

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF HOWARD COUNTY,
ARKANSAS.

BY

M. W. BECK, IN CHARGE, M. Y. LONGACRE, F. A. HAYES,
AND W. T. CARTER, JR.

HUGH H. BENNETT, INSPECTOR, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1917.]



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1919.

BUREAU OF SOILS.

MILTON WHITNEY, *Chief of Bureau.*

ALBERT G. RICE, *Chief Clerk.*

SOIL SURVEY.

CURTIS F. MARBUT, *In Charge.*

G. W. BAUMANN, *Executive Assistant.*

COMMITTEE ON THE CORRELATION AND CLASSIFICATION OF SOILS.

CURTIS F. MARBUT, *Chairman.*

HUGH H. BENNETT, *Inspector, Southern Division.*

W. EDWARD HEARN, *Inspector, Southern Division.*

THOMAS D. RICE, *Inspector, Northern Division.*

W. E. MCLENDON, *Inspector, Northern Division.*

MACY H. LAPHAM, *Inspector, Western Division.*

J. W. MCKERICHER, *Secretary.*

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF HOWARD COUNTY, ARKANSAS.

BY

M. W. BECK, IN CHARGE, M. Y. LONGACRE, F. A. HAYES,
AND W. T. CARTER, JR.

HUGH H. BENNETT, INSPECTOR, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1917.]



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1919.

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., August 22, 1918.

SIR: I have the honor to transmit herewith the manuscript report and map covering the survey of Howard County, Arkansas, and to recommend that they be published as advance sheets of Field Operations of the Bureau of Soils, 1917, as authorized by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

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

CONTENTS.

	Page.
SOIL SURVEY OF HOWARD COUNTY, ARKANSAS. By M. W. BECK, IN CHARGE, M. Y. LONGACRE, F. A. HAYES, and W. T. CARTER, JR.	5
Description of the area.	5
Climate.	7
Agriculture.	8
Soils.	12
Hanceville stony fine sandy loam.	16
Hanceville shale loam.	17
Hanceville fine sandy loam.	18
Hanceville loam.	20
Greenville gravelly loam.	21
Greenville fine sandy loam.	23
Greenville loam.	24
Orangeburg fine sandy loam.	24
Ruston gravel.	25
Ruston fine sandy loam.	26
Ruston very fine sandy loam.	27
Caddo very fine sandy loam.	28
Susquehanna fine sandy loam.	29
Susquehanna very fine sandy loam.	30
Susquehanna clay loam.	31
Oktibbeha very fine sandy loam.	31
Oktibbeha clay.	32
Houston clay.	33
Chalk (Houston material).	34
Sumter clay.	34
Amite fine sandy loam.	35
Cahaba fine sandy loam.	36
Kalmia fine sandy loam.	37
Myatt very fine sandy loam.	38
Leaf very fine sandy loam.	39
Hannahatchee fine sandy loam.	39
Ochlockonee fine sandy loam.	40
Ochlockonee silt loam.	41
Ochlockonee silty clay loam.	42
Bibb very fine sandy loam.	42
Pope fine sandy loam.	43
Catalpa silty clay loam.	44
Trinity clay.	45
Portland clay.	46
Rough stony land.	47
Summary.	47

ILLUSTRATIONS.

PLATES.

	Page.
PLATE I. Fig. 1.—Section of a 3,700-acre peach orchard on Greenville gravelly loam, west of Corinth. Fig. 2.—Showing topography and vegetation of the Greenville gravelly loam.....	32
II. Fig. 1.—Greenville fine sandy loam, showing level to gently undulating topography. Fig. 2.—Ditch cut through Catalpa silty clay loam.....	32
III. Fig. 1.—Field of Catalpa silty clay loam. Fig. 2.—Plowing under alfalfa sod on Catalpa silty clay loam.....	40

FIGURE.

Fig. 1. Sketch map showing location of the Howard County area, Arkansas....	5
---	---

MAP.

Soil map, Howard County sheet, Arkansas.

SOIL SURVEY OF HOWARD COUNTY, ARKANSAS.

By M. W. BECK, In Charge, M. Y. LONGACRE, F. A. HAYES, and W. T. CARTER, JR.—Area Inspected by HUGH H. BENNETT.

DESCRIPTION OF THE AREA.

Howard County includes an area of 602 square miles situated in the southwestern part of Arkansas, about 120 miles southwest of Little Rock. The county lies in the southern part of the Ozark or Appalachian province and in the northern part of the Gulf Coastal Plain. The boundary line between these two geological divisions passes east and west about 1 mile north of Dierks. North of this line is the Appalachian or Southern Ozark region, sometimes known as the Ouachita Mountains. This area is prevailingly hilly, becoming mountainous in the northern part of the county. Here the streams in many places have cut steep-walled valleys, and in some places the immediate slopes are precipitous. The greater part of this section, however, is hilly, with many gently rolling and rolling areas over the broader divides.

The southern or Coastal Plain division is level to gently undulating and gently rolling, with some hilly areas. Along most of the streams there are low first-bottom areas varying from a few yards to 1 mile or more in width. There are also in places second bottoms or terraces, in places very narrow, in others several miles in width. These second bottoms are separated rather distinctly from the first bottoms and also from the uplands by well-defined escarpments.

The bottoms and terraces are nearly level, and topographically are well suited to cultivation. There are also many level, undulating or gently rolling areas through the southern or Coastal Plain portion of the county. In the rougher northern part, while many slopes are too steep for cultivation, or so steep that they would be subject to ruinous erosion if plowed, there are numerous smooth bodies of land that are safely cultivated.

The county has an average elevation of about 600 feet above sea level, the southern part west of Saratoga being the lowest and a



FIG. 1.—Sketch map showing location of the Howard County area, Arkansas.

point 2 miles north of Athens the highest. The latter reaches a height of 1,600 feet, being 600 feet higher than the country 1 mile south. The mean elevation of the Coastal Plain is probably about 400 feet, and of the Appalachian region about 800 feet, above sea level. The elevation above sea level at Athens is 959 feet, at Dierks 500 feet, at Center Point 591 feet, and at Nashville probably 400 feet. The general slope of the county is southwestward.

Howard County is drained by three principal streams, the Saline River, Cossatot River, and Muddy Fork. The Saline River and its tributaries drain the greater part of the county. Its channel varies from a few feet to 100 feet in width and is rather shallow. In the northern part of the county this stream has considerable fall. The Cossatot River drains the extreme northwestern part of the county. Its main channel is about 50 feet in width and, in places, the stream has developed rather deep gorges. Muddy Fork drains about 12 square miles in the northeastern corner. Its channel is rather narrow and shallow and the stream has a slow current, resembling a lake in many places.

In the vicinity of Schall and north of Buckrange there are some rather large flats that have practically no run-off, but excepting the low first bottoms and some other small areas, the remainder of the county is well drained.

Howard County was organized in 1873, being formed largely from Hempstead and Sevier Counties, with small parts taken from Polk and Pike Counties. The county lines have remained unchanged since the county was established. Center Point was the county seat until 1905, when the seat of government was transferred to Nashville. The 1910 census reports a total population of 16,898, all which is classed as rural. This gives an average of 28.1 persons per square mile. The early white settlers came principally from Mississippi, Alabama, the Carolinas, and Tennessee, with a few from the mid-western and northern sections of the State. The northern part of the county is rather sparsely settled, but the southern part is thickly settled and well developed. General farming, fruit growing, trucking, and lumbering are the principal industries.

Nashville, the county seat, had a population of 2,374 in 1910; Mineral Springs, the next largest town, 432; Center Point, 328; and Dierks, 272. Saratoga, Athens, and Schall are smaller towns. All the towns have increased considerably in population since 1910. At present Dierks is growing rapidly, owing to the construction of a large sawmill at this place. The Memphis, Dallas & Gulf Railroad shops and a box factory at Nashville give employment to a large number of men.

The southern part of the county has fairly good shipping facilities, but the greater part of the northern section is a number of miles

from a railroad. The Memphis, Dallas & Gulf, which passes through Schall, Mineral Springs, and Nashville, from Ashdown to Hot Springs, connects with the main line of the Kansas City Southern Railway at Ashdown. A branch of the St. Louis, Iron Mountain & Southern Railway, a part of the Missouri Pacific system, has Nashville as a terminus, leaving the main line at Hope. The De Queen and Eastern Railway connects with the main line of the Kansas City Southern, and has Dierks as a terminus.

The public roads are in fairly good condition except in the northern part of the county, but bridges and culverts are needed in many places. The roads are best in the central part of the county. There should be no difficulty in constructing excellent roads, as road-building material of good quality can be obtained with small expense for hauling.

There are a considerable number of schools and churches in Howard County, and these are quite conveniently located. The county is well served by rural mail delivery routes. Artesian water has been obtained over the southern part of the county at depths of 150 to 800 feet, and there are a number of high-grade mineral springs throughout the county.

Farm products are shipped principally to Kansas City, St. Louis, and Omaha, while strawberries, potatoes, radishes, peaches, and melons have a wider range of market. Some cars of peaches go to the East and to Canada. Cotton is shipped principally to New Orleans, Galveston, and Memphis.

CLIMATE.

The climate of Howard County is characterized by mild winters and long, warm summers. The mean annual temperature is about 64° F. The mean temperature for the winter months, December, January, and February, is about 45.5° F., according to the records of the Weather Bureau station at Center Point. The lowest temperature recorded at this station is 0°. Periods of cold weather during the winter are of very short duration, and the temperature rarely goes below freezing. Snowfall is rare.

The summer months are rather warm. The mean temperature for June, July, and August is 80.8° F. The maximum record is 111°. For the spring and fall the temperature averages 64° or 65°.

The average date of the first killing frost in the fall is November 4, and that of the last in the spring, March 29, giving a normal growing season of 220 days. The advanced spring enables the farmer to get truck crops on the market at an early date.

The mean annual precipitation is recorded as 53.27 inches. The total rainfall in the wettest year on record was 63.31 inches and in

the driest year, 42.5 inches. The rainfall is fairly well distributed throughout the growing season, being heaviest during the spring months and lightest during the fall.

The following table, giving the normal monthly, seasonal, and annual temperature and precipitation, is compiled from the records of the Weather Bureau station at Center Point, which is in the central part of the county:

Normal monthly, seasonal, and annual temperature and precipitation at Center Point.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1910).	Total amount for the wettest year (1915).
	°F.	°F.	°F.	Inches.	Inches.	Inches.
December.....	45.3	76	10	4.49	6.00	3.04
January.....	45.6	86	5	3.03	1.67	4.81
February.....	45.6	84	0	4.02	3.82	3.80
Winter.....	45.5	86	0	11.54	11.49	11.65
March.....	58.7	92	21	4.48	2.05	4.90
April.....	63.0	94	29	5.06	4.48	5.72
May.....	70.9	98	34	8.78	7.95	6.00
Spring.....	64.2	98	21	18.32	14.48	16.62
June.....	78.3	105	52	4.72	2.18	4.90
July.....	81.6	105	54	5.18	4.71	3.98
August.....	82.5	111	51	2.16	4.69	16.34
Summer.....	80.8	111	51	12.06	11.58	25.22
September.....	76.7	104	39	4.56	1.40	.80
October.....	64.9	97	24	2.93	3.55	2.00
November.....	55.2	86	12	3.86	T.	7.02
Fall.....	65.6	104	12	11.35	4.95	9.82
Year.....	64.0	111	0	53.27	42.50	63.31

AGRICULTURE.

All of Howard County, except the "black-land" areas, was originally forested, principally with shortleaf pine and several varieties of oak. The timber on the "black land" (Sumter and Houston soils) consisted of a scant growth of bois d'arc, or Osage orange, and red and black haw, with some cottonwood and pine. The original settlers of the county cleared small patches for gardens and small farms. Corn and cotton, with small fields of oats and wheat and garden vegetables,

were grown. After the Arkansas & Louisiana Railroad, which is now part of the Missouri Pacific System, was completed in the spring of 1884 lumbering became an important industry. Agriculture has been important ever since the settlement of the county, but it has increased most rapidly since sawmills were established, and recently commercial peach orchards and truck farms have been developed. Corn and cotton, however, are still the most important crops.

The 1880 census reported the average size of farms as 134.7 acres, of which 31.9 per cent was improved; the 1910 census gives the average size of farms as 79.5 acres,¹ of which 46.3 per cent is improved.

Corn has always occupied the largest acreage, but cotton has been the principal money crop. The 1880 census reports 17,671 acres devoted to corn and 12,259 acres to cotton. There were 3,357 acres in wheat in 1879, 2,486 acres in oats, 115 acres in sweet potatoes, and 23 acres in tobacco. Orchard and market-garden crops produced in 1880 were valued at \$9,697.

The 1890 census reports 24,166 acres in corn, as compared with 22,998 acres in cotton. Oats were grown on 3,142 acres in 1889, wheat on 817 acres, sweet potatoes on 339 acres, and hay on 169 acres. Apples and peaches produced 41,689 bushels.

The 1900 census reports corn grown on 28,890 acres and cotton on 23,939 acres. The area in oats is given as 4,428 acres, and that in wheat as 3,526 acres. All hay crops occupied 670 acres, including 32 acres in alfalfa. There were 92 acres in Irish potatoes and 146 acres in sweet potatoes. The orchard crops produced were valued at \$16,920. In 1899 the value of animals sold or slaughtered was \$106,496, and the value of poultry raised, \$20,694.

