

Issued January 27, 1913.

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE STATE OF MISSISSIPPI, E. F. NOEL, GOVERNOR
E. N. LOWE, DIRECTOR STATE GEOLOGICAL SURVEY.

SOIL SURVEY OF WAYNE COUNTY,
MISSISSIPPI.

BY

A. L. GOODMAN AND GROVE B. JONES, OF THE U. S.
DEPARTMENT OF AGRICULTURE, AND E. M. JONES,
OF THE MISSISSIPPI GEOLOGICAL SURVEY.

HUGH H. BENNETT, INSPECTOR IN CHARGE SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1911.]



WASHINGTON:
GOVERNMENT PRINTING OFFICE,
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LETTER OF TRANSMITTAL

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., May 16, 1912.

SIR: The continuation of the soil-survey work in Mississippi during the field season of 1911 included a detailed survey of Wayne County. The selection of this area was made after conference with officials of the State, with which the bureau is now cooperating. Requests for this survey, duly indorsed by the Representative in Congress from the sixth district of Mississippi, are on file in this bureau.

The accompanying report and map embody the results of this survey and I have the honor to recommend that they be published as advance sheets of Field Operations of the Bureau of Soils for 1911, as authorized by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

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MAP.

Soil map, Wayne County sheet, Mississippi.

SOIL SURVEY OF WAYNE COUNTY, MISSISSIPPI.

By A. L. GOODMAN and GROVE B. JONES, of the U. S. Department of Agriculture, and E. M. JONES, of the Mississippi Geological Survey.

DESCRIPTION OF THE AREA.

Wayne County, named in honor of Gen. Anthony Wayne, is located in the southeastern part of Mississippi, being bounded on the north by Clarke and a small portion of Jasper County; on the east by Washington and Choctaw Counties, Ala.; on the south by Greene and Perry Counties; and on the west by Jones County. The eastern boundary has a length of 31 miles, the western $26\frac{1}{2}$ miles, and the average width is $28\frac{1}{2}$ miles. The included area is 524,800 acres, or 820 square miles. The base map used in plotting the soils was constructed in the field with the plane table as the soil survey progressed.

Wayne County has a topography ranging from undulating, in some places comparatively level, to hilly. The north and northwest parts of the county are dissected by many streams and badly eroded. In the extreme northeastern section a narrow belt of prairie land is found, while in the southern part the topography is more uniformly undulating to hilly. The general slope of the surface is toward the south, all of the large streams flowing in that direction, the principal lines of

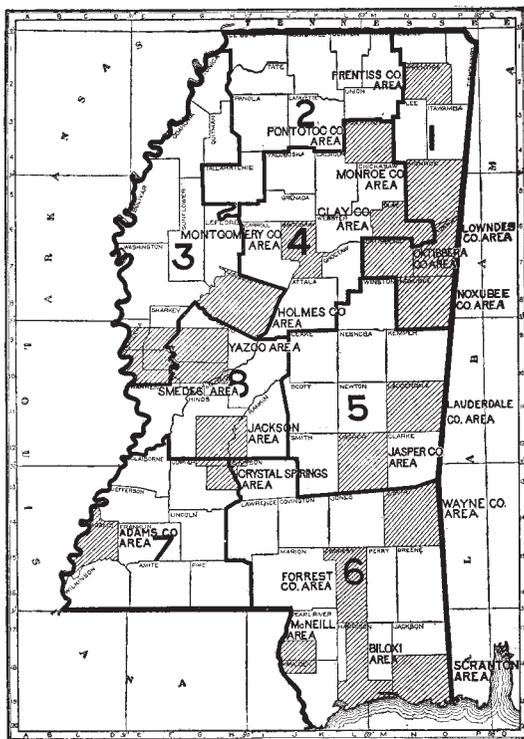


FIG. 1.—Sketch map showing areas surveyed in Mississippi.

drainage lying along the eastern part of the county, through which the Chickasawhay River, with its tributaries, and Buckatunna Creek flow. Thompsons Creek is the main source of drainage of the western part of the county.

Wayne County was formed in 1809, the first white settlers coming from North Carolina and South Carolina. They were mainly of Scotch descent. The county seat was first located at Winchester, and in November, 1868, was moved to Waynesboro, where it is now. The lands around Winchester and Bucatunna were the first settled, but with a steady immigration of settlers the lands in the northern part of the county were soon opened up. At present the south-central and southwestern parts of the county are sparsely settled, most of this section consisting of virgin pine forests or areas recently cut over. The densest population is found along the Mobile & Ohio Railroad, which runs the whole length of the county, entering it from the north about 12 miles west of the Alabama State line and leaving it to the south about $1\frac{1}{2}$ miles west of the Alabama line. This road was opened for traffic in September, 1854.

