Orange sands are frequently exposed in road cuts and have been transported for some distance down into the roadway.

The topography of the Orangeburg sandy loam affords good natural drainage, yet the soil seldom suffers from lack of moisture, except in periods of extended drought. The structure of the soil is loose, yet it contains a sufficient quantity of silt and clay to render it slightly tenacious, and this finer material greatly aids in the retention of moisture. The subsoil possesses a friable sandy nature and affords easy percolation, hence much of the rainfall is held instead of running off as surface water. The principal timber growth consists of red, white, and post oak, hickory, chestnut, and frequently a scattering growth of scrub pine, which is one of the type characteristics. Except in sections difficult of access the greater part of the timber suitable for commercial purposes has been cut.

The type is especially adapted to fruit growing and in its present condition could not be more profitably used, if managed properly, than for that industry, since orchards would tend to check the severe erosion which is now going on. Cotton and corn are the principal crops grown. The average yield of cotton is from one-fourth to one-half bale per acre, and of corn from 10 to 15 bushels. There are practically no fertilizers used. The soil, if properly terraced, fertilized, and cultivated, will yield from three-fourths bale to 1 bale of cotton per acre

and from 20 to 30 bushels of corn. Some of the most progressive farmers use barnyard manure quite freely, and have in the past few years tried some commercial fertilizers as an experiment. [a]

The average value of this soil is from $5 to $10 an acre. Some improved areas have a much higher value, ranging from $15 to $25 an acre, but these are by no means numerous.

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

Mechanical analyses of Orangeburg sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
14207, 14538	Soil	0.5	9.6	17.4	31.2	4.9	24.3	11.5
14208, 14539	Subsoil	.3	6.2	12.9	24.7	2.2	17.2	36.0

LUFKIN SILT LOAM.

To a depth of 10 inches the soil of the Lufkin silt loam varies from a heavy fine sandy loam to a silty loam. The sand is very fine, and in most cases the soil appears more like a silt loam. The first 2 or 3 inches are of a dark-gray color, owing to an admixture of decayed vegetable matter. The soil from 3 to 10 inches is a lighter gray or yellowish-gray and is not so loamy as in the first few inches. Both the texture and the color of the subsoil show wide variations, though it is usually a mottled gray, heavy silty loam, frequently containing iron concretions and some fine sand and increasing in tenacity to a depth of 3 or 4 feet, when a stiff clay is found. The soil becomes more sandy and the subsoil brighter in color as the elevation increases. The sub-

[a] Tests to determine the manurial requirements of this soil have been made in the Bureau laboratories. The sample used was obtained from a young peach orchard, situated on the slope of a hill, the land between the trees being planted to cotton. This field has been under cultivation for about twenty years, and at present yields from one-third to one-half bale of cotton per acre. No fertilizers have ever been used, though since setting out the peach trees three years ago, each tree has had several shovelfuls of manure, but these being 15 or 20 feet apart, the amount per acre is inconsiderable. Shallow cultivation is given the cotton, and although fairly good care has been taken of this field to prevent washing, severe erosion has taken place. The trees are in a flourishing growth.

Nitrate of soda, used alone, gave a good increase, as did a complete fertilizer, but both were exceeded by the complete fertilizer with lime. Increases were also obtained following applications of stable manure, cowpea vines with lime, and nitrate of soda with sulphate of potash or acid phosphate. Lime, sulphate of potash, and acid phosphate, used singly, and combinations of the two last, were but slightly beneficial.

These results are held to be strictly applicable to the field from which the sample was obtained and for wheat or similar crops, but may be found to apply generally to this type of soil throughout the area.

soil of the most elevated areas is usually a dark or dirty yellow silty clay, and the surface soil varies very little, and then only in the amount of silt it contains.

The more silty phase of the Lufkin silt loam is found where it borders the Orangeburg clay and the Orangeburg sandy loam. Here it occasionally contains a little medium to coarse sand. Sometimes the type occurs as low depressions, but in these spots the soil does not contain any sand.