The 1910 census reports corn grown on 35,398 acres, and cotton on 24,740 acres. The next crop in acreage is oats, which occupied 1,414 acres in 1909. Hay and forage crops, including 529 acres in alfalfa, were grown on 3,055 acres. Potatoes and other vegetables occupied 1,300 acres. Sugar cane and sorghum were grown on 862 acres. There were 71,906 peach trees, 39,464 apple trees, and 1,714 grape vines in the county in 1909, and the value of the fruit produced was \$22,434.² Animals sold or slaughtered in that year amounted in value to \$227,970; dairy products, excluding those used in the home, were produced to the value of \$95,499; and poultry and eggs to the value of \$61,668. There were 6,165 dairy cows on farms in 1909.

Practically all the farmers have small gardens and orchards for home use. Peanuts and cowpeas are grown by many farmers, the 1910 census reporting 664 acres in cowpeas and 142 acres in peanuts. The acreage devoted to watermelons, cantaloupes, peaches, strawber-

¹ The 1910 census classified each tenancy as a "farm."

² This amount includes small sums representing the values of small fruits and nuts.

ries, and radishes recently has increased yearly, and at present these are important commercial crops. Peaches do well and some varieties of apples succeed, but the peach has been the most important commercial fruit. (See Pl. I, fig. 1.)

Cotton is grown exclusively as a cash crop. Corn is used principally for feeding work stock, and a little is sold on the local market. Cowpeas and other forage crops are largely fed on the farm, but a small supply is sold in local markets. Large quantities of hay and other feedstuffs are imported. Peanuts are generally dug and the vines fed as hay. Sweet potatoes are grown mainly for home use, the surplus being absorbed by the home market. Oats and wheat are used on the farm. The alfalfa acreage is being extended, and in the future this may become an important cash crop.

Cattle raising and dairying have not been very important in the past, but at present the introduction of thoroughbred cattle is receiving considerable attention, the Angus and Hereford being the popular beef breeds, while the Jersey is the leading dairy type. Practically all the farmers keep one or more cows to produce milk for the home.

Hogs are raised rather extensively. Registered Poland-China and Duroc-Jersey, and to a less extent the Hampshire, are the most important breeds. A number of farmers raise registered hogs to sell for breeding purposes and find it profitable. Hog raising should be further developed, as there is not enough meat produced to supply even the local demand.

The adaptation of certain soils to certain crops is recognized to some extent. It is realized that the Sumter, Catalpa, and Houston soils give the best results in the production of long-staple cotton and alfalfa; that the Greenville gravelly loam is especially adapted to peaches; and the more sandy soils to truck crops.

The tenant-farm buildings as a rule consist of a frame house and small barn. On many farms operated by the owners the buildings are more adequate, the house being more substantial and the barns larger and better. Where hay is grown extensively, large sheds are generally provided for storing the crop, but implement sheds are lacking, and stock, other than work animals, has no protection during the winter.

The work stock consists principally of medium-weight mules and some horses. The work implements at present consist chiefly of 1-horse plows and cultivators, disk and spike-tooth harrows, mowers, and rakes, but there are a considerable number of riding cultivators and 2-row planters, and a few manure spreaders in use. The 1910 census reports the following distribution of property values on the farms: Land, 52.9 per cent; buildings, 19.3 per cent; implements, 4.7 per cent; and domestic animals, 23 per cent.

Cotton is grown on ridges or "beds." It is thinned and the grass between the stalks removed with hand hoes. Cultivation is done with shallow-running implements, such as cultivators and light shovels or scoops. Oats as a rule are sown broadcast and plowed under rather roughly. A few farmers who flat-break the land first and then disk the land after sowing the seed get the best returns. The most common method of growing corn is to bed the land and plant the corn on a slight ridge 3 feet apart in 5-foot rows. This crop as a rule is planted from March 15 to April 1, and cotton from April 1 to 10.

On the black-land areas the best results are said to be obtained with cotton by plowing 10 or 12 inches deep as early in the fall as possible. On this type of land cotton and corn are both planted on a slight ridge. Little attention has been paid to crop rotation, but a few farmers follow a three-year rotation of corn, oats, and cotton, with cowpeas or peanuts planted between the corn rows.

Commercial fertilizers have not been used very extensively in this county. In 1879 only \$229 was expended for fertilizer; in 1889, \$365; in 1899, \$170; and in 1909, \$7,039. At present commercial fertilizer is used more extensively and scientifically, with good results. The fertilizers in most common use are 16 per cent acid phosphate, or a mixture carrying 10 per cent acid phosphate, 2 per cent nitrogen, and 0.5 per cent potash. Cotton is fertilized with about 200 pounds per acre of the former. Radishes, beans, cantaloupes, and other truck crops receive about 600 pounds of the latter mixture per acre. Barnyard manure is used when available and invariably increases yields.

In normal times farm laborers can be obtained rather easily. During the peach-harvesting season pickers receive $17\frac{1}{2}$ to 25 cents an hour. Farm laborers receive from \$15 to \$25 a month, with house furnished, and day laborers from 75 cents to \$1.50 with board, or \$1 to \$2 without board.

The 1910 census reports 58.4 per cent of the farms operated by owners, 41.5 per cent by tenants, and 0.1 per cent by managers. There are numbers of rather large holdings. Recently some rather large farms have been purchased to be used as stock farms. Most of the cultivated land is rented on shares. The annual rent on the sandy land is one-third of the cotton and one-fourth of all other crops, and on the black land one-fourth of all crops, the tenant furnishing everything; but where the landlord furnishes the animals, implements, etc., he receives one-half of all crops. Land rents on a cash basis at \$1.50 to \$8 an acre, but very few farms are rented for cash. Farms sell at prices ranging from \$5 to \$65 an acre, depending on the soil and location. The 1910 census reports the average assessed value of farm land as \$8.51 an acre.

SOILS.

In that part of Howard County lying within the southern Ozark or Appalachian Province the soils are residual, being formed by the weathering in place of fine-grained sandstones and shales. The sandstones range from light colored to reddish brown. The shales are red, yellow, and greenish. In places the soil is comparatively shallow, with occasional exposures of the bedrock, while in other places, especially on some of the smoother slopes where it has accumulated by colluvial wash, the soil is many feet deep.

The soils in the southern or Coastal Plain part of the county are derived from material washed from land areas farther north and laid down in the sea when this region was submerged. The sedimentary beds include calcareous and noncalcareous sandy clays and heavy clays with much chert and quartz gravel, and locally ferruginous rock of a conglomeritic and sandstone or ironstone nature. Since the ocean has receded much change in the materials has taken place through the agencies of erosion, aeration, oxidation, and the growth of vegetation. In the poorly drained areas little oxidation has taken place, while in the better-drained soils oxidation has reached an advanced stage. The more poorly drained soils are grayish or mottled grayish and yellowish or yellowish and reddish, while the better drained soils are more uniform and darker in color, being brown, reddish, and yellowish.

In the northern part of the county the alluvial soils consist of material washed from residual sandstone and shale soils; in the southern part they consist of reworked Coastal Plain material. The soil in the extreme southwestern part of the county is influenced by backwater from the Red River, and is classed in the Portland series. The Saline River and a number of its largest tributaries have rather extensive terraces or second bottoms, consisting of unconsolidated sands and clays deposited when these streams were flowing at higher levels than at present. These terraces also consist of reworked Coastal Plain material.

On the basis of origin, the various soils of Howard County can be grouped in four divisions, viz, (1) residual soils; (2) Coastal Plain soils, (*a*) calcareous and (*b*) noncalcareous; (3) terrace or old-alluvial soils; and (4) first-bottom soils subject to overflow, (*a*) calcareous and (*b*) noncalcareous. The various soils are classified into series, each series including types which have the same color, origin, and structure, with similar drainage and topographic characteristics. The types in any series differ only in texture.

The soils of residual origin are classed in the Hanceville series. The Greenville, Orangeburg, Ruston, Caddo, Oktibbeha, and Susquehanna series comprise the noncalcareous Coastal Plain soils and

the Houston and Sumter series the calcareous soils. The terrace or old-alluvial soils are classed in the Amite, Cahaba, Kalmia, Leaf, and Myatt series. The recent-alluvial or first-bottom soils of non-calcareous nature are classed in the Hannahatchee, Ochlockonee, Bibb, and Pope series, and the calcareous bottom-land soils in the Catalpa, Trinity, and Portland series.

The Hanceville series is characterized by a gray surface soil, a pale-yellow to reddish subsurface layer, and a dull-red or yellowish-red friable clay subsoil, the lower part of which often contains yellowish mottlings. The Hanceville soils occupy rather hilly country and are well drained. They are derived from sandstone and shale.

The Greenville soils have dark-red to reddish-brown surface soils, with red, friable sandy clay or clay loam subsoils. They occupy gently rolling to hilly areas and are very well drained, although retentive of moisture.

Very closely related to the Greenville soils are the Orangeburg. This series differs essentially in the color of the surface soils, which are gray to brownish gray, underlain by a red, friable sandy clay subsoil. They also occupy well-drained or rolling positions.

The Ruston series has gray to grayish-brown surface soils and reddish-yellow to yellowish-red friable sandy clay subsoils. The soils of this series occupy gently rolling areas. They are closely related to the Orangeburg soils on the one hand, and the Caddo on the other, but differ particularly in the color of the subsoil, which is intermediate between the yellow of the Caddo and the bright red of the Orangeburg. The color denotes poorer drainage than in the Orangeburg soils and better drainage than in the Caddo soils.

The Caddo differs from the other Coastal Plain series chiefly in the color of the subsoil. The surface soils are gray and the subsoils yellow, the lower part being mottled faintly with gray and rather compact. This series occurs on rather level areas and gentle slopes where the drainage is imperfect.

The Susquehanna series is similar to the Orangeburg and Ruston in color, but differs essentially in the greater plasticity of the subsoil, which is due to a higher clay content. The surface soils are gray and the subsoil dull-red and gray, mottled, plastic, tenacious clay. This series occupies rather rolling to hilly positions.

The Oktibbeha soils are very similar in structure and color to the Susquehanna. They occur only in the "black prairie belt" and are underlain by soft calcareous material. They differ from the Susquehanna in the color of the surface soil, which is prevailing grayish red or reddish gray to reddish brown. The subsoils consist of red and gray mottled, plastic clay. These soils are developed on rolling land and on ridges adjacent to or underlain by calcareous material.

The Houston series comprises dark-brown to dark ashy brown surface soils, underlain with yellowish-brown clay or greenish-yellow sticky clay subsoils. The material is calcareous. The Houston differs in origin from all the other Coastal Plain series except the Sumter. It is derived from highly calcareous material or rotten chalky limestone. The Houston soils occupy practically level areas and gentle slopes, but drainage is good.

Closely related to the Houston series is the Sumter. This has brown to yellowish-brown surface soils, underlain by sticky yellow clay with a greenish tinge. In the lower subsoil whitish chalky lime concretions or partly decayed fragments from the parent marl or limestone beds are usually encountered. This series also is derived from highly calcareous chalky material. In the northern part of the Coastal Plain belt some areas are derived from an indurated limestone.

The typical Amite soils are reddish brown, with red friable sandy clay subsoils. This series closely resembles the Greenville of the uplands. The soils are composed of well-oxidized old alluvium. They occupy level or nearly level second bottoms or terraces, but their drainage is thorough.

The Cahaba series is characterized by grayish to light-brown or slightly reddish brown surface soils, underlain by yellowish-red or reddish-yellow friable sandy clay. The Cahaba soils occupy old stream terraces or second bottoms. They have good drainage, but are not so well drained as the Amite soils.

The Kalmia series is characterized by a grayish surface soil, a pale-yellow subsurface soil, and a mottled yellow and gray, friable subsoil. This series occupies flat and depressed areas on the second bottoms and consists of old alluvium derived from Coastal Plain material. The soils are not as well drained as the Cahaba.

The Myatt soils are characterized by their light-gray to gray and rusty-brown, mottled surface soils, with a gray, pale-yellow, and rusty-brown friable subsoil. They occupy the most poorly drained areas of the second bottoms.

The Leaf series has dark-gray to light-brown surface soils, underlain by a pale-yellow, gray, and red mottled, plastic clay subsoil. The red mottlings and the plasticity of the subsoil are the principal distinguishing features of this series as compared with the Kalmia. This series also occupies imperfectly drained positions in second bottoms.

Typically the Hannahatchee series includes reddish-brown soils with red, friable sandy clay subsoils. The subsoil is practically the same in structure and texture throughout the 3-foot section. This series is derived principally from wash from the Greenville soils.

It occupies first bottoms along streams and is subject to overflow. Drainage is good between overflows.

The Ochlockonee series is characterized by brown surface soils and a mottled rusty-brown and bluish-gray, rather heavy clay loam to fine sandy clay subsoil. These soils occur in stream bottoms and are subject to overflow. They are composed of wash from upland Coastal Plain soils. Neither soil nor subsoil shows effervescence with hydrochloric acid.

The Bibb series is the first-bottom equivalent of the Myatt. Typically, the soil is light gray and the subsoil mottled light gray or bluish gray and yellowish. The Bibb soils occupy the most poorly drained positions in the first bottoms, and are subject to overflow. The material consists chiefly of wash from Coastal Plain soils.