The last census gives Wayne County a population of 14,709, against 12,539 in 1900, thus showing a gain of about 15 per cent. The floating population of the county left with the passing of the big saw-mills, which has occurred during the last decade.

The principal towns in the county are Waynesboro, with a population of 652; Bucatunna, with 421; State Line, with 363; Chicora, with 400; and Hiwannee, with 217. Matherville, Eucutta, Boyce, Clara, and Whistler are prosperous settlements.

A large proportion of the low-lying bottoms along the streams in the county has not yet been opened up. The value of these lands for farming under present conditions is low. No section of the county, not even that along the railroad, has yet been settled to its full capacity, and much land that will produce fine crops is still uncultivated. Scarcely 5 per cent of the available land in the area is now under cultivation.

At present the public roads are largely unimproved and during wet weather are almost impassable. Much could be done to improve these roads at a small expense, as good material for ballasting and surfacing is available in the county.

The educational facilities throughout the county are being yearly improved. The agricultural high school at Clara is doing much to raise the standard of farming.

CLIMATE.

The climate of Wayne County is typical of the warm temperate zone. The winters are relatively short and mild, while the summers are long and hot. The southern boundary of the area is only 63

miles from the Gulf of Mexico, and the temperature is consequently tempered in the winter by the warm winds and in the summer by the cool breezes from the gulf.

The short, mild winters and long, hot summers give a long growing season and the opportunity for a wide diversification of crops. Winter weather is so mild that it is possible to keep the land in cultivation nearly all the year round.

The temperature ranges from 30° F. in winter to 105° F. in summer, with an average of about 51° for winter and 82° for summer. Frequent sharp changes of temperature take place in the winter, but none of them are of extreme nature. Warm, springlike weather sometimes occurs in winter. Snow rarely falls and seldom remains upon the ground longer than a few hours.

The following data, taken from the records of the Weather Bureau station at Hattiesburg, in the adjoining county of Perry, gives the normal monthly, seasonal, and annual temperature and precipitation, the absolute minimum and maximum temperatures, the total precipitation in the wettest and driest years so far of record, and the amount of snowfall:

Normal monthly, seasonal, and annual temperature and precipitation at Hattiesburg, Perry County, Miss.

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
	° F.	° F.	° F.	Inches.	Inches.	Inches.	Inches.
December.....	51	85	13	4.4	6.5	5.2	T.
January.....	49	82	16	4.6	3.9	6.2	T.
February.....	52	85	1	5.3	2.8	4.2	0.9
Winter.....	51			14.3	13.2	15.6	0.9
March.....	61	88	24	4.3	2.0	7.0	0.0
April.....	66	93	33	3.3	0.5	2.9	0.0
May.....	75	98	39	2.6	0.4	4.0	0.0
Spring.....	67			10.2	2.9	13.9	0.0
June.....	81	103	52	5.3	5.3	1.3	0.0
July.....	82	103	60	6.1	3.0	5.3	0.0
August.....	82	103	55	5.3	1.8	7.2	0.0
Summer.....	82			16.7	10.1	13.8	0.0
September.....	77	101	40	2.5	0.8	7.2	0.0
October.....	67	95	30	1.5	0.5	4.2	0.0
November.....	57	87	21	2.9	1.9	3.0	0.0
Fall.....	67			6.9	3.2	14.4	0.0
Year.....	67	103	1	48.1	29.4	57.7	0.9

The following table gives the dates of the first killing frosts in spring and last in fall, and the average dates, at Waynesboro, from 1903 to 1911, inclusive:

Dates of first and last killing frosts.

Year.	Waynesboro.		Year.	Waynesboro.	
	Last in spring.	First in fall.		Last in spring.	First in fall.
1903.....	Mar. 26	Oct. 26	1908.....	Feb. 28	Oct. 25
1904.....	Mar. 4	Oct. 24	1909.....	Mar. 16	Do.
1905.....	Mar. 2	Nov. 2	1910.....	Mar. 17	Oct. 29
1906.....	Mar. 21	Oct. 29	1911.....	do	Oct. 21
1907.....	Apr. 2	do	Average.....	Mar. 12	Oct. 26

The average annual precipitation is about 48 inches, most of which falls during the winter and spring months. As a general rule the period of least rainfall is from August to November, a condition favorable to harvesting the crops.