The Lufkin silt loam is found principally a little to the west of the central part of the county, in an area running from the northern to the southern boundary of the county and broken only by occasional stream bottoms. It lies between the Orangeburg clay and Orangeburg sandy loam on the east and the Monroe silt loam and Lufkin clay on the west. This type, with the Lufkin clay, covers a broad depression or basin in the central part of the county, the greater part of the former lying in the northern portion and the latter in the southern. The topography varies from level to moderately rolling. The silty phase bordering the Orangeburg soils as a narrow strip is very level. The broadest area is found southwest of Ecru. Going west from this strip the topography gradually becomes more rolling until the Monroe silt loam is reached. In the extreme southern part of the county the greater portion of the type is level.

The greater part of the Lufkin silt loam has fair surface drainage, though there are areas so flat that artificial drains must be installed before the soil can be profitably used for agricultural purposes. The rolling areas are well drained. The greatest trouble with this soil is the underground drainage. While the texture of the subsoil to a depth of 3 feet does not appear to be extremely impervious, it seems to possess a great capacity for holding water. The fact that a stiff clay is usually found at a depth of 3 or 4 feet would account for this to a great extent. The type naturally receives much water from the higher lands on each side.

There is a considerable acreage of this soil under cultivation, and during favorable seasons the yields are very good.[a] It is easily cultivated. When plowed it breaks up into clods, which can be easily pulverized by means of a light harrow. During wet years the crops suffer from excessive moisture, yet the yields are always fair. An average yield

[a] A study of the manurial requirements of the soil was made by the wire-basket method in the Bureau laboratory. A sample for the purpose was obtained from a field that has been cleared and under cultivation for five years; corn being grown two years, followed by cotton two, and then corn again. No fertilizers have been used. The results of the tests show very large increases from the use of cowpea vines and lime, as well as from lime alone. A complete fertilizer with lime also gave a large increase. Nitrate of soda, sulphate of potash, and acid phosphate, singly and in combination, gave good increases over the untreated soil, as did stable manure. It was noticed in the test that lime, either alone or in combination, seemed to exert a most

of cotton is about one-half bale per acre. Oats do well under favorable conditions, but suffer from rust during a wet year. Very few oats are sown, however, and these are cut and fed in the straw. The soil is not considered good for corn, the average yield being from 12 to 15 bushels per acre. For peaches and pears the soil is poor, but it is excellent for grapes and plums.

The principal timber growth is post oak, though there is considerable red oak, white oak, and hickory, and on the ridges shortleaf pine. Some of the area affords good grazing. The value of this land varies from $4 to $10 an acre, depending upon the improvements and the drainage.

The following table gives the average results of mechanical analyses of samples of this type:

Mechanical analyses of Lufkin silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
14530, 14532	Soil	0.2	0.6	0.5	2.6	15.0	68.9	11.5
14531, 14533	Subsoil	.3	.7	.4	6.7	16.3	59.2	17.3

ORANGEBURG CLAY.

The Orangeburg clay consists of 5 inches of a reddish-brown loam containing a high percentage of silt, and resting on 12 inches of a light-yellow loam slightly heavier and with less organic matter than the soil. The soil varies considerably to a depth of from 3 to 10 inches, and may be a loam, a sandy loam, or a clay. Where the soil is a sandy loam it is reddish brown in color, heavy, and contains a small percentage of small iron concretions. Its depth is rarely over 9 inches, except in depressions. The sand particles vary from the medium to fine grades. In this phase the soil lies immediately upon the subsoil, with no gradation between the two.