The Pope series has brown surface soils, with light-brown to yellowish-brown, friable subsoils. It occurs in the overflowed bottoms of streams in the sandstone and shale region. The soils are fairly well drained.

The Catalpa series in some respects is similar to the Trinity and the Ochlockonee. Typically, the soil is brown and the subsoil a mottled yellowish and bluish-gray, plastic clay. The material is very sticky when wet, and on drying breaks down into a crumbly mass. The surface soil effervesces freely with hydrochloric acid, but the subsoil does not. The Catalpa soils occur in the first bottoms along streams and consist of material washed from both calcareous and noncalcareous Coastal Plain soils.

The types of the Trinity series have a dark-brown or ashy-brown soil, with upper subsoil of the same color and lower subsoil lighter brown, usually greenish brown. Both soil and subsoil are plastic and sticky when wet. The Trinity soils occur in first-bottom areas and consist almost entirely of wash from the Houston and Sumter soils. They are very calcareous, effervescing freely with hydrochloric acid throughout the 3-foot section.

The types included in the Portland series has brown to chocolate-brown surface soils and salmon-colored or dull-red, plastic clay subsoils. Both soil and subsoil are sticky and plastic when wet, but when dry the soil crumbles to a favorable tilth, as is characteristic of limy soils. This series occupies first bottoms along the Saline River in the southwestern part of the county. Backwater overflow from the Red River has deposited the characteristic reddish material. The soil effervesces with hydrochloric acid.

In the following pages of this report the various soils of Howard County are described in detail and discussed in their relation to agriculture. The following table gives the name and the actual and relative extent of each type:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Hanceville stony fine sandy loam.....	84,032	21.8	Trinity clay.....	6,144	1.6
Hanceville fine sandy loam.....	44,160	11.5	Oktibbeha very fine sandy loam.....	6,016	1.6
Susquehanna fine sandy loam.....	22,720	6.4	Greenville fine sandy loam.....	5,888	1.5
Deep phase.....	1,920		Amite fine sandy loam.....	5,568	1.4
Rough stony land.....	21,504	5.6	Ruston gravel.....	5,312	1.4
Greenville gravelly loam.....	21,248	5.5	Hanceville shale loam.....	4,224	1.1
Caddo very fine sandy loam.....	18,240	4.7	Catalpa silty clay loam.....	4,032	1.0
Ruston very fine sandy loam.....	16,384	4.2	Ochlockonee silty clay loam.....	3,712	0.9
Susquehanna very fine sandy loam.....	14,912	3.9	Ruston fine sandy loam.....	1,152	0.9
Sumter clay.....	13,120	3.4	Deep phase.....	2,240	
Pope fine sandy loam.....	11,008	2.9	Leaf very fine sandy loam.....	3,136	0.8
Ochlockonee silt loam.....	10,304	2.7	Orangebue fine sandy loam.....	3,072	0.8
Bibb very fine sandy loam.....	8,576	2.2	Oktibbeha clay.....	2,624	0.7
Cahaba fine sandy loam.....	7,616	2.0	Susquehanna clay loam.....	2,560	0.7
Hanceville loam.....	7,552	2.0	Greenville loam.....	2,304	0.6
Kalmia fine sandy loam.....	4,864	2.0	Myatt very fine sandy loam.....	1,664	0.4
Mound phase.....	2,688		Chalk (Houston material).....	768	0.2
Ochlockonee fine sandy loam.....	6,592	1.7	Portland clay.....	576	0.1
Hannahatchee fine sandy loam.....	6,400	1.7	Houston clay.....	448	0.1
			Total.....	385,280	.....

HANCEVILLE STONY FINE SANDY LOAM.

The surface soil of the Hanceville stony fine sandy loam consists of a fine sandy loam or loamy fine sand, 8 to 20 inches deep, gray in the surface 3 to 5 inches and below this depth pale yellow to yellow. The subsoil to 36 inches or more is a light-red or red, friable to moderately stiff clay, frequently slightly mottled with yellow and gray spots of fine sandy material or almost completely weathered sandstone particles. Angular fragments of sandstone, small to large in size, are strewn over the surface and throughout the subsoil, and bedrock is sometimes encountered at depths of less than 3 feet. In places small quartz fragments and blocks and chips of shale are present with the sandstone. Some areas near the Coastal Plain region and also near the Saline River have considerable rounded gravel and sandstone and chert fragments on the surface.

Stone may occur on the surface in sufficient quantities to render cultivation difficult or, where the surface is rough, almost impossible without the removal of some of larger size. On many of the farms on the smoother areas some of the stones have been removed. On the lower slopes of some of the valleys where the shale comes to the surface most extensively the surface soil is a brown loam, but as this soil is intricately associated with the typical soil and is of about the same agricultural value it is not separated. Small areas of Dekalb

stony sandy loam, a grayish stony sandy loam and yellow stony sandy loam to sandy clay, also are included.

The Hanceville stony fine sandy loam is the most extensive soil type in the Ozark or northern part of the county. The surface is gently rolling to strongly rolling and very hilly. Some of the slopes are quite steep, but if cleared of the larger stones practically all of the type might be cultivated. Drainage is good, and where the slope is rather steep erosion is damaging. The type lies 600 to 1,000 feet above sea level.

The Hanceville stony fine sandy loam is not an important soil in the agriculture of the county and probably not over 10 per cent of it is in cultivation. The greater part of it remains in the native forest of white oak, red oak, pine, hickory, black oak, and other trees.

The same crops are grown as on the Hanceville fine sandy loam, and the farming methods are the same. Yields on the smoother areas of the type closely approximate those obtained on the fine sandy loam, but in general the yields of all crops probably are slightly lower. Practically the only difference between the two types is the more stony and more strongly sloping topography of this soil. It is used largely for the grazing of cattle and hogs, the latter thriving on acorns and other forage. Considerable lumbering is now or soon will be carried on over nearly all the type.

This land is sold for \$5 or even less to \$10 an acre. It is being bought by large lumber interests.

The methods of improvement suggested for the Hanceville fine sandy loam apply equally well to this type. The soil is apparently best suited to the production of peaches, grapes, berries, and vegetables.

HANCEVILLE SHALE LOAM.

The surface soil of the Hanceville shale loam is a brown, somewhat silty shaly loam having an average depth of about 8 inches. The subsoil consists of a dull-red to reddish-yellow, friable shaly clay, which at 15 to 20 inches becomes in places a mass of partially weathered, bluish and yellowish shale. The shale fragments in the soil and upper subsoil are small and soft, and bluish to yellowish in color, while the lower subsoil may have enough red fine-earth material to give the mass a reddish color.

This type is confined to a number of small bodies in the northwestern part of the county. In the narrow valleys it is closely associated with the Hanceville loam, and small areas of that type are included in mapping.

The surface ranges from gently rolling to quite rolling, and the surface drainage is good. Underdrainage is excessive and crops suffer

in dry weather even more than on the Hanceville loam. A number of small streams head in the larger areas of the type, and along these there occur some short narrow areas of Conway fine sandy loam, too small to map.

The Hanceville shale loam is very unimportant in Howard County. Only small patches are cultivated. Hickory trees seem to grow especially well in places, as do also blackjack oak and post oak, with some pine and other trees. The same crops are grown, and under about the same farming methods, as on the other Hanceville types. Crop yields are fairly good in years of considerable rainfall.

HANCEVILLE FINE SANDY LOAM.

The surface soil of the Hanceville fine sandy loam consists of a fine sandy loam to loamy fine sand, 8 to 15 inches deep. The immediate surface material is gray, but at depths of 3 to 5 inches this color gives way to pale yellow, and a little deeper to yellow. The surface soil becomes slightly heavier with increasing depth. The subsoil to a depth of 36 inches or more is typically a red or light-red, friable to moderately stiff clay. It frequently is slightly mottled with gray and yellow in the lower part of the 3-foot section. These colors often represent fine sandy loam and fine sand material in the red clay of the subsoil. In places the subsoil has a reddish-yellow to yellowish-red color.

Throughout large areas of the type there are included many small bodies of Hanceville stony fine sandy loam, too inextensive to map. There are also included some very small areas of Hanceville loam and Dekalb fine sandy loam. Fragments of sandstone and in places chert gravel and chips of shale are present on the surface and through the soil and subsoil.

The Hanceville fine sandy loam in general has weathered to a depth of several feet, but in places partially weathered sandstone and shale lie within less than 3 feet of the surface. There are in many places small and some large sandstone and quartz fragments scattered over the surface and throughout the soil and subsoil, but these are not sufficiently abundant to render cultivation very difficult. In some places the larger stones have been removed and piled about the field. Locally this soil is called "sandy land" or "hill land."

The Hanceville fine sandy loam is not very extensive in Howard County, although it occupies a number of large areas and many small areas in the northern part of the county. The largest areas are mapped around Umpire, Burg, Mineola, and Athens.

In general the surface of this type is gently rolling to strongly rolling, although most of the slopes are moderate. The principal areas occupy the high, more or less rolling drainage divides and

ridges. Most of the type lies from 700 to 1,000 feet above sea level. Surface drainage is good, and on the steeper slopes erosion may result in damage if the surface is unprotected. The subsoil is sufficiently heavy to be retentive, and crops do not suffer for lack of moisture except in long periods of drought.

The Hanceville fine sandy loam is the most important of the residual soils in northern Howard County. It is the principal type in cultivation here, as there are larger areas of this soil topographically and texturally suited to cultivation than of any other soil in this section. Probably 70 per cent of the type is farmed. The land not cultivated remains in the original forest, consisting mainly of white oak, red oak, pine, and hickory, with some other trees, and is used for pasture.

The leading crops on this soil are corn, cotton, oats, sorghum, and cowpeas. Orchard fruits, some small fruits, and vegetables are produced in small quantities for home use. The acreage devoted to corn probably exceeds that used for cotton in most sections, but it is about equal in some parts of the county. Cotton is the principal money crop, but on many farms a considerable distance from railroads there are only a few acres in this crop. The corn grown is used on the farms, being fed to work stock and to cattle and hogs, which are raised for market in considerable numbers by nearly all the farmers. Small fields of oats are grown on many farms, but the yields of this crop are uncertain. Sorghum is grown for hay and some is manufactured into sirup.

Cattle, mostly young animals, graze over considerable areas of unfenced land, but are fed to some extent. The cattle, which are not of standard breeds, are sold as yearlings to buyers who ship to other States. The hogs also are sold to buyers and shipped from the county. Many farmers have fairly good grades or pure-bred hogs, mainly of the Poland-China and Duroc-Jersey breeds. Mast supplies good hog feed for a considerable part of the year.

Vegetables grow well on this type, as do also strawberries and other berries, but they are not grown commercially. Peaches seem well suited to the soil and the climate, and much fruit is produced in the small home orchards. The Elberta and White Chinese Cling are the leading varieties. Pears and apples grow well, but they seem to be unsuited to the climatic conditions and suffer from blight and other diseases or parasites. In the vicinity of Wickes, Polk County, and along the Kansas City Southern Railroad just out of Howard County this soil is used for the commercial production of truck, orchard fruit, and berries. Grapes produce abundantly in the small vineyards.

Yields on the Hanceville fine sandy loam vary largely with the condition of the soil and the season. Where the land has not been

under cultivation long the yields are much better than where it has been farmed for several years, especially if no effort toward soil improvement has been made. Under ordinary conditions corn yields 10 to 25 bushels or more per acre and cotton one-fourth to one-third or even one-half bale. Oats when they do well average 20 bushels per acre. Irish potatoes produce fair yields in the home gardens.

The Hanceville fine sandy loam is easily tilled and with good cultivation the soil holds moisture satisfactorily. It responds well to fertilization and under good methods of management, including the use of stable manure, green manure, and commercial fertilizers, a fair degree of productiveness may be maintained. No systematic crop rotation is practiced, but corn and cotton, the main crops, are alternated to some extent. Commercial fertilizers are used extensively for cotton and corn, at the rate of 125 to 200 pounds per acre. In normal times the mixtures used analyze 10 or 12 per cent phosphoric acid, 1 or 2 per cent nitrogen, and 1 or 2 per cent potash. Little green or barnyard manure is used.

Land of the Hanceville fine sandy loam sells for \$5 to \$15 an acre.

The type, especially where cultivated, is markedly deficient in organic matter. Crop yields could be greatly increased by using natural methods of soil improvement. Vegetation and other organic matter should be plowed under and leguminous crops should be grown and the vines turned under. Where uncultivated this soil in many places supports a good growth of lespedeza, and this plant might be used to keep up the soil fertility. Great improvement would follow the use of barnyard manure. As many farmers raise cattle much manure could be obtained by penning the cattle at night. Kafir and milo have been grown with good success by a few farmers.

HANCEVILLE LOAM.

The surface soil of the Hanceville loam is a brown to pale-yellow or yellowish-brown loam about 8 inches deep, the surface 3 or 4 inches usually being brown and the subsurface yellowish, especially in forested areas. The subsoil to 36 inches or more, or in places less, is a red or yellowish-red, moderately friable clay, in some areas slightly mottled with yellow and gray in the lower part of the 3-foot section. The deep subsoil is often rather stiff. Chips of soft, partially weathered shale occur on the surface and throughout the soil mass, and frequently at 24 to 36 inches there is encountered a bed of more or less disintegrated bluish shale, which weathers into a yellow color. Much of the surface is strewn with medium-sized angular fragments of sandstone and massive blocks of shale. There are many small bodies of Hanceville shale loam in the areas of Hanceville loam, too small to map separately. The principal difference between the two

types is in the abundance of shale in the upper 24 inches of the soil section. Where the surface is so stony as to constitute a stony loam the soil is mapped with the Hanceville stony fine sandy loam, with which it is closely associated.