The rainfall is fairly well distributed throughout the year, although droughts sometimes affect the crops severely. The sandy and friable nature of the soil found throughout Wayne County makes absorption of moisture rapid, and it seldom if ever gets muddy, except in the clay or prairie portion of the county. In the rolling and hilly parts the heavy rains cause much erosion, particularly where fields are left bare during the winter. Extensive floods also occur, covering the valleys and lowlands.

AGRICULTURE.

As originally established, Wayne County included all of what is now Greene, Covington, Jones, Perry, Lamar, and that part of Lawrence and Marion Counties lying west of the Pearl River. The early settlers devoted themselves almost entirely to hunting and fishing, and it was not until the erection of Fort Patten and Fort Rogers that any agriculture was practiced.

The sandy lands of the second bottoms of the Chickasawhay River were the first to be cleared. These were planted to cotton and corn. Transportation facilities were poor and all crops sold were hauled to Mobile, the nearest market, 75 miles by road. In 1854 the Mobile & Ohio Railroad was completed, opening a large extent of country previously undeveloped.

The census of 1880 gave Wayne County a total of 76,270 acres in farms, with 21,235 acres improved; the census of 1900 gives 207,212 acres in farms, with 40,266 acres improved; and the census of 1910, 185,472 acres in farms and 50,254 improved. There has thus been a steady increase in the area actually under cultivation. The growth

in agriculture is shown perhaps more definitely in the increase in value of all farm property, which was 119 per cent greater in 1910 than 10 years earlier.

Within the last few years more diversified farming has been practiced, but cotton and corn are still by far the most important crops. Cultivation is practically along the same lines as it was years ago, except in the case of a few of the more progressive farmers, who employ labor-saving machinery and more intensive methods of soil management. As a rule the crops are planted and harvested with as little expense as possible, without regard to betterment of the soils.

For the last 15 years commercial fertilizers have been used, but only within the last 10 years to any great extent. The sandy and loose nature of the soil makes it almost impossible to produce a good crop without them. In 1900 it was estimated that Wayne County spent \$18,426 for fertilizers, while in 1910 the figures had risen to \$51,386.

The average size of farms, according to the census of 1910, was 74.5 acres.¹ They range in size from 3 acres to 1,000 acres. Most of the farms are operated by the owners, who live upon them. Some of the large farms are leased in relatively small lots, the owners living in town. In most cases the owner superintends the work on such farms. Where cash rent is asked land rents at \$2 to \$4 an acre, depending upon its productiveness. Some of the land is leased on shares, and in cases where the owner furnishes seed, stock, implements, etc., his share is one-half of the cotton and one-third of the corn.

Land in Wayne County at present ranges in price from \$2 to \$25 an acre. Ten years ago timberland could be bought for 50 cents an acre, large tracts of this land being bought up by nonresident land syndicates and corporations. At the present time this timberland can not be bought for less than \$30 an acre. The Mobile & Ohio Railroad owns large tracts of land in the southwestern part of the county.

A few years ago many kinds of truck crops were shipped from Waynesboro, but at present string beans, onions, and cabbage constitute the bulk of the shipments. Many other vegetables are grown for home use. Shipments to northern markets usually begin about May 1.

The county contains excellent soils for the production of tree fruits, such as pears, peaches, summer apples, and plums, although very little fruit of any sort is grown. Blackberries also do well. The San Jose scale, blight, and insects are the chief pests.

Stock raising was formerly the principal occupation of the inhabitants in Wayne County. At the present time there is no stock law in

¹ Each tenancy was enumerated as a separate farm. The average holding is, therefore, greater than this.

the county, the cattle being allowed free range, and large herds of sheep and beef cattle are seen in the western part of the county. Owing to the excellent natural facilities for stock raising, this industry should be extended. Cattle can be pastured from 9 to 10 months of the year, and some which have access to the switch cane found in low swampy places keep in good condition through the winter.

In the northeastern part of the county, where a small belt of prairie land is found, alfalfa can be profitably grown. As many as five cuttings a year have been secured by some of the progressive farmers living at Frostbridge. At present the crop is grown for home use only, none of it being shipped out of the county. Good crops of soy beans can also be grown throughout the county. The production of upland rice is just beginning to gain a foothold in the county and good stands of rice were seen on the Ruston soils. From 15 to 35 bushels per acre is the ordinary range in the yields. A variety of lowland rice has been found to give good results on the Kalmia and Thompson soils throughout the area. Rice should be planted about April 15 to obtain the best results. Some wheat is produced in the county, but owing to the rust only a limited acreage is planted.