The subsoil of the Orangeburg clay is a stiff red sandy clay containing a few iron concretions. Its sand content varies. Where the percentage is small the clay is very sticky, but as a rule the proportion of sand is sufficient to render the clay friable. The color varies little and then only in small spots. Underlying a sandy loam, it shows a brighter red and contains more sand than where overlain by a loam, though this difference is apparent only upon close observation. In eroded gullies and road cuts small irregular seams of yellow or yellow-

beneficial influence, and its addition to a complete fertilizer produced a very marked increase over that derived from the use of the fertilizer to which no lime was added. These results are held to be strictly applicable to the field from which the sample was taken and to wheat, the indicator used, or to some similar crop; but the treatments indicated as most effective will probably prove more or less beneficial on other fields of this soil in this locality.

ish-red sandy clay are often to be seen running through the subsoil. In places where the Orangeburg clay merges into the bottom lands there is a comparatively wide zone of gradation and a very gentle slope. In these places the soil is a rich, mellow brown loam to a depth of from 10 to 15 inches, while the subsoil is a dark-red clay containing a comparatively small quantity of sand, though it is quite loamy. Frequently this same material is found in depressions of small extent. In both instances the phase is due to material transported from the surrounding hills.

The Orangeburg clay has been subjected to severe erosion for many years, which accounts for the wide variation in composition. Very few areas of any size show the soil of a uniform texture and depth.

The topography is very rolling and the areas consist of irregular ridges interspersed with narrow V-shaped valleys. In a general way these ridges run north and south and form a part of Pontotoc Ridge. The slope of some of these ridges is too steep to admit of profitable cultivation, and the comparatively level areas on the broad ridges are the better suited for farming purposes. These areas, however, form a very small proportion of the type. There are thousands of acres of this soil which are eroded into a network of gullies and which can be reclaimed only at enormous cost.

The Orangeburg clay occurs in broad, uniform areas and occupies the larger part of the eastern half of the county, extending from the northern to the southern boundary. In a general way that portion having a sandy loam soil is found in the southern part, while that with the loamy soil is in the northern part, Pontotoc being about on the dividing line between the two phases.

The Orangeburg clay is the most important and most productive of the upland types of soil. Where it has been well cared for it produces excellent yields of cotton, corn, and oats.[a] The best of it will yield from three-fourths to 1 bale of cotton, from 25 to 35 bushels of corn, and from 35 to 50 bushels of oats per acre. Taking the type as a whole, the average yield of cotton is from one-fourth to one-half bale, and of corn from 12 to 25 bushels. The Orangeburg clay is also well adapted to fruit, especially peaches, pears, and plums.

The timber growth consists of red, white, and post oaks, with some hickory and chestnut. In areas having a sandy loam soil pine is usually found. The value of the Orangeburg clay ranges from $8 to $10 an acre, according to location and productiveness.

[a] To enable a test of the manurial requirements of this soil, a sample was obtained from a field which has been in cultivation for about twenty years, during which time the crops have been cotton and corn grown in alternate years without the use of fertilizer. Recently the field has been terraced to some extent and peach trees planted, cotton being grown between the rows of trees. Yields have been from 12 to 25 bushels of corn and about one-half bale of cotton per acre. The wire-basket tests indicate that the greatest increase over the untreated soil was obtained from the use of

The following table gives the average results of mechanical analyses of samples of this type:

Mechanical analyses of Orangeburg clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
14209, 14546, 14548	Soil	0.4	6.3	6.6	9.4	5.5	57.6	14.1
14210, 14547, 14549	Subsoil	.3	5.2	5.8	7.7	3.4	48.9	28.2

CONGAREE LOAM.

The Congaree loam is one of the most important soils of the area and shows a wide variation in texture, structure, and drainage. The soil varies from a sandy loam to a clay, and the subsoil usually varies according to the surface soil. As the areas of this type are comparatively small, the scale of map used would not permit the representation of the many different phases and they had to be classed as a single type. This type has some of the characteristics of Meadow, especially in spots, but the fact that a large proportion of it is well drained and under cultivation forbids its correlation with Meadow. Though there are several phases of this soil, the most usual occurrence is a brown or reddish-brown loam or clay loam, with a depth of 10 or 12 inches, gradually merging into a subsoil that becomes lighter in color and heavier in texture until at a depth of 2 or 3 feet it is a gray mottled clay or clay loam. In the sandy phase the soil is a reddish-brown heavy sandy loam to a depth of about 10 inches, underlain by a lighter colored sandy clay or clay loam and occasionally by an almost pure yellowish-white sand. The heaviest part of the type is found in depressions and usually occurs in areas only a few acres in extent.