Locally this soil is called "loamy slate land." The Hanceville loam is very inextensive in Howard County. It occurs in a number of small areas in the northwestern part of the county, where it occupies small, narrow valleys, the surface being gently rolling to rolling. The type is usually surrounded by slopes covered with Hanceville stony fine sandy loam. Surface drainage is thorough and under-drainage excessive, on account of the shale substratum. Crops suffer in dry weather and, although the soil is naturally more productive than the Hanceville fine sandy loam, it does not produce quite as high yields in years of drought.

Hickory, pine, black oak, and blackjack oak, with some white and red oak, are the principal trees on the Hanceville loam. Probably 50 or 60 per cent of the type is cultivated. Notwithstanding its tendency to drought, it is, on the whole, considered more desirable than the other Hanceville types.

The same crops are grown, and under the same methods of farming, as on the Hanceville fine sandy loam. The methods of improvement suggested for that type can be applied equally well to the loam. With a good supply of organic matter in the soil and with the use of some phosphoric acid and potash the type should produce good yields of Irish potatoes. Peaches, vegetables, grapes, and berries do well on this soil; oats make somewhat higher yields than on the Hanceville fine sandy loam, and in years of ample rainfall corn yields 20 to 30 bushels per acre and cotton one-half bale.

GREENVILLE GRAVELLY LOAM.

The Greenville gravelly loam consists of a reddish-brown gravelly loam, underlain at 4 to 10 inches by red, friable gravelly clay. In most places there is little gravel in the subsoil, but in some areas, especially on slopes, the subsoil contains a large percentage of gravel, and numbers of ferruginous conglomerate fragments known locally as "cement rock." In places the surface material is a gravelly clay loam, the gravel consisting mostly of rounded chert, with some quartz, the fragments ranging up to cobble stones in size. The soil and subsoil are rather porous in structure. Patches of Orangeburg gravelly loam, Ruston gravelly loam, and Susquehanna gravelly loam are included in the type as mapped.

This is one of the most extensive soils in the county. A belt about 4 miles wide extends in a southwesterly direction from Corinth nearly across the county, interrupted by streams and areas of a few

other soils. The general topography is rolling to hilly (Pl. I, fig. 2), but the surface is smooth, with rounded hills and ridges. Surface run-off and subdrainage are thorough, but owing to the porous nature of the soil and the large content of gravel there is little erosion. The soil gives up its moisture very readily in dry weather.

The Greenville gravelly loam is one of the most important peach soils in the United States. The largest peach orchard under one management in the world is situated principally on this type, comprising 3,700 acres in one body. (See Pl. I, fig. 1.) This is also a good general farm-crop soil. Probably 75 per cent of it is in cultivation, the remainder being covered with the natural growth of shortleaf pine, red oak, black oak, post oak, blackjack oak, and white oak, gum, and elm. All the crops grown in the county are produced to some extent. The most important crops are cotton, corn, and peaches. Cotton and peaches are the principal money crops, while corn, oats, and wheat are grown for farm use.

The manager of the Highland peach orchard is said to have visited many important trucking and fruit-growing sections of the southeastern and eastern United States before selecting the present site, which lies around Corinth and extends east into Pike County. The soil, rainfall, altitude, topography, and other elements were considered in choosing the location. One block of 1,000 acres was set out in 1913. The trees were set 20 feet apart each way. The land was plowed deep and well harrowed before the orchard was planted. Each winter the land is plowed deep and clean, level cultivation is practiced during the summer months except August. This 1,000-acre tract produced 35 cars of peaches in 1916 and with a favorable season in 1917 will produce 150 cars. The fruit is of high flavor and color. Nashville is the shipping headquarters, but the peaches are shipped from Highland, Pike County. The season begins about July 10 and lasts about three weeks. The peaches are shipped to all parts of the United States east of the Rocky Mountains and to Canada. The Elberta is the principal variety. There are 100 acres in the J. H. Hale and 160 acres in the Red Bird Cling. The orchard was not fertilized the first three years, but it will be fertilized from this year on. The trees were well sprayed with lime sulphur the past winter, and in addition have been sprayed four times during the summer. There has been no evidence of the San Jose scale.

The Greenville gravelly loam is also an excellent cantaloupe, watermelon, and strawberry soil. Cantaloupes yield about 100 crates per acre in favorable years. Cotton yields one-third to one-half bale per acre, corn 15 to 30 bushels, wheat 10 to 20 bushels, and oats 20 to 35 bushels.

This type of land is held at \$15 to \$40 an acre, the price depending upon the location and state of improvement.

Owing to its good physical qualities, this soil can be easily improved. It responds readily to the application of fertilizer and barnyard manure. It is probable that the growing of winter cover crops would give good results, as well as the plowing under of green crops in the fall. Deep fall plowing would also prove beneficial.

GREENVILLE FINE SANDY LOAM.

The Greenville fine sandy loam consists of a reddish-brown fine sandy loam from 6 to 10 inches deep, underlain by a red, friable sandy clay subsoil. Included in the type are patches of soil similar to the Ruston fine sandy loam and others similar to the Orangeburg fine sandy loam. There is more or less gravel on the surface and through the subsoil, but not enough materially to interfere with cultivation. The soil and subsoil have an open structure, but are sufficiently heavy to be retentive of moisture.

The Greenville fine sandy loam is one of the best sandy soils in the county, but it is not extensive. The two largest areas are in the vicinity of Yorks Chapel and west of Bayou Store.

In general the topography is level to gently undulating. (See Pl. II, fig. 1.) The open structure of the subsoil permits of excellent subdrainage. The soil is retentive of moisture in dry seasons and gives up its excess water freely in wet weather. Crops rarely suffer from drought.

This type is practically all in cultivation. Almost all the natural forest growth, which consisted mainly of shortleaf pine, hickory, and blackjack, and other oaks, has been removed. Cotton and corn are the principal crops, about the same acreage being devoted to each. Some cowpeas, peanuts, and oats are grown for farm use. Potatoes, truck crops, and peaches do well, but are grown only for home use. Cotton is the cash crop, and occasionally some corn is sold, but this crop is generally fed on the farm.

Corn yields 20 to 30 bushels per acre, cotton one-third to 1 bale, oats about 15 bushels, and wheat 15 to 25 bushels. Sweet potatoes yield about 150 bushels per acre and Irish potatoes 150 to 200 bushels. Peanuts yield about 25 bushels of nuts and 1½ tons of hay per acre.

This soil is very easily tilled and responds readily to fertilization. Corn and cotton are fertilized to some extent. Under normal conditions in the fertilizer market mixtures containing 10 per cent phosphoric acid, 1 to 2 per cent nitrogen, and 1 to 2 per cent potash are applied to these crops at the rate of 200 pounds per acre. Barnyard manure results in an increase in yield of about one-third, but so few animals are kept that the supply is entirely inadequate. The general practice on this soil is to bed and rebed the land, but flat breaking is becoming more general.

Land of this type sells for \$15 to \$40 an acre, depending upon the location and improvements.

The productiveness of this soil is easily maintained and increased by plowing under green crops such as cowpeas or rye. Flat breaking with shallow and level cultivation makes the soil more retentive of moisture and has proved better than ridge breaking. A systematic rotation of crops might also prove valuable. In certain other sections of the Coastal Plain the rotation of cotton, oats, cowpeas, and corn, each grown one year, has proved very profitable on this type of soil.

GREENVILLE LOAM.

The typical Greenville loam is a reddish-brown loam from 6 to 10 inches deep, underlain by a red, friable clay. The type is comparatively free from gravel, although there is a scattering of gravel in local areas in both soil and subsoil. In places the soil is somewhat sandy, resembling the Greenville fine sandy loam. The absence of gravel makes the soil much more easily tilled than the gravelly loam.

The Greenville loam is not extensive in this county. The largest area occurs about 2 miles southeast of Center Point and there are a few small bodies throughout the gravelly loam type. The topography is characteristically level to very gently undulating. Within the gravelly loam type this soil generally occupies the more nearly level situations. Owing to the porous nature of the soil and subsoil the drainage is thorough, resulting in good oxidation and aeration.

The Greenville loam is one of the better Coastal Plain soils, but owing to its small extent it is not important. Practically all of the type has been cleared of its natural forest growth, which consisted mainly of shortleaf pine, oak, and some gum and locust, and is now under cultivation. It is used principally for cotton and corn, and some peanuts, cowpeas, and oats are grown. Cotton is the only cash crop, the others being used for feeding the farm animals. Cotton yields from one-half to 1 bale per acre, corn 30 to 40 bushels, oats 20 to 45 bushels, peanuts about 45 bushels, and cowpea hay about 2 tons. This soil does not wear out as rapidly as the gravelly type. The land sells for \$40 to \$75 an acre.

The methods of improvement suggested for the gravelly loam type would give good results on the soil.

ORANGEBURG FINE SANDY LOAM.

The typical Orangeburg fine sandy loam consists of a grayish-brown to slightly reddish brown loamy fine sand to fine sandy loam, passing at 5 or 6 inches into reddish fine sandy loam which is underlain at 8 to 10 inches by red, friable sandy clay. In places the lower subsoil is more sandy, lighter colored, and more compact than as

described. Where the surface soil is deep it has a distinctly gray color. In places where there has been considerable erosion the subsoil clay lies at the surface. There are some small areas of Ruston fine sandy loam included with this type and in some places the subsoil contains more sand than typical. A scattering of chert gravel occurs in a few places.

The Orangeburg fine sandy loam is not an extensive soil. The largest areas occur between Nashville and Edwards Creek, with a few small areas throughout the south-central part of the county. The topography is gently undulating to rolling. The type occupies rather high hills as compared to the adjacent soils, and is very well drained. On the steeper slopes severe erosion takes place.

Probably 90 per cent of this type is in cultivation. The remainder is covered with red oak, white oak, walnut, red elm, and slippery elm. Cotton and corn are the principal crops, with a small acreage in oats, peanuts, potatoes, cowpeas, and sorghum. Peaches and strawberries are produced to some extent.

The Orangeburg fine sandy loam is one of the better upland sandy soils of the county, but it is not very important owing to its small extent. Cotton yields one-half to 1 bale per acre, corn 30 to 50 bushels, oats 15 to 30 bushels, and peanuts 40 to 60 bushels. Sorghum produces a rather light colored sirup, which yields about 100 gallons per acre. Peaches and truck crops do very well on this type, but are grown only for home use. Cotton and some corn are the only crops sold. This land ranges in selling price from \$10 to \$65 an acre.

Owing to the sloping surface and susceptibility to erosion, most of this type needs terracing. The incorporation of organic matter would not only increase yields, but would help conserve moisture and retard erosion. All yields could be greatly increased by proper crop rotation and fertilization.

RUSTON GRAVEL.

The Ruston gravel consists of dark-brown to black gravel from 2 to 8 inches deep, passing into dull-reddish gravel. From 5 to 15 per cent of the mass is made up of interstitial sand, which is dark in the surface soil and reddish in the subsoil. The soil is dark on account of organic matter formed from vegetable mold. In some places the material has been cemented into conglomerate. The gravel and cobbles consist mostly of rounded chert, but there is some quartz.

Ruston gravel occurs in small developments along the steeper stream slopes and on rather high ridges and mounds. The largest areas are mapped along Blue Bayou south of Center Point. The type occupies slopes, ridges, and roundish hills. Drainage is excessive.

All of this type is still covered with a forest consisting principally of blackjack oak and shortleaf pine, with considerable hickory. The type is valued mainly for its timber, and is held at \$5 to \$10 an acre.

On account of the high percentage of gravel this is not a good agricultural type, and it would hardly pay to clear it for farming. In most places there is a very scant growth of grass.

RUSTON FINE SANDY LOAM.

The Ruston fine sandy loam consists of grayish fine sandy loam about 6 inches deep over pale-yellow fine sandy loam which at an average depth of 10 inches grades into a dull-red or yellowish-red, friable sandy clay. In places the lower part of the 3-foot section shows faint yellow and gray mottlings, but these are not common. Areas exist which contain considerable gravel. The soil and subsoil here are practically the same as in the typical nongravelly areas.

Only a small total area of Ruston fine sandy loam is mapped in Howard County. The largest area lies 1 mile north of Mineral Springs. There are small areas throughout the Coastal Plain sandy types. The surface is gently undulating to gently rolling. The type occupies well-drained positions, but drainage is not excessive. Like the other Ruston soils it is more thoroughly oxidized and aerated than the Caddo soils, owing to its better topographical position and more perfect drainage.

The Ruston fine sandy loam is a good soil, but owing to its small extent it is unimportant agriculturally. About 90 per cent of the type has been cleared of its natural growth, which consisted principally of shortleaf pine, hickory, white oak, red oak, and post oak, and is now under cultivation. Cotton and corn are the leading crops, and oats, cowpeas, peanuts, wheat, cantaloupes, watermelons, and strawberries also are grown. Cotton, cantaloupes, and strawberries are grown for market, while the other crops are used at home. Peanuts are generally grown for hog pasturage. Cotton yields one-third to one-half bale per acre, corn 15 to 25 bushels, and oats 20 to 25 bushels. Cowpeas yield 1 to 1½ tons of hay and 3 to 5 bushels of seed. Sweet potatoes yield about 100 bushels per acre and Irish potatoes about 60 bushels. Cantaloupes yield 40 to 50 crates per acre. Barnyard manure is the only fertilizer used on this type, and gives good results. No crop rotation is followed. This land sells at prices ranging from \$10 to \$40 an acre.