Sugar cane is especially well adapted to several soils in the area, the sirup yield ranging from 300 to 500 gallons per acre. The sirup finds a ready sale at from 40 to 60 cents a gallon and a year of failure for this crop is seldom if ever recorded. Sugar cane does best upon low-lying areas of sandy soil, where the higher moisture content is favorable. There has been a steadily increasing demand for this sirup throughout the Southern States for the last 10 years, and for the last 5 years large quantities have been shipped to the northern markets. During the last few years sirup mills have been installed and operated profitably at many points in the Gulf Coast section.

Winter oats are planted as a cover crop by some of the farmers, but not to a very great extent. The crop gives good results on many of the soils. Cotton is generally planted between the 1st and 10th of April, and some late cotton as late as May.

Corn is usually planted from the 1st to the 15th of March, but will produce in a favorable season if planted as late as May 20. In a corn-growing contest 1 acre of Ruston fine sandy loam at Matherville is said to have produced 178 bushels.

Wayne County will probably always be largely agricultural in its pursuits. Very little of the land has yet reached its possible producing capacity. The great abundance of land, conditions of tenure, and lax methods of cultivation are factors retarding a more progressive and highly developed agriculture. A spirit of progress is clearly shown by an increasing interest in all of the agricultural pursuits and by a more general prosperity throughout the county.

SOILS.

Wayne County is situated to the south of east-central Mississippi, on the Alabama line. The county, therefore, lies wholly within the Gulf Coastal Plain. It includes recent alluvium, Grand Gulf, Vicksburg, and Jackson formations.¹ The soils of this county are derived from these formations, but the character of the soil material and not the age of the parent rock has been the main guide in the classification. It so happens, however, that the grouping of the soils in some instances conforms in a general way to the geological divisions.

The soils of Wayne County, although quite varied, are simple in their characterizing features and in their relation to each other. In a general way the various types fall into four groups, based upon the character of the materials from which the soils are directly derived, as follows: (1) Soils derived from unconsolidated old sedimentary material of the uplands, including the Norfolk, Orangeburg, Ruston, Guin, and Susquehanna series; (2) soils derived from consolidated material, as limestone and shales, including the Houston and Sumter series; (3) soils derived from Recent deposits and still subject to overflow, including the Ocklocknee and Thompson series and Meadow; and (4) soils derived from old alluvium no longer subject to overflow, including the Cahaba and Kalmia series.

In the classification followed these broad groups have been subdivided into series or subgroups, the determining characteristics being the peculiarities of the soils, or those properties of soil affected by processes of weathering or degree of weathering. According to this series grouping the various soils or types comprising a given series have thus closely related characteristics, especially of color, structure, and drainage condition. The series themselves have been further subdivided into soil types, as determined by the textural constitution of the soil; that is, their relative content of sands, silt, and clay.

The Norfolk series, including in this area the sand and fine sandy loam types, is characterized by the gray color of the soils, the yellow color and friable structure of the subsoils, and by good drainage. The associated Orangeburg types, of which the sand, sandy loam, and fine sandy loam occur in Wayne County, have gray surface soils, bright-red, friable subsoils, and excellent drainage. Another associated group is the Ruston series, of which the sand, sandy loam, fine sandy loam, and gravelly sandy loam members occur here. These last have gray soils, reddish-yellow to yellowish-red subsoils of friable structure, and good drainage.

The materials from which these series are derived probably were originally the same, that is, a deposit of stratified sands and silt, laid down in water and later but in very remote time raised above the

¹ See "Cement Materials," Mississippi Geological Survey.

influence of such water. Physical differences between these important soil groups are represented by differences in the color of their subsoils, and these color differences are believed to have resulted from the varying degrees of oxidation to which the material has been subjected. In the Orangeburg the bright-red subsoil color has been brought about very likely by thorough oxidation processes, by which the iron components were altered to the bright-red oxide salts—a condition more nearly approximating complete oxidation than has been reached in case of the yellow Norfolk subsoils. The color of the Ruston subsoil is intermediate between that of the Norfolk and Orangeburg, and it is believed that in the Ruston soils oxidation has advanced to a stage intermediate between that of the Norfolk and Orangeburg.

The Guin stony sand is a rather variable soil, especially in color of the subsoil material. It is derived from old sedimentary material, which in a general way is related to that giving the Orangeburg, Ruston, and Norfolk. One striking feature of the Guin is the abundance of ferruginous sandstone and conglomerate fragments.