The greater proportion of the type is easily cultivated. Some of it breaks up into clods, however, and bakes to some extent, but when in a good state of cultivation it acts like a mellow loam. A great drawback to the cultivation of this type is the fact that during a rainy season it frequently remains too wet for plowing until late in the spring, necessitating the late planting of crops. As the soil is very rich, promoting rapid growth, failures rarely result from late planting. Cotton is usually planted on the sandy phase, as it is better drained and the crop matures more rapidly than on the heavier phases and is not so apt to rust.

complete fertilizer, that observed when lime was added being slightly greater than that resulting from the fertilizer alone. Good increases were also obtained from the application of cowpea vines, to which lime was added, and from stable manure. The remaining treatments proved inferior to those enumerated, lime and acid phosphate, used singly, being apparently without effect. The results of this investigation are held to be strictly applicable only to the field from which the sample was taken and to wheat or a similar crop, but will doubtless be found to be true of this type of soil generally in this area.

The Congaree loam occurs along the stream courses and is principally found along Chiwapa, Scoona, Mud, and Lappatubba creeks. The areas vary from one-eighth mile to 1½ miles in width, but there are very few places where it is over three-fourths of a mile wide. It is derived from stream deposits and material transported from the surrounding hills. This type is elevated from 4 to 10 feet above the normal water level and is comparatively flat. Those parts adjacent both to the stream courses and to the uplands are usually the most elevated, thus leaving a slight depression or basin in the middle not well drained, and here the soil is of heavier texture. In the western part of the county, where the topography is not so rolling and the slopes to the streams are more gradual, the bottoms are not elevated so far above the normal water level, and this results in poorer drainage. The soil is also heavier, the soils of the surrounding uplands, from which the bottoms are largely derived, being of a heavier texture.

This type has to be artificially drained before it can be cultivated, but where this is properly done it is the most productive soil in the area. It produces from three-fourths bale to 1 bale of cotton and from 30 to 60 bushels of corn per acre. It is valued at from $25 to $40 an acre. In the eastern part of the county it is more valuable than in the western part, especially where it occurs in the post-oak flats.

The following table gives the average results of mechanical analyses of samples of this type:

Mechanical analyses of Congaree loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
14558, 14560	Soil	0.2	2.8	3.4	22.3	15.5	39.9	15.6
14559, 14561	Subsoil	.1	1.8	3.7	21.4	10.1	44.9	17.6

The following sample contains more than one-half of 1 per cent of calcium carbonate ($CaCO_3$): No. 14560, 1.4 per cent.

SUMMARY.

Pontotoc County lies in the north central part of Mississippi and covers an area of 498 square miles, or 318,720 acres. Its topography varies from rolling to very flat. There are two broad ridges running north and south across the county, one in the eastern part and the other in the extreme western part. The ridges are frequently very rough and broken. Between these two ridges is a broad basin or poorly drained valleylike area known as the "Post-oak Flats." The streams are small, and practically all those which affect the drainage of the county have their source within the county limits.

There has been little immigration, and the greater number of the present inhabitants are direct descendants of the first settlers, who

came principally from the Carolinas. Pontotoc, the county seat, has between 1,200 and 1,500 inhabitants and is the largest town in the area.

The climate of Pontotoc County is temperate and is subject to few sudden or extreme variations. The summers are comparatively long and hot and the winters short and rather mild. The average growing season is about seven months.

Cotton and corn are the principal crops grown. Wheat was once grown on a large acreage and produced good yields, but the crop was gradually abandoned and at the present time none is grown and there is not a flour mill in operation in the county. All of the flour used and large quantities of corn and meat are shipped into the county.