This type is low in organic matter. Cowpeas and rye do well, and by plowing under either of these yields can be greatly increased. Deep flat breaking is advisable on this soil. Planting corn in the water furrow also gives very good results.

Ruston fine sandy loam, deep phase.—The deep phase of the Ruston fine sandy loam consists of about 6 inches of gray fine sand or loamy fine sand, passing into a pale-yellow, loamy fine sand. The subsoil, which is encountered at 20 to 30 inches, is a friable, yellowish-red or reddish-yellow fine sandy loam. The soil and subsoil are both rather loose and incoherent.

This phase is not extensively developed in this county. A rather large area occurs along the Hempstead County line east of Nashville and a small area is mapped at Saratoga. The topography is gently undulating, the phase as a rule occupying slopes and ridges. Owing to the porous and open nature of soil and subsoil, drainage is excessive.

The natural forest growth, which is practically the same as that on the typical fine sandy loam, has nearly all been cleared off, and the land is now under cultivation. Early vegetables do excellently, radishes yielding from 20 to 30 barrels per acre. This soil is farmed in the same way as the typical fine sandy loam, and gives only slightly lower yields. The land sells for \$10 to \$40 an acre.

This phase is deficient in organic matter, and the liberal application of barnyard manure or the plowing under of green crops would probably increase yields very materially.

RUSTON VERY FINE SANDY LOAM.

The surface soil of the Ruston very fine sandy loam to about 6 inches is a gray or grayish-brown very fine sandy loam with a reddish tinge, passing into pale-yellow very fine sandy loam, underlain by yellowish-red or reddish-yellow, friable fine sandy clay. Some of the higher knolls consist of Orangeburg fine sandy loam, while on the other hand there are included small flat areas consisting of Caddo very fine sandy loam. These soils are so patchy in occurrence that separation is impracticable in mapping.

The Ruston very fine sandy loam is most extensively developed in the central part of the county, the largest areas being in the vicinity of Muddyfork and Dierks. The surface is gently undulating to rolling. The type holds an intermediate position between the flats occupied by the Caddo series and the more elevated positions occupied by the Orangeburg. Drainage is good.

Only about 10 per cent of this type is under cultivation. The remainder has been bought by a lumber company for the timber, which consists principally of shortleaf pine, elm, gum, and several varieties of oak. Cotton, corn, and oats are the principal crops grown. Each farmer has a good garden and a small orchard. Cotton yields about one-half bale per acre, corn 20 to 30 bushels, and oats 30 to 40 bushels. Very little fertilizer is used.

This land can be purchased for \$8 to \$30 an acre.

This is a productive soil when handled properly, and its productiveness can be maintained and increased by plowing under green crops or barnyard manure. The scientific use of commercial fertilizer would also add greatly to the productiveness.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Ruston very fine sandy loam:

Mechanical analyses of Ruston very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
461601.....	Soil.....	1.0	0.3	0.6	16.0	29.0	44.8	7.5
461602.....	Subsoil.....	1.0	.3	.4	11.4	24.9	37.9	24.0

CADDO VERY FINE SANDY LOAM.

The Caddo very fine sandy loam is characterized by 3 to 5 inches of grayish very fine sandy loam underlain by pale-yellow very fine sandy loam which at about 10 inches passes into pale-yellow or yellow, friable fine sandy clay. This is mottled somewhat in the lower part of the 3-foot section with grayish and reddish yellow, and is rather more compact in this lower part. The more poorly drained areas have a light-gray soil with rusty-brown mottlings, and a mottled gray and pale-yellow subsoil which is compact and contains dark concretions and concretionary material in the lower part. There are included with the type some mounds of Ruston and Susquehanna soils, too small to separate.

The Caddo very fine sandy loam is rather extensively developed in Howard County. The largest areas occur southeast of Dierks and 3 miles west of Center Point, with small developments throughout the central part of the county. The surface is prevailingly flat or nearly level. There is very little run-off and drainage is poor except on slight elevations and mounds.

A very small percentage of this type has been cleared of the native timber, which consists mostly of shortleaf pine, red oak, white oak, black oak, post oak, and dogwood. There is more cedar than on any other soil in the county. Cotton and corn are grown on the better drained areas of this soil. Cotton yields about one-half bale and corn from 15 to 25 bushels per acre. The land sells at \$3 to \$15 an acre.

This type is used principally for pasturage. By ditching or tile draining the more poorly drained areas fairly good results should be obtained with the general farm crops. In Louisiana this type of soil

is used for the production of rice, and in portions of Arkansas it is used for growing Bermuda-grass hay.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Caddo very fine sandy loam:

Mechanical analyses of Caddo very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
461610.....	Soil.....	0.9	0.3	0.2	7.9	36.8	47.8	5.7
461611.....	Subsoil.....	.2	.2	.1	5.5	38.1	39.9	15.7

SUSQUEHANNA FINE SANDY LOAM.

The Susquehanna fine sandy loam consists of a grayish fine sandy loam, about 5 inches deep, overlying pale-yellow fine sandy loam, which gives way at 12 to 20 inches to red, stiff clay. This passes beneath into mottled red and pale-yellow or red and gray, plastic, heavy clay. In some places, shown on the map by gravel symbols, chert gravel is present, and platy, angular, and rounded ferruginous rocks are encountered in some areas.

This type is rather extensive. The largest area is a fairly wide strip extending north from Nashville and thence southwestward to the Saline River bottoms. There are also some rather extensive areas east and southeast of Hoodinpile Ford, on the Saline River.

The surface is gently undulating to rolling. Run-off in places is excessive, causing rather severe erosion, but subdrainage is more or less slow, owing to the impervious nature of the subsoil.

About 50 per cent of this type is in cultivation. The original timber consisted principally of pine, sweet gum, and hickory, with some oak. Cotton, corn, and oats are grown, in addition to vegetables and orchard fruits for home use. Cotton does better on this land than corn. In dry seasons corn is subject to "firing," though cotton withstands droughts quite well. In good seasons cotton yields one-third to one-half bale per acre, corn 20 to 30 bushels, and oats 25 to 35 bushels. Peaches yield well and the trees have a healthy appearance.

This land sells for \$8 to \$40 an acre, the price depending upon the location.

The Susquehanna fine sandy loam is not as productive as types with friable subsoils, as the subsoil is more impervious and more susceptible to drought. By deep plowing and the incorporation of organic matter, this type can be built up considerably. It furnishes good pasturage of Bermuda grass.

Susquehanna fine sandy loam, deep phase.—The Susquehanna fine sandy loam, deep phase, consists of a grayish fine sand which passes at an average depth of 5 or 6 inches into pale-yellow fine sand, and this into pale-yellow or yellow fine sandy loam underlain at 20 to 30 inches by red and mottled gray, stiff, plastic clay, similar to that of the typical fine sandy loam.

This phase occurs in rather small areas, occupying positions somewhat higher than those of the typical soil. The surface is rather rolling and drainage is excessive.

The same crops are grown as on the typical Susquehanna fine sandy loam. Early vegetables do fairly well, but yields of the general farm crops are lower than on the typical soil. Cotton yields one-fourth to one-half bale per acre and corn 10 to 20 bushels. Oats are not a successful crop. This land is held at \$10 to \$30 an acre.

The greater depth to the subsoil makes it more difficult to maintain the productiveness of this type than that of the typical Susquehanna fine sandy loam. The same methods of improvement are needed as on the typical soil.

SUSQUEHANNA VERY FINE SANDY LOAM.

The Susquehanna very fine sandy loam consists of a yellowish-brown or grayish-brown very fine sandy loam, passing at about 5 inches into pale-yellow very fine sandy loam and this at 6 to 10 inches into dull-red to yellowish-red, plastic, heavy clay. This quickly shows mottlings of yellow with increasing depth and then mottlings of bluish gray. The lower subsoil is a plastic, heavy clay, mottled reddish and bluish gray. When wet the subsoil is quite sticky. There are some dome-shaped mounds where the very fine sandy loam is deep, clay not being encountered above 30 inches. Here the surface soil is rather light gray to whitish. Some gravel areas are indicated on the map with gravel symbols. The gravel consists of eroded chert and quartz.

This type occurs in rather large areas north of the Corinth-Center Point Road and south of Martha. In general the topography is gently undulating. The type occupies some rather steep slopes. Surface drainage is good, but owing to the plasticity of the subsoil the underdrainage is slow.

This is not an important soil agriculturally, as all but about 5 per cent of it is covered with shortleaf pine and oak. This land is practically all owned by a lumber company. Cotton and corn are grown on the cultivated areas. Cotton yields one-half to two-thirds bale per acre, and corn 15 to 30 bushels in good seasons.

This type is valued principally for its timber, and can be bought for \$5 to \$15 an acre.

By deep plowing and the use of a systematic rotation, this soil could possibly be made rather productive. It is in need of organic matter.

SUSQUEHANNA CLAY LOAM.

The Susquehanna clay loam typically consists of 3 or 4 inches of brownish silt loam, loam, or very fine sandy loam, overlying yellow or yellowish-red clay loam to clay which passes at 5 to 8 inches into dull-red, plastic, heavy clay. This is mottled below, first with pale yellow and then with bluish gray. The subsoil is sticky when wet. The soil plows up as a rather heavy clay loam, in places a yellowish gray. Some of the flat areas of this type have a brownish-yellow to light-brown clay loam to silty clay loam soil underlain at 5 to 6 inches by yellowish, stiff clay which passes into mottled reddish and grayish, plastic, heavy clay. In these flat areas gray predominates, while in the typical soil red is the predominating color.

The Susquehanna clay loam is not extensive in this county. One rather large area is mapped north of Brushy Creek, and there are a few very small areas elsewhere, usually in depressions within other Susquehanna types. The general topography is undulating to flat, and drainage is good.

Only very small tracts of this soil have been cleared for farming. The greater part supports a forest of post oak, blackjack oak, and hickory. Where the type is farmed cotton and corn are the main crops, and some oats and peas are produced. The soil is slow in warming up in the spring, owing to its wet condition. In favorable seasons cotton yields one-fifth to one-fourth bale per acre, corn 20 to 30 bushels, and oats 25 to 35 bushels, while in wet seasons very low yields are obtained. The land has a selling price of \$10 to \$25 an acre. This soil furnishes fairly good pasture.

OKTIBBEHA VERY FINE SANDY LOAM.

The Oktibbeha very fine sandy loam, to a depth of 3 to 5 inches, is a brownish-gray to reddish-gray very fine sandy loam, passing into yellowish-red, dull-red, or mottled reddish and grayish plastic clay. The gray becomes more conspicuous with increase in depth, and it usually predominates in the lower subsoil. There are some mounds in which the soil consists of a loamy very fine sand 8 or 10 inches deep over yellowish-brown very fine sandy loam which extends to 18 or 20 inches and gives way to yellowish-red, friable clay, passing into mottled reddish, yellowish, and grayish plastic clay. The substratum, which underlies the type at any depth from 4 to 12 feet, consists of highly calcareous material. This substratum and the

more brownish surface soil distinguish this type from the Susquehanna series. As mapped there are included with the type some small areas of clay and clay loam. There are no stones or gravel in this soil.

The Oktibbeha very fine sandy loam is rather extensively developed throughout the "black prairie belt" in the southern part of the county. It is most extensive in the vicinity of Tollette and in the southeast corner of the county. The general topography is level to gently rolling. In many instances the type occurs on ridges within the Houston or Sumter soils. The Sumter clay generally occupies the slopes and the Oktibbeha very fine sandy loam the tops of ridges. Drainage is fairly well developed.

The original timber growth consisted principally of post oak, red oak, and other oaks, with a little shortleaf pine. About 50 per cent of the original timber has been cut, and this land is farmed to cotton, corn, oats, and cowpeas. Cotton probably occupies 65 per cent of the total cultivated acreage. This soil is well adapted to strawberries, watermelons, and cantaloupes. Orchard fruits do well, but are grown only for home use.

The long-staple variety of cotton is grown, yielding one-fourth to three-fourths bale per acre. Corn yields 20 to 25 bushels per acre, oats 15 to 30 bushels, cowpeas 2 to 3 tons of hay, sweet potatoes from 100 to 200 bushels, and Irish potatoes 50 to 100 bushels. The type receives very little commercial fertilizer and is plowed rather shallow. The land is held for \$25 to \$50 an acre.

This type could be improved greatly by the incorporation of barnyard manure or some other form of organic matter. Deep fall plowing should prove beneficial.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Oktibbeha very fine sandy loam:

Mechanical analyses of Oktibbeha very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
461636.....	Soil.....	0.9	1.1	0.7	6.7	38.7	42.8	8.5
461637.....	Subsoil.....	.2	.6	.3	1.6	24.0	32.6	40.5

OKTIBBEHA CLAY.