The Susquehanna series is characterized principally by the plastic structure, heavy texture, and mottled red and gray color of the subsoils. With this group the degree of oxidation does not account for the prominent physical features which mark the Susquehanna series as distinctly different from the other upland series, the Orangeburg, Ruston, and Norfolk. Although the Susquehanna series is placed with the general group of soils derived from unconsolidated old upland sedimentary material, it must be admitted that such a grouping would necessarily be rather broad in its scope to include this series, because the parent material in this case may have included quite compact clay beds and clay shales, and possibly some strictly consolidated strata associated with the limestone of the region. Broadly, however, the grouping is probably correct, as the evidence indicates an origin chiefly from heavy clay beds such as could not be changed solely by oxidation to the texture of the sandy clay subsoil of the Orangeburg series. Unquestionably oxidation is an effective aid in the process of weathering, which in its continued action upon the Susquehanna material makes this material more and more like that of the Orangeburg. In the better-drained situations the color of the Susquehanna clay is more uniformly red and the structure usually more friable. The slow removal of the fine-clay particles by water action in such situations, coupled with the reddening effect of oxidation (during which the soil seems to become progressively more friable), tends to convert the Susquehanna material into Orangeburg material, and, possibly, other clay materials into Susquehanna. But a discussion of these processes of weathering has no very important place here except to bring out the relationship of the soil series.

The Sumter soils are yellowish-brown in the surface portion and yellow in the subsoil and contain fragments of grayish limestone in conspicuous quantities from the surface downward. As developed in Wayne County they are highly calcareous and adapted to lime-loving plants like melilotus and alfalfa. The Houston soils are dark brown to black in the surface section and grayish to brownish below. Limestone fragments are not abundant in the surface portion, the material is not as calcareous as that of the Sumter, and the drainage seems to be better. These points suggest the possibility of the Houston material representing an advanced stage in the weathering of the Sumter material. The material of both these series is derived largely from hard limestone, including probably some softer associated beds, such, perhaps, as clay shales. The limestone probably belongs to the Vicksburg formation. Some of the parent material may also belong to the Jackson formation.

In the overflowed first bottoms of streams the recent alluvial material was divided between two series, the Ocklocknee and Thompson, and an undifferentiated type called Meadow. The material here all represents comparatively recent deposits washed from the uplands of the region and laid down over the stream flood plains in time of overflow. On account of the poor drainage, the frequent overflows, and successive additions from each overflow, weathering, especially oxidation, has not advanced to the stage attained in the upland soils. Also, there has been less chance for the soil and subsoil to reach that uniformity of color, texture, and structure found in the upland soils. The soils here are much more variable than in the uplands, particularly in the texture at different depths, since there has not been the opportunity for the washing out or redistribution within the soil body of the finer particles by percolating and flow-off rain water, such as has existed in the case of upland soils. The Ocklocknee soils are the brown to dark-brown bottom soils, while the Thompson series includes the grayish-brown soils with yellowish subsoils mottled with gray.

On the terraces or second bottoms, representing old flood plains of the streams when they flowed at higher levels, the Cahaba and Kalmia series are developed. The former includes the best drained and most completely weathered brown soils with reddish subsoils, while the latter comprises the not so well drained grayish soils with yellow or mottled yellow and grayish subsoils. In places, especially along the Chickasawhay River, there is a succession of distinct terraces standing above each other somewhat on the order of a flight of steps. The highest of these are, of course, the oldest, and on these the soil has naturally weathered most completely. The subsoil of the high terrace phase of the Cahaba fine sandy loam is a red, friable, fine sandy clay, very similar to that of the Orangeburg fine sandy

loam of the upland proper. This phase is so like the Orangeburg fine sandy loam in character of material that the question would naturally be raised as to the advisability of mapping such similar soils separately. As a matter of consistency, this separation is necessary, for the adopted system of classification holds the upland of the Coastal Plain separate from the alluvial soils, whether in the first bottoms or on the terraces which were former first bottoms. Aside from this the terraces are prevailingly flat, while the uplands are prevailingly undulating to rolling. Also, it is not certain that the mineralogical constitution of the two soils is identical, nor is it certain that oxidation has advanced as far in this phase of the Cahaba fine sandy loam as it has in the older and longer weathered Orangeburg fine sandy loam.

The various soil types are discussed in detail, and their crop values and adaptations brought out in the succeeding pages.