The average sized farm is about 71 acres. Nearly half of the farms are operated by the owners and the remainder are either rented for a certain quantity of cotton or else worked on shares. Under the share system the landlord furnishes everything except the labor, and the tenant receives one-half of the crop in return for his labor. The tenant is usually furnished his supplies in advance and gives a lien on his half of the crop as security.

No systematic rotation of crops is practiced over the greater part of the county. Generally cotton is grown for a few years, then corn for several seasons, and then cotton again. A great many fields have been planted in cotton alone for the last ten years or more.

The agricultural methods in use are not as good as might be. The 1-horse plow is generally used in preparing the soil for planting and in cultivating the crops the same implement is used to do the bulk of the work. There is a considerable proportion of the county so rolling that labor-saving machinery could not easily be used, but on the other hand there are many farms where modern farming machinery could be used to great advantage.

The greater part of the farm labor is colored and requires constant supervision. The present available supply of labor is about exhausted, much of it having left the rural districts for near-by towns and cities, and its cost has reached the limit which the farmer can pay and realize any profit.

Seven types of soil were found in Pontotoc County, namely, Orangeburg clay, Orangeburg sandy loam, Lufkin clay, Lufkin silt loam, Monroe silt loam, Houston clay, and Congaree loam. The Orangeburg soils are derived principally from the Orange sands and clays found in the eastern part of the county, though a few areas were found where they were derived from greensand marl. The Houston clay or black prairie is derived from the "rotten limestone" and is more extensively developed in the adjoining county on the east. The Monroe silt loam is found along the western edge of the county and is locally known as the "Pine Ridges." The Lufkin soils are found in the valley-like "Post-oak Flats" and are derived from underlying strata of heavy

gray clay belonging to an older Tertiary formation. The Congaree loam is formed almost entirely of local material, washed from the hills and deposited in the bottoms by the heavy rains. The rolling topography of the Orangeburg clay, Orangeburg sandy loam, and Monroe silt loam gives to these types excellent natural drainage, while the Lufkin silt loam has only moderately good drainage. The Lufkin clay and Congaree loam have to be artificially drained before they can be used for agriculture.

Cotton and corn are the only crops of importance grown on the Monroe silt loam. Cotton yields from one-fourth to three-fourths of a bale per acre and corn from 15 to 30 bushels.

The Houston clay is in a badly eroded condition and is so difficult to till that no attempts are made to use it for growing crops. The only use that can be made of it is for pasture land and it is very poor even for this purpose, as the grass is usually very scattering. This soil has the least value of any type in the area.

Only a small proportion of the Lufkin clay is under cultivation. In favorable years it will yield about one-half bale of cotton and from 15 to 20 bushels of corn to the acre. This type ranks next to the Houston clay in low valuation.

Cotton and corn are the principal crops grown on the Orangeburg sandy loam. The average yield of cotton is from one-fourth to one-half bale per acre and of corn from 10 to 15 bushels. This soil washes badly and very few areas of any size have escaped destructive erosion. This type is especially adapted to fruit growing and could be most profitably used for that industry.

A considerable acreage of the Lufkin silt loam is under cultivation. An average yield of cotton is about one-half bale per acre. Oats do well under favorable conditions, but suffer from rust during a wet year. The soil is not considered good for corn and the average yield is from 12 to 15 bushels per acre. This is a poor soil for peaches and pears, but is excellent for grapes and plums.

The Orangeburg clay is the most important and the most productive soil of the upland types. Where it has been well cared for it produces excellent yields of cotton, corn, and oats. The best of it will yield from three-fourths bale to 1 bale of cotton, from 25 to 35 bushels of corn, and from 35 to 50 bushels of oats per acre. Taking the type as a whole, the average yield of cotton is from one-fourth to one-half bale and of corn from 12 to 25 bushels. It is also well adapted to fruit, especially peaches, pears, and plums.

The Congaree loam has to be artificially drained before it can be cultivated, but when well drained it is the most productive soil in the county. It yields from three-fourths to 1 bale ot cotton and from 30 to 60 bushels of corn per acre.

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