Oktibbeha clay consists of a bright-red clay from 8 to 10 inches deep, passing into rather plastic clay which is mottled reddish, yellowish, and grayish. The red decreases with depth and the gray

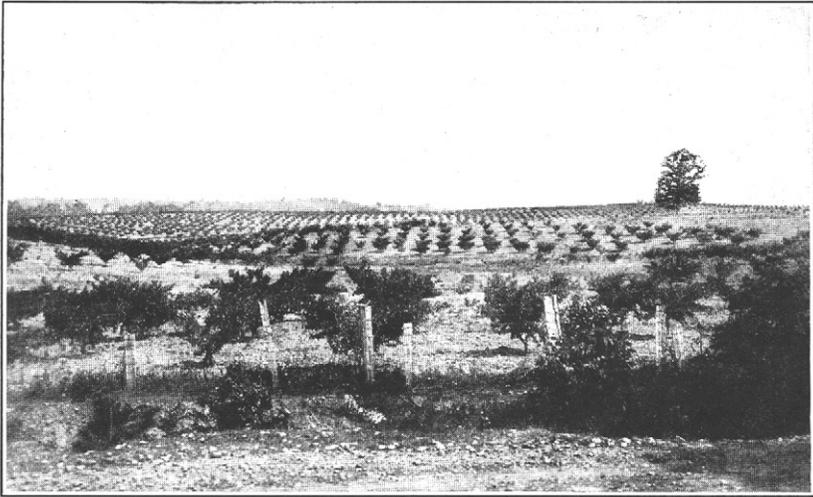


FIG. 1.—SECTION OF A 3,700-ACRE PEACH ORCHARD ON GREENVILLE GRAVELLY LOAM, WEST OF CORINTH.



FIG. 2.—SHOWING TOPOGRAPHY AND VEGETATION OF THE GREENVILLE GRAVELLY LOAM.

The forest growth consists principally of pine and varieties of oak.



FIG. 1.—GREENVILLE FINE SANDY LOAM, SHOWING LEVEL TO GENTLY UNDULATING TOPOGRAPHY.



FIG. 2.—DITCH CUT THROUGH CATALPA SILTY CLAY LOAM.

This ditch, built at a cost of \$1,000 per mile, prevents overflows. The increased crop yields the first year more than paid for its construction.

increases. On the more nearly level ridge tops there is usually a veneer of an inch or two of very fine sand. The surface soil is in many places faintly mottled grayish and yellowish. The soil and subsoil are very sticky when wet. The substratum, encountered at depths of 4 to 6 feet, consists of whitish and bluish marly material such as gives rise to the Houston and Sumter series. The soil crumbles more readily than the Susquehanna clay.

The Oktibbeha clay occurs only within the belt occupied by the Houston and Sumter soils, and it is restricted principally to the vicinity of Buckcrange and to the section between Plum and Baber Creeks. The surface is level to gently rolling. Drainage is fairly good. Subdrainage is slow owing to the dense plastic structure of the subsoil.

About 25 per cent of the Oktibbeha clay has been cleared of the natural growth, which consisted mainly of post oak, black oak, white oak, and red oak. There is practically no pine on this type. Probably 75 per cent of the cultivated land is used for the production of long-staple cotton; the remaining 25 per cent is principally in corn, but to some extent in cowpeas and oats. Cotton yields about one-third bale per acre, corn 30 to 40 bushels, and oats 15 to 20 bushels. This soil is not adapted to commercial trucking or orcharding, but each farmer has a good garden and a small orchard.

This type of land is valued at \$25 to \$50 an acre, including the areas of "black land."

With deep fall plowing and the liberal addition of organic matter it is probable that the yields of crops on this soil would at least double.

HOUSTON CLAY.

The Houston clay consists of a dark-brown to dark ashy brown clay underlain at 6 to 8 inches by yellowish-brown clay which passes into greenish-yellow, sticky clay. As a rule, the lower part of the 3-foot section is faintly mottled with yellow. Included in this type are some areas in which the surface material is black, owing to a larger admixture of organic matter. The soil when wet is very sticky, but when dry it breaks down into the desirable crumb structure. Both soil and subsoil are high in lime, being derived from rotten limestone and marl.

The Houston clay occurs only in small areas, and is most extensive around the head of Yellow Creek. As a rule it occupies a position intermediate between the Sumter clay and the first bottoms. Drainage is fair to good.

This soil has a very high agricultural value, and it is all in cultivation, but owing to its small extent it does not have much influence

on the agriculture of the county. Long-staple cotton is the only crop grown, with the exception of a small acreage in corn. Yields are about one-third higher than on the corresponding Sumter type.

Included with areas of the Sumter and Trinity soils this land can be bought for \$25 to \$50 an acre.

The best results with cotton on the Houston clay have been obtained by deep fall plowing. Alfalfa is well adapted to this type.

CHALK (HOUSTON MATERIAL).

The typical Chalk (Houston material) consists of pale-yellowish or whitish, highly calcareous, chalky material. In places the lower part of the 3-foot section has a greenish appearance. This soil represents the substratum of the Sumter clay exposed by erosion. It contains many fossil shells.

This type occurs in patchy eroded areas, usually on slopes and sharp ridges. The largest area is that north and west of Saratoga, known as the "Devils Backbone," and there are small areas throughout the southern part of the county.

The land is usually bare of vegetation. It is so badly gullied that farming is impossible, and it has no agricultural value in its present condition. By growing sweet clover and filling the gullies with brush it might be possible to reclaim much of this type, at least to the point of making good pasture land.

SUMTER CLAY.

The Sumter clay consists of brown to yellowish-brown clay, underlain at 3 to 6 inches by yellow clay. This is generally very sticky in the lower part of the 3-foot section, where it usually has a greenish cast. In the lower subsoil and on eroded slopes whitish, chalky lime concretions or partly decayed fragments from the parent marl or limestone beds are usually encountered. On freshly eroded slopes the soil has a grayish-yellow or greenish-yellow color, and whitish, chalky, calcareous material comes near the surface. The peculiar greenish cast of this soil is a distinguishing characteristic. The Sumter clay in the central part of the county is rather shallow; flat limestone fragments occur on the surface, and there are rather massive limestone outcrops in places. This soil is very high in lime, effervescing freely with hydrochloric acid. When wet the soil is extremely sticky, but when dry it becomes crumbly, owing to its high lime content. Where it is uncultivated the surface cracks freely on drying.

The Sumter clay is one of the more extensive soils in Howard County. It occurs in large bodies in the southern part of the county, east of Mine Creek and south of Brushy Creek. The topography is gently rolling. It occupies slopes adjacent to the Oktibbeha soils.

This is one of the most valuable soils in Howard county for general farm crops. It is a "black prairie" type, supporting in its native State only a scant growth of bois d'arc, shortleaf pine, red oak, post oak, and red haw. Probably not over 5 per cent of the type is in forest, but only 30 to 40 per cent is farmed, owing to the large holdings. Cotton is grown on about 75 per cent of the cultivated area. The remainder is used largely for the production of corn. A considerable acreage is in alfalfa. Oats do well, but are not grown extensively. Good home gardens and orchards are maintained on this soil.

As on the other "black land" soils, the long-staple variety of cotton is grown. The yield is about one-half bale per acre. Corn yields 30 to 50 bushels per acre, oats about 30 bushels, and alfalfa 6 to 10 tons per acre for the four cuttings usually made each year. No fertilizer is used on this type. The land is bedded and rebedded as early in the spring as possible. Corn is planted almost level, but cotton is generally planted on a slight ridge and given level cultivation.

It is probable that with deep fall plowing yields on this soil would be increased somewhat. Sweet clover grows wild, and by plowing under this crop the soil in the light-colored areas could probably be made considerably darker, and more productive.

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

Mechanical analyses of Sumter clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
461638.....	Soil.....	0.2	0.5	0.2	2.4	4.1	38.8	53.8
461639.....	Subsoil.....	.1	.5	.9	8.2	7.8	33.0	49.7

The following samples contained more than one-half of 1 per cent calcium carbonate (CaCO₃): No. 461638, 50.27 per cent; No. 461639, 63.54 per cent.

AMITE FINE SANDY LOAM.

The typical Amite fine sandy loam consists of 8 to 12 inches of reddish-brown fine sandy loam, underlain by red, friable fine sandy clay. In places the soil is distinctly red and in other places it is only faintly reddish. In many places there is a substratum of gravel, 4 feet or more in depth, but this apparently does not lower the productiveness of the soil. On most escarpments there is a covering of chert gravel, which also occurs in the subsoil; these areas are indicated on the map by gravel symbols. The Amite fine sandy loam is very closely related to the Greenville fine sandy loam in color, texture, and structure.

This soil is fairly extensive along Mine Creek and its larger tributaries and Blue Bayou, the largest areas occurring in the vicinity of Nashville and south of Mineral Springs. The type is of terrace formation. Its surface is fairly level, but drainage is excellent, as it is situated somewhat higher than the other terrace soils.

The original timber consists of shortleaf pine, red oak, white oak, post oak, gum, hickory, and some wild cherry. From 75 to 85 per cent of the timber has been cut off and the land put in cultivation. All the crops grown in the county are produced on this type. Cotton and corn, the principal crops, are of about equal importance, and a small acreage is devoted to oats, cowpeas, peaches, and truck crops.

Cotton yields one-fourth to one-half bale per acre, corn 25 to 40 bushels, oats 20 to 30 bushels, and cowpeas 1 to 2 tons of hay and about 50 bushels of seed. Peaches produce well, but not as well as on the Greenville gravelly loam. Sweet potatoes and Irish potatoes yield 100 to 175 bushels per acre, radishes 15 to 20 barrels, watermelons 1 to 1½ carloads, and cantaloupes 50 to 100 crates.

This type of land sells for \$8 to \$65 an acre.

The Williamson method of growing corn, which is used extensively in South Carolina, should give very good results on this soil, as on other sandy types. Under this method the farmers flat break the land about 12 inches deep and harrow well. The field is then bedded with ridges 15 to 20 inches high. After harrowing with and against the ridges with a spike-tooth harrow, the corn is planted in the water furrow. The ridges are worked to the corn three different times. When the crop is laid by the field is perfectly level, and as a result the first roots are deep in the soil, and the plants are almost if not entirely free from danger of firing in dry weather. If fertilizer is used one-half the amount should be applied at the time of planting and the other half when the corn is laid by. The turning under of cowpeas or rye or the application of barnyard manure should increase yields. This type of soil is very responsive to fertilization.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Amite fine sandy loam:

Mechanical analyses of Amite fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
461614.....	Soil.....	0.4	1.4	2.5	32.1	23.1	31.2	9.0
461615.....	Subsoil.....	.5	.9	1.6	21.7	19.6	30.8	24.6

CAHABA FINE SANDY LOAM.

The Cahaba fine sandy loam consists of a light-brown to slightly reddish brown fine sandy loam, underlain at about 6 inches by yel-

lowish or reddish fine sandy loam and this at about 10 inches by yellowish-red or dull-red, friable sandy clay, which is usually lighter red or yellowish in the lower part. In places the soil consists of about 6 inches of grayish loamy fine sand over yellowish loamy fine sand which passes at 10 to 12 inches into reddish fine sandy loam and this at 20 to 30 inches into dull-red or reddish-yellow, friable sandy clay. There are some areas which have considerable gravel on the surface and in the subsoil; these are indicated on the soil map by gravel symbols. The Cahaba fine sandy loam is an intermediate type between the well-drained Amite on the one hand and the more poorly drained Kalmia on the other.

The Cahaba fine sandy loam occurs on terraces along the upper streams in the central-eastern part of the county. The largest area is near Mineral Springs. There are several other areas in the southern half of the county. The type occupies comparatively flat positions, but has good drainage. The subsoil permits of good under-drainage.

The original forest on this type was similar to that on the Amite fine sandy loam. Practically the same crops are grown, but yields are slightly lower. The land is held at \$8 to \$65 an acre.

The methods of improvement suggested for the Amite fine sandy loam would prove valuable on this soil.

KALMIA FINE SANDY LOAM.

The typical Kalmia fine sandy loam consists of a grayish loamy fine sand, passing at 3 to 5 inches into pale-yellow loamy fine sand to fine sandy loam, and this at an average depth of 10 or 12 inches into yellow or pale-yellow, friable fine sandy clay, usually mottled in the lower part of the subsoil with gray. In the more poorly drained situations the gray mottling is more conspicuous and comes nearer the surface than elsewhere. Some small depressions have a mottled grayish and yellowish soil and subsoil, the type here approaching closely the character of the Myatt fine sandy loam. In places the texture of the soil is a very fine sandy loam. The more important gravel areas are shown on the map by gravel symbols.

This soil is not very important in the agriculture of the county. There are rather extensive areas in the vicinity of Schaal and southwest of Mineral Springs. The type occupies level or nearly level second-bottom areas. Drainage is not as good as in the Cahaba and Amite soils, but somewhat better than in the Myatt very fine sandy loam.

About 50 per cent of this type has been cleared of its natural forest, which consisted principally of shortleaf pine, white oak, post oak, red oak, and dogwood. Cleared areas are used chiefly in the

production of cotton and corn. Cotton is grown on probably 60 per cent of the cultivated area. Some oats, cowpeas, and peanuts are grown for farm use. Garden vegetables and the orchard fruits suited to the section do well on this soil.

Cotton yields one-third to one-half bale per acre, corn 15 to 40 bushels, oats 15 to 30 bushels, Irish potatoes 100 to 150 bushels, sweet potatoes 100 to 200 bushels, peanuts 20 to 50 bushels, and watermelons one-third to one carload. This land is sold at \$5 to \$60 an acre.