The following table gives the name and actual and relative extent of each soil mapped in Wayne County:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Ruston fine sandy loam.....	199,680	38.0	Sumter clay.....	6,016	1.1
Norfolk fine sandy loam.....	48,192	9.2	Ruston sand.....	3,456	.7
Cahaba fine sandy loam.....	30,912	7.1	Thompson sand.....	3,328	.6
High terrace phase.....	6,592		Norfolk sand.....	2,816	.5
Meadow.....	36,928	7.0	Orangeburg sand.....	2,688	.5
Thompson fine sandy loam...	32,448	6.2	Sumter stony clay.....	2,432	.5
Orangeburg sandy loam.....	27,456	5.2	Ocklocknee fine sandy loam..	1,984	.4
Kalmia fine sandy loam.....	26,048	5.0	Houston clay.....	1,792	.3
Susquehanna clay.....	20,224	3.9	Ruston gravelly sandy loam..	1,664	.3
Orangeburg fine sandy loam..	15,488	3.0	Thompson silt loam.....	1,408	.3
Susquehanna fine sandy loam.	13,184	2.5	Cahaba clay.....	896	.2
Cahaba loamy sand.....	12,928	2.5	Kalmia silt loam.....	768	.1
Ruston sandy loam.....	10,752	2.1	Kalmia sand.....	640	.1
Guin stony sand.....	7,232	1.4			
Ocklocknee clay.....	6,848	1.3	Total.....	524,800	

NORFOLK SAND.

The Norfolk sand consists of a gray or yellowish-gray, medium to coarse incoherent sand, resting at about 3 to 10 inches upon a yellow subsoil having about the same texture as the soil and extending to a depth of 36 inches.

Small patches of this type are found covering flat areas and slopes in the uplands throughout the county. The only large areas are those east of Robinsons Store and near Reynolds Store.

This is considered a droughty soil and the few crops planted on it mature very early. Only a very small proportion of it is cultivated, owing to its weak moisture-retaining power. General farming can

not be carried on on such a soil with success, except in irrigated sections. With liberal additions of humus and fertilizers profitable crops of truck could be secured. Sweet potatoes, melons, and a number of vegetables for the earliest markets are the crops best suited to the soil.

The timber growth is of no commercial value, consisting of scattering old-field pine and scrub oak.

NORFOLK FINE SANDY LOAM.

The Norfolk fine sandy loam consists of a gray or grayish-yellow fine sandy loam, which becomes pale yellow or yellow within a few inches of the surface and grades at about 10 to 16 inches into a fine sandy clay, often high in content of silt. Some patches that had a slight reddish subsoil were included. These would have been mapped as Ruston fine sandy loam had they been of sufficient size. Where the drainage is insufficient the subsoil is often slightly mottled with gray or reddish colors and contains a small percentage of iron concretions. This poorly drained phase is also not typical of the soil, which has a uniform yellow subsoil color. Extensive areas of this soil are found in the south and southwestern parts of the county, bordering on Greene, Perry, and Jones Counties, also in the neighborhood of Uriel and east of Battle Flag Station.

The Norfolk fine sandy loam was mapped mainly over high rolling areas of well established drainage. Some nearly level areas adjacent to small streams where the drainage is not so perfect were included. These low-lying areas approach the Kalmia fine sandy loam in topography and, to a less extent, soil characteristics. The phase was not believed to represent terrace material—at least in the main portion—and owing to its small extent is of little importance.

At present only small areas of this type are under cultivation, the greater proportion being covered with virgin forest of longleaf pine or lying idle in a logged-off condition. Erosion is not active in this type.

The surface few inches of the virgin soil often contains considerable organic matter, but under cultivation this constituent is soon exhausted and commercial fertilizers are used to keep up the productivity. Cotton and corn at present are practically the only crops grown. Applications of fertilizers generally range from 150 to 300 pounds per acre. With these quantities cotton produces from one-fourth to three-fourths bale and corn from 10 to 25 bushels per acre. With proper management larger yields than this are sometimes produced.

The Norfolk fine sandy loam is well adapted to sugar cane, oats, and a variety of forage crops, such as velvet beans, bur clover, and lespedeza. Beans, peas, cabbage, melons, strawberries, tomatoes, and sweet and Irish potatoes also do well.

Efforts toward improving this soil should aim first at the addition of organic matter. Barnyard manure is especially beneficial, but the supply is entirely inadequate and green manuring crops must be substituted. For this reason cowpeas, soy beans, or some other legume should be grown as a regular part of the rotation and occasional crops should be turned under. Tracts of this soil now in the virgin state are for sale in Wayne County at prices ranging from \$5 to \$8 an acre.

ORANGEBURG SAND.

The Orangeburg sand consists of a gray to brownish-gray medium sand, grading below, frequently at about 12 inches, into a yellowish-red to red, slightly loamy, sand, which is sometimes underlain within the 3-foot section by a red friable sandy clay. Iron concretions are often present.

The type is of very little importance compared with other soil types found in the county, as it embraces only a few square miles. It is scattered in patches throughout the area on slopes along small streams and on the crests of ridges and hills.