For best returns, in addition to the incorporating of organic matter, it is probable that this type of soil should be ditched, or tile drained, and limed.

Kalmia fine sandy loam, mound phase.—The principal difference between the mound phase of the *Kalmia fine sandy loam* and the typical soil is in the dome-shaped mounds, which give the phase a billowy surface. The drainage of the flat land between the mounds is imperfect. On the mounds the soil consists of Cahaba, Amite, or *Kalmia fine sandy loam*, with little or no gray mottling in the 3-foot section. Between the mounds the soil is prevailingly typical *Kalmia fine sandy loam*, although in some of the most poorly drained areas it ranges close to *Myatt fine sandy loam*.

The mound phase occurs in areas south of Nashville and southeast of Schaal. It does not yield quite as well as the typical *Kalmia fine sandy loam*, and is not as easily cultivated. The land, however, has the same selling price. It can be improved by the means suggested for the typical soil.

MYATT VERY FINE SANDY LOAM.

The *Myatt very fine sandy loam* consists of a light-gray, or when dry nearly white to mottled grayish and rusty-brown very fine sandy loam, underlain at about 6 inches by a mottled gray or bluish-gray and pale-yellow very fine sandy loam. This passes quickly into similarly mottled fine sandy clay of a stiff, impervious nature.

This type occurs in rather large areas west of Shiloh and on the flats around Schaal. It occupies nearly level to depressed areas in the second bottoms along the Saline River. Drainage is poor, owing to the unfavorable topographic position.

Practically all of this type is still covered with a forest of pine and oak, and a scattering of some hickory. It is not valued very highly for agricultural uses other than grazing, owing to the poor drainage. Small patches are farmed, but the yields are unsatisfactory. The land is valued principally for the timber, and is held at \$5 to \$20 an acre. It is probable that with thorough draining

and liming good returns could be obtained in the farming of this type.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Myatt very fine sandy loam:

Mechanical analyses of Myatt very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
461620.....	Soil.....	0.1	0.3	0.5	15.2	20.5	51.5	11.5
461621.....	Subsoil.....	.0	.2	.4	10.4	18.2	41.5	29.1

LEAF VERY FINE SANDY LOAM.

The soil of the Leaf very fine sandy loam consists of 6 to 8 inches of a light-brown or grayish-brown very fine sandy loam, passing into a pale-yellow very fine sandy loam extending to about 10 inches. Below this the material gives way to yellowish, stiff clay, grading into mottled reddish-yellow and gray, plastic clay. This soil differs from the Kalmia principally in the presence of red in the subsoil and in the plasticity of the subsoil.

This type is encountered in several large areas in the vicinity of Schaal, in a small area one-half mile west of Forgy, and in a small area near the Saline River north of Saltworks Ford. It is one of the most poorly drained types of the terraces, or second bottoms. Its topography is level, and some areas are apparently without drainage outlets.

Only very small patches of this type are under cultivation. Yields are very low. Cotton yields about one-fourth bale per acre, and corn 10 to 20 bushels. The greater part of the type consists of pasture and forest land. The forest is mainly post oak and hickory, with some pine. This land can be bought for \$3 to \$20 an acre.

Unless this type is thoroughly drained and plowed deeply, it can probably be more profitably pastured than farmed.

HANNAHATCHEE FINE SANDY LOAM.

The surface soil of the Hannahatchee fine sandy loam to a depth of about 10 inches is a reddish-brown fine sandy loam. The subsoil is a red, friable fine sandy clay, extending to a depth of 3 feet or more without much change. The structure of this soil is rather open and porous. Many of the lower areas are covered with chert gravel, which interferes more or less with cultivation but does not result in appreciably lowered yields. There are some areas included in which the soil is light brown and the subsoil yellowish red.

The Hannahatchee fine sandy loam is rather extensively developed along practically all the streams heading in the Greenville soils. Its best development is along Mine Creek and Blue Bayou. The type occurs in practically level first-bottom areas, which are subject to overflow during high water, but otherwise it has excellent drainage. The forest, which occupies practically 50 per cent of the area of the type, consists principally of post oak, white oak, elm, red oak, gum, sycamore, and hickory. The cleared land is used chiefly for the production of cotton and corn. A small acreage is devoted to the growing of early radishes; some rye, wheat, and oats are grown for home use; and cantaloupes and watermelons are produced on a small scale.

Cotton yields from one-half to 1 bale per acre, corn 20 to 40 bushels, and oats 25 to 50 bushels. Sweet potatoes yield 100 to 300 bushels and Irish potatoes 100 to 150 bushels. Cowpeas yield 1 to 2 tons of hay per acre and 10 to 30 bushels of seed. Cantaloupes yield 100 to 150 crates, and watermelons 1½ to 2 carloads per acre.

This land sells for \$15 to \$75 an acre.

The Hannahatchee fine sandy loam is an excellent soil, and it responds well to fertilization and incorporation of organic matter. Rye and cowpeas both do well, and the plowing under of either of these crops should result in considerably greater yields. Where barnyard manure has been liberally used an increase in yield of 25 to 35 per cent has resulted.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Hannahatchee fine sandy loam:

Mechanical analyses of Hannahatchee fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
461654.....	Soil.....	0.2	1.1	2.4	41.0	23.6	30.9	10.8
461655.....	Subsoil.....	.0	1.8	3.4	33.8	18.6	19.2	22.9

OCHLOCKONEE FINE SANDY LOAM.

The Ochlockonee fine sandy loam consists of 8 to 12 inches of brown fine sandy loam, passing into a bluish-gray, yellowish, and rusty-brown mottled fine sandy clay to silty clay loam which extends to a depth of 3 feet or more. Included with the type, especially near the streams, are slight ridges where the soil is a brown loamy fine sand, about 10 inches deep, underlain by yellowish-brown fine sandy loam. There are also included some rather small areas consisting of about 10 inches of loam passing into light-brown, friable loam to sandy clay, which in the lower part is yellowish in places.



FIG. 1.—FIELD OF CATALPA SILTY CLAY LOAM.

This was a corn field, and land is now being prepared for cotton by plowing deep with a middle buster. Note the friable nature of this heavy textured soil.

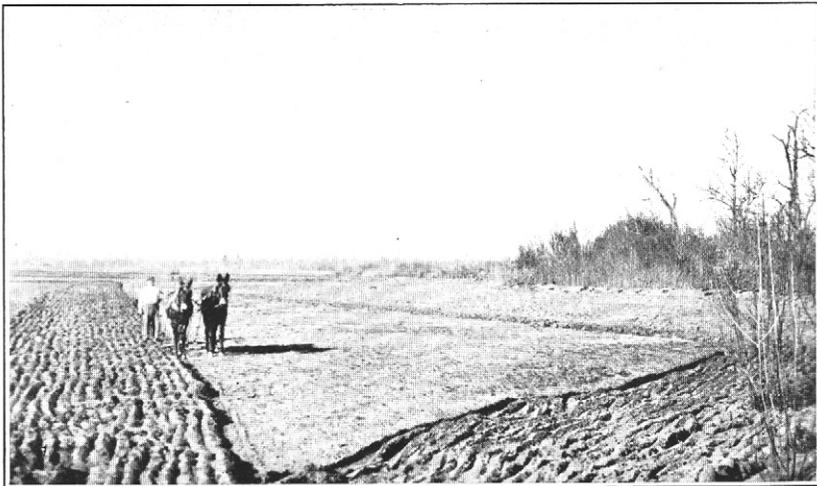


FIG. 2.—PLOWING UNDER ALFALFA SOD ON CATALPA SILTY CLAY LOAM.

This field is 6 years old. After the first year it gave 8 tons per acre each season, being cut five times.

A relatively small area of Ochlockonee fine sandy loam is mapped in Howard county. The largest areas occur along Dillard, Messers, and Holly Creeks. The type occupies flat though fairly well-drained first bottoms.

About 50 per cent of this type is still in forest and valued chiefly for the pasturage afforded by Bermuda grass and some bluegrass. The forest growth consists mostly of hickory, oak, gum, and pine. Cotton occupies about 75 per cent of the cultivated area, and corn ranks next in importance. Some oats and cowpeas are grown. Cotton yields one-third to one-half bale per acre, corn 15 to 25 bushels, oats 30 to 50 bushels, and cowpeas from 3 to 5 tons of hay. This land can be bought for \$10 to \$25 an acre.

The turning under of green crops would probably very materially increase yields on this soil. The poorly drained areas will probably give the largest returns if used for pasture.

OCHLOCKONEE SILT LOAM.

The Ochlockonee silt loam consists of a brown, mellow silt loam underlain at 8 to 12 inches by mottled rusty-brown and bluish-gray silty clay loam which passes into similarly mottled, plastic sticky silty clay loam or silty clay. This soil does not show any effervescence with hydrochloric acid. Included in the type as mapped are small mounds of Hannahatchee silt loam.

The Ochlockonee silt loam is widely distributed throughout the southern half of the county. Large areas occur along the Saline River from Hoodinpile Ford to a point a little north of the mouth of Plum Creek. There is a rather large area along Mine Creek east of Mineral Springs and the type is also encountered along some of the smaller streams. It occupies low, flat areas and is subject to overflow during high freshets. The drainage is in general poor.

Probably 10 per cent of this type is in cultivation. The remainder is still covered with white oak, red oak, water oak, gum, holly, and pine, there being more holly on this soil than on any other type in the county. Cotton and corn are the only crops grown, the former probably occupying the larger acreage. Cotton yields one-half to 1 bale per acre and corn 30 to 75 bushels in the best years. The land is bedded rather high for both corn and cotton, and the ridges are smoothed down considerably before planting. This soil is never fertilized.

Land of this type is sold at prices ranging from \$15 to \$50 an acre.

The Ochlockonee silt loam affords excellent Bermuda-grass pasture. Tile or ditch draining is one of the foremost needs of the type. Early and deep fall plowing would, it is believed, give better results than spring plowing.

OCHLOCKONEE SILTY CLAY LOAM.

The Ochlockonee silty clay loam consists of a brown silty clay loam, underlain at 8 to 10 inches by yellowish-brown or brownish-yellow, plastic silty clay, which passes in the lower subsoil into mottled yellowish-brown and bluish-gray, plastic clay. In the more poorly drained areas reddish mottling occurs in the lower subsoil. Neither soil nor subsoil of the typical areas shows any effervescence with hydrochloric acid. When wet this soil is very sticky, but on drying it cracks and breaks down into a crumbly mass. It consists of alluvium washed principally from noncalcareous material, but influenced locally to some extent by calcareous material.

This type occurs only along Mine Creek, beginning southeast of Mineral Springs and extending to within about 2 miles of the mouth of the stream. It occupies flat first-bottom situations, but has fairly good drainage.

This is a highly valued type of soil, and probably 75 per cent of it has been cleared of the original forest growth, which consisted of white oak, red oak, and some water oak, pine, and holly, and is now in cultivation. Corn and cotton are the only crops grown at present, except for one small field of alfalfa. Long-staple cotton occupies probably 90 per cent of the cleared land. The type yields one-third to 1 bale of cotton and 30 to 60 bushels of corn per acre. Alfalfa yields 3 to 6 tons per acre per season. The stand is not as good as on the highly calcareous soils. No fertilizer is used on this type. Cotton and corn are planted on slight ridges.

This land is held at \$25 to \$50 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Ochlockonee silty clay loam:

Mechanical analyses of Ochlockonee silty clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
461642.....	Soil.....	0.1	0.3	0.9	13.0	16.6	42.9	26.1
461643.....	Subsoil.....	.3	.7	.8	8.6	11.3	38.5	39.5

BIBB VERY FINE SANDY LOAM.

The Bibb very fine sandy loam to a depth of 8 to 12 inches is a light-gray and pale-yellow, mottled very fine sandy loam. This is underlain by mottled light-gray, rusty-brown, and pale-yellow very fine sandy loam to fine sandy clay. In the southern half of the county, especially along Sand Creek north of Rosedale, the soil is usually a fine sandy loam. There are some included areas of silty

clay loam. Some small hummocky areas of Thompson very fine sandy loam are included with the type, consisting of grayish fine sandy loam over yellow, friable fine sandy loam to fine sandy clay. The type is very low in organic matter and when dry has a whitish appearance.

This soil is not extensive, but there are some rather large areas along Muddy Fork and Little Holly Creek. It occupies low, flat first-bottom areas and is very poorly drained, remaining wet the greater part of the year.

Practically all this type is still covered with hardwood forest consisting of elm, sweet gum, black gum, and holly, with some oak and maple. Very small patches are cultivated to cotton and corn. Both crops give low yields for a bottom-land type, cotton yielding about one-fourth to one-third bale per acre, and corn 10 to 20 bushels in good years. Where this soil receives some wash from areas of Sumter clay the yields are about one-third higher. The areas of this type devoted to pasturage give fairly satisfactory returns, as a good growth of Bermuda grass is obtained where the land has been cleared.

Land of the Bibb very fine sandy loam is held at prices ranging from \$5 to \$25 an acre.

To give the most profitable returns this soil needs to be efficiently drained and the supply of organic matter increased.

POPE FINE SANDY LOAM.