This type is less retentive of moisture than either the Orangeburg fine sandy loam or sandy loam. Its open structure naturally assures good drainage. During dry seasons crops suffer from lack of moisture. It gives only moderate yields of cotton and corn, but vegetables and small fruits are well adapted to it. Of the several sand types found in the area this is the strongest, and on that account probably the best, for early vegetables. Tomatoes, squash, cabbage, sweet potatoes, melons, radishes, garden peas, and other vegetables could be grown for early market. Strawberries and cultivated blackberries will also give profitable returns. The markets of Meridian (52 miles distant) and Mobile (83 miles), on the direct line of the Mobile & Ohio Railroad, would take considerable quantities of truck and small fruits.

Very little of the type is at present under cultivation. Heavy applications of barnyard manure and velvet beans or cowpeas turned under green and liberally fertilized with some high-grade commercial fertilizer should be used for all crops. Commercial fertilizers with a high percentage of nitrogen and potash are said to give best results.

Originally the Orangeburg sand was forested with longleaf and shortleaf pine and considerable scrub oak.

The average value of this soil would be difficult to estimate. In some cases, however, it can be bought as low as \$2 to \$3 an acre.

ORANGEBURG SANDY LOAM.

The Orangeburg sandy loam to an average depth of about 12 to 15 inches consists of a medium to rather coarse grayish-brown to reddish-brown loamy sand to light sandy loam. This rests upon a red

friable sandy clay subsoil, sometimes containing iron concretions and small gravel. Some patches of fine sandy loam and coarse sandy loam too small to map have been included with the type.

The areas of the Orangeburg sandy loam occur over much eroded ridges and seldom have a level surface. The largest areas are located northeast and northwest of Boyce and near the Alabama State line, south of Frostbridge. Most of this soil has been allowed to wash and erode and is now cut with gullies and the courses of small streams. Its steep topography and open structure make it well drained. This soil is not representative of the typical Orangeburg sandy loam, as mapped in many other areas, but is rather the rolling phase, also mapped elsewhere.

The type owes its origin to the weathering of a sedimentary stratum of sandy and clayey material covering parts of the uplands. When this material was first brought to the surface by the receding of the Gulf waters it probably presented a much less sandy surface than is now the case. The action of rain water has doubtless removed a considerable quantity of the clay, leaving the sand behind.

In places suitable for cultivation, that is, not too rolling or broken, the type produces very good crops. It is considered a leachy soil and annual applications of commercial fertilizers are necessary to insure profitable results. The type is exceptionally valuable for the production of fruits, melons, and berries. Cotton, corn, sugar cane, and truck crops, such as potatoes and cabbage, do well. Among the fruits peaches and strawberries have given the best results.

A large proportion of this type is at present "lying out," being covered with a growth of grass and scrub oak. The type can be easily built up by applications of the proper kind of fertilizers and by a more scientific method of farming than is now being practiced. The soil is very much in need of organic matter, such as can be advantageously supplied by turning under crops like cowpeas. In handling land so susceptible to the ruinous effects of erosion as this the steeper slopes should be seeded to grass, as Bermuda or lespedeza.

ORANGEBURG FINE SANDY LOAM.

The Orangeburg fine sandy loam consists of a gray or brownish-gray loamy fine sand to light fine sandy loam, 4 to 15 inches deep, underlain by a red friable fine sandy clay. Iron concretions are frequently found scattered over the surface and in a few instances some have been found in the soil and subsoil.

The type is confined to the northwestern part of Wayne County, bordering the Clarke County line, along Taylors Mill Creek and southeast of Boyce.

The topography in the main varies from rolling to hilly. The drainage is uniformly good. In some places where erosion has been

severe long, narrow ridges are formed, down whose sides extend deep eroded gulches. It is only occasionally that level areas of any extent are found. The rolling to hilly areas represent a development of the rolling phase of the Orangeburg fine sandy loam of other areas, not the typical soil, which is a flat to gently rolling type.

The Orangeburg fine sandy loam is derived from an upland stratum of sedimentary sands and clay. Oxidation has probably brought about the bright-red color of the subsoil.

The hilly phase of this type is much lower in agricultural value than the more level areas. At present cotton and corn are the main crops grown, both doing exceedingly well where heavily fertilized. Cotton in good seasons produces from one-fourth to 1 bale and corn ranges from 12 to 35 bushels per acre.

The type is well adapted to truck farming and will make good yields of tomatoes, cabbages, beans, peas, oats, and a number of other vegetables. Sorghum, sugar cane, and fruits also do well. It is especially adapted to the Elberta peach. Very few orchards are now found in the county, but the prospects for large development along this line throughout the county are very promising.