The typical Pope fine sandy loam consists of a light-brown to gray, rather heavy fine sandy loam, passing at 8 to 10 inches into yellowish-brown, heavy fine sandy loam. In many places the subsoil has a slight reddish tinge. Rock fragments and gravel are present in many areas. There is included in the type as mapped some typical Pope loam, in which the soil and subsoil contain less sand than in the fine sandy loam. The material of the Pope fine sandy loam has been washed entirely from sandstone and shale soils.

This type is developed only in the northern part of the county. Practically all the streams in this section are bordered by narrow strips of this soil, and the larger streams by rather extensive areas. The type occupies rather flat first bottoms, but has moderately good drainage. It is subject to overflow during high water. As mapped there are included some small areas of second bottom.

The Pope fine sandy loam is an important soil, as compared with surrounding hill land. The bottom lands are cultivated to corn, cotton, oats, and some sorghum, corn occupying the largest acreage. The original timber is mostly pine, with some oak, and with some cedar in gravelly areas. Cotton yields average one-half bale per acre. Corn yields 15 to 40 bushels per acre, with an average of about 20 bushels.

Oats yield 20 to 25 bushels per acre. Cotton is the only crop marketed, the oats and corn being fed on the farm. This land is held at \$12 to \$20 an acre.

This type could be improved materially by draining the poorly drained areas and maintaining the supply of organic matter by adding manure or plowing under green crops.

CATALPA SILTY CLAY LOAM.

The Catalpa silty clay loam consists of a brown silty clay loam underlain at 6 to 10 inches ordinarily by mottled yellowish and bluish-gray, plastic clay, though in places the upper subsoil is yellowish brown. Where slight depressions occur the lower part of the 3-foot section has faint red mottlings. This soil is composed of material washed in part from the calcareous Sumter and Houston soils, and in part from noncalcareous types. The surface soil effervesces with hydrochloric acid, but the subsoil does not. The soil is stiff, but it breaks up into a very granular tilth and can be kept in a high state of cultivation. When wet it is very sticky, but it crumbles on drying.

This type occurs only in the southern part of the county, mainly along Brushy and Baber Creeks. It occupies rather sloping first bottoms, subject to overflow, but otherwise is moderately well drained. (See Pl. II, fig. 2.)

The Catalpa silty clay loam is practically all under cultivation. The uncultivated area supports a mixed forest of oaks and some pine. Cotton occupies about 75 per cent of the cultivated area, and corn the greater part of the remainder. Bermuda grass and alfalfa are two important hay crops on this type, but neither is grown extensively. Oats yield well but are not generally grown. Long-staple cotton is grown and yields one-half to one bale per acre. Corn yields 30 to 50 bushels, and oats 40 to 50 bushels. Alfalfa is cut five times and yields an average of 1 to 2 tons per acre at a cutting. Bermuda grass yields 2 to 3 tons per acre in two cuttings. One field on this soil which was plowed about 12 inches deep in the early fall yielded $1\frac{1}{4}$ bales of cotton per acre, while an adjoining field plowed in February and planted at the same time as the other yielded only one-third bale per acre. (See Pl. III, fig. 1.) Corn and cotton are planted on slight ridges. In growing alfalfa the ground is flat broken, preferably in the fall, and 20 to 30 pounds of seed per acre sowed between the 1st and the 15th of March. The first cutting can be made May 1, followed by two more the first year. The first year the crop yields 2 to 3 tons per acre. The stand of alfalfa on this soil decreases after the seventh year unless the fifth-year crop is allowed to go to seed. (See Pl. III, fig. 2.) This

type is more certain for alfalfa than the Sumter clay and yields heavier, as the crop makes a ranker growth. The land, including adjacent hill areas, is valued at \$25 to \$60 an acre.

Deep, early fall plowing has proved best on this soil, as the winter rains tend to make the soil crumbly and thus aid in putting it in good tilth.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Catalpa silty clay loam:

Mechanical analyses of Catalpa silty clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
461628.....	Soil.....	0.1	0.3	0.9	9.3	12.3	40.3	36.4
461629.....	Subsoil.....	.0	1.0	.5	4.0	14.5	36.5	44.3

The following sample contained more than one-half of 1 per cent calcium carbonate (CaCO_3): No. 461628, 1.68 per cent.

TRINITY CLAY.

The Trinity clay consists of a dark-brown to black clay which shows very little change within the 3-foot section, except that the lower subsoil is lighter, usually a greenish brown. The soil and subsoil are both plastic and sticky when wet, but crumble to a highly desirable tilth upon drying. The material is decidedly calcareous throughout the 3-foot section, effervescing freely with hydrochloric acid. Lime concretions and shells are common in this type. According to records kept in boring an artesian well the calcareous material extends to a depth of 100 feet. Soil material proper has been derived almost entirely as wash from areas of the Houston and Sumter soils.

The Trinity clay is not extensively developed in this county. It is confined principally to the southern part of the county, along Plum Creek. Drainage is fairly well developed.

The Trinity clay is one of the more productive soils in the county for all crops, except truck and orchard crops. The original forest, which consisted principally of bois d'arc, cottonwood, red locust, large sweet gum, oak, and some hackberry, has been removed from above 40 per cent of the type, and this land is now farmed. Cotton and Bermuda grass probably are grown on 60 per cent of the cultivated area. Corn occupies a large area, and alfalfa a very small area. All these crops are grown for sale, except as needed to feed the work stock and other domestic animals.

Long-staple cotton yields one-half to 1 bale per acre, corn 35 to 50 bushels, alfalfa 6 to 10 tons, in several cuttings, and Bermuda grass 2

to 4 tons. As a rule the Bermuda grass is pastured during the winter, and to some extent during the summer.

The farmers on this type plan to plow as early as possible after the crops have been removed. Corn and cotton are planted on very slight ridges. Corn is planted from April 1 to May 1 and cotton about May 1. No fertilizer or manure is used. This land is held at \$35 to \$50 an acre.

The essential step in securing maximum yields from the soil is thorough cultivation, plowing deep as early in the fall as possible, and harrowing in the spring until a fine seed bed is obtained.

PORTLAND CLAY.

The Portland clay in this county ranges from (1) a brown clay passing at 5 or 6 inches into lighter brown, sticky, plastic clay and at 10 to 14 inches into chocolate-red, sticky, plastic clay or grading first into salmon-colored and then chocolate-red clay with little or no gray mottling, to (2) a brown clay, passing at 5 or 6 inches into yellowish-brown or mottled yellowish-brown, drab, and bluish-gray clay. The clay is sticky and plastic when wet, but crumbles like the Trinity clay on drying. The chocolate-red material is derived from the backwater of Red River. The material of this type effervesces with hydrochloric acid.

The Portland clay occurs only in a small area in the extreme southwestern part of the county in the first bottom of the Saline River. This area is subject to backwater overflow from Red River, which covers it at times to a depth of 15 feet. Drainage is not well established.

This is an unimportant type, owing to its small extent. It is all in forest, which consists principally of oak, bitter pecan, sycamore, ash, red haw, hackberry, maple, sweet gum, and elm. The land is held at \$15 to \$25 an acre.

If this type were cleared and the drainage improved it would probably produce as well as the other calcareous soils. It is, however, subject to deep overflows, and therefore probably could better be used for pasture or for the production of Bermuda-grass hay than for tilled crops.

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

Mechanical analyses of Portland clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
461662.....	Soil.....	0.1	1.1	0.9	3.2	1.9	36.9	56.4
461663.....	Subsoil.....	.0	.4	.4	1.4	1.1	43.2	53.4

ROUGH STONY LAND.

The areas mapped as Rough stony land are usually very steep, and are too stony to permit of any agricultural use except perhaps as pasture land. The soil between the rocks consists mostly of Hanceville fine sandy loam or loam and Dekalb loam and fine sandy loam. Part of the Rough stony land might be considered a very rough phase of the Hanceville stony fine sandy loam. Some of the areas included represent Rough broken land more typically than Rough stony land. The rocks present in this type are sandstone and shale, the former predominating.

Rough stony land is encountered in the northwestern part of the county, where it forms the steeper slopes and sharper ridges. The largest areas lie north of Athens and south of Baker Springs.

This type is used for pasturing cattle and hogs. It is covered with white oak, hickory, pine, and red oak. It is valued only for its timber and pasturage.

SUMMARY.

Howard County lies in the southwestern part of Arkansas. It has an area of 602 square miles, or 385,280 acres. The county lies within two provinces, the Coastal Plain and the Appalachian Mountain and Plateau, the former covering the southern part. The topography of this region is level to gently rolling, while the northern section is hilly to mountainous. Regional drainage is well established. The Saline River drains the greater part of the county.

The total population of Howard County is given as 16,898 by the 1910 census. The population is all classed as rural, and averages 28.1 persons per square mile. The county was organized in 1873. The early settlers came principally from the eastern States. Nashville, the county seat, had a population of 2,374 in 1910.

The southern part of the county has fairly good railroad facilities, but the northern section is rather distant from a railroad. The public roads of the county are in fairly good condition. There are a number of good schools and churches, and the greater part of the county is supplied with rural mail delivery service.

The winters in Howard County are mild and the summers long and warm. The mean annual temperature is 64° F. There is an average growing season of over seven months. The mean annual rainfall is 53.27 inches. Rainfall is heaviest during the spring months.

The greater part of Howard County is suited to agriculture. General farming, fruit growing, truck farming, and cattle raising are carried on quite extensively. Cotton is the principal cash crop. Peaches and truck crops are becoming important commercially.

The methods of farming are those common to the cotton growing States, except that relatively little commercial fertilizer is used. Crop rotation receives very little attention. As a rule farm labor is easily obtainable. The work stock consists principally of medium-weight mules.

The 1910 census reports over half the farms operated by owners. The average size of the farms is reported as 79.5 acres, of which 36.8 acres are improved.

The average assessed value of farm land is given as \$8.51 an acre in 1910. The better grades of land are held at \$15 to \$60 an acre.

This county includes four distinct groups of soils: Upland soils, derived from the weathering of sandstone and shale; upland soils of sedimentary origin; terrace or old-alluvial soils; and first-bottom or recent-alluvial soils. The soils are separated into 34 types, representing 21 series, in addition to Rough stony land.

The upland soils of residual origin, embraced in the Appalachian Province, are classed in the Hanceville series. Those derived from Coastal Plain sediments are classed in the Greenville, Orangeburg, Ruston, Caddo, Susquehanna, and Oktibbeha series where noncalcareous, and in the Houston and Sumter series where calcareous. The terrace soils are classed in the Amite, Cahaba, Kalmia, Myatt, and Leaf series. The first-bottom soils of calcareous nature are correlated with the Trinity, Catalpa, and Portland series, and the non-calcareous types with the Hannahatchee, Ochlockonee, Bibb, and Pope series.

The Hanceville fine sandy loam is the most important of the residual soils, which occupy the northern part of the county. The Hanceville soils are well to excessively drained, and in general are good agricultural types.

The Coastal Plain soils are desirable agricultural types, well suited to a wide range of crops. The Greenville gravelly loam is one of the most important peach soils in the United States.

The terrace and first-bottom soils are very productive types where well drained. Owing to their generally level surface they need artificial drainage in many places.

The soils of Howard County offer good opportunities for diversified farming. The sandy soils are well adapted to trucking and general farming. The gravelly soils are well suited to fruit. The calcareous soils are especially adapted to alfalfa and long-staple cotton. In general the soils are deficient in organic matter, and on many of the types commercial fertilizer is apparently necessary for the best results.

[PUBLIC RESOLUTION—No. 9.]

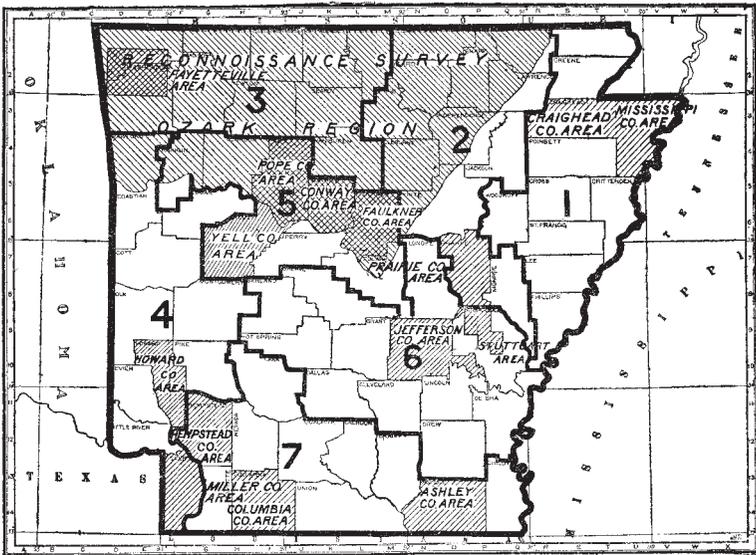
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, providing “for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture.”

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided*, That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]



Areas surveyed in Arkansas.

Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at <http://offices.sc.egov.usda.gov/locator/app>.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all of its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex (including gender identity and expression), marital status, familial status, parental status, religion, sexual orientation, political beliefs, genetic information, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write to:

USDA
Assistant Secretary for Civil Rights
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, S.W., Stop 9410
Washington, DC 20250-9410

Or call toll-free at (866) 632-9992 (English) or (800) 877-8339 (TDD) or (866) 377-8642 (English Federal-relay) or (800) 845-6136 (Spanish Federal-relay). USDA is an equal opportunity provider and employer.