This type, where the surface is not too uneven, is easily handled, responds readily to fertilizers, and is susceptible of great improvement. Adequate tillage methods, the use of winter cover crops to prevent washing, and a systematic plan of crop rotation would make this type a stronger and more productive soil. Much care must be used to check erosion. The steeper slopes should never be plowed, as this only encourages the stripping of the soil by erosion. Bermuda grass will be found very serviceable in holding in place the soil of the steeper slopes.

Present values range from about \$5 to \$25 an acre, prices depending largely on the extent to which erosion has taken place and nearness to markets or shipping points.

RUSTON SAND.

The Ruston sand to a depth of 8 to 24 inches consists of a light-gray to gray loose-textured medium sand. This is underlain to a depth of 36 inches by a yellowish-brown to yellowish-red loamy sand, which becomes more compact with depth.

The type occupies hilly to rolling areas and is thoroughly, often excessively, drained as a result of the incoherent, open structure of the soil and the sloping surface. On account of its tendency to drought the yields are small, though somewhat better where highly fertilized. Naturally the soil is better adapted to peanuts, beans, watermelons, and cowpeas, than to grains or grass, though where

well fertilized with barnyard manure fair yields of corn are obtained, provided the season is not abnormally dry.

This type is found in small areas throughout the county, only a few of them containing more than 25 or 30 acres. Very little of the Ruston sand is in cultivation at present, most of it being covered with a growth of scrub oak and scattering pine.

RUSTON SANDY LOAM.

The Ruston sandy loam to an average depth of about 12 or 14 inches consists of a gray to grayish-brown loamy sand to light sandy loam. The subsoil to a depth of 3 feet or more is a yellowish-red to dull-red friable sandy clay.

This type is found throughout the county in areas of varying sizes, many small patches occurring in large areas of the Ruston fine sandy loam. The topography is rolling to hilly, and the surface is often badly gullied. Drainage is well established. Owing to its hilly character, a considerable proportion of the type can not be cultivated profitably.

The surface soil is lacking in organic matter; only in depressions does the humus content run high. Few leguminous crops are grown and little organic matter turned under. The soil is usually treated with commercial fertilizers. Some farmers mix their own fertilizers, using for corn 100 pounds of acid phosphate and 200 pounds of cottonseed meal and for cotton 200 pounds of phosphate and 100 pounds of meal. These mixtures give good increases in yields. In general the yields are lower than on the Ruston fine sandy loam, owing to the fact that the type is more readily affected by drought. From one-fourth to one-half bale of cotton and 8 to 25 bushels of corn per acre is about the ordinary range. Cowpeas, potatoes, beans, watermelons, and strawberries are crops that do well on this soil.

The natural vegetation consists of oak, pine, and some scrub oak.

At present the type is generally valued at \$3 to \$6 an acre. Where the surface is less sandy and the location nearer the railroad areas sell for \$10 an acre, while the rough, hilly areas can be bought for \$2 or \$3.

RUSTON FINE SANDY LOAM.

The Ruston fine sandy loam to a depth of 6 to 8 inches consists of a gray to grayish-brown loamy fine sand to light fine sandy loam. The subsoil is yellowish-red to dull-red, friable fine sandy clay. The type corresponds very closely in general appearance to the Orangeburg fine sandy loam, except in the lighter red color of the subsoil. The subsoil is not as red as that of the Orangeburg nor as yellow as that of the Norfolk. It also has some of the characteristics of the

Susquehanna fine sandy loam and the Norfolk fine sandy loam subsoil in that it is frequently somewhat plastic and mottled with gray in the lower portion. This is strictly a gradational or intermediate type and in some places it was a difficult matter to draw sharp boundaries, especially between this and the Orangeburg fine sandy loam.

The type covers a larger area than any other soil type in the county. A fair proportion is now under cultivation, much of it having been built up by efficient soil management to quite a satisfactory degree of productiveness. Many areas have been allowed to wash badly, leaving the subsoil exposed or near the surface. Virgin forest covers a considerable total area.

In topography the type ranges from undulating to hilly. The drainage in most cases is good. Where areas are found that are not well drained a slight grayish mottling of the subsoil is readily noted. The soil is derived from the upland sedimentary layer of sands and clays that give rise to the Orangeburg soils.

This soil will produce a great variety of crops. The loose, friable texture makes it a good soil for truck farming. To secure the best results it must be liberally fertilized. A mixture of two parts of cottonseed meal and one part of phosphate is commonly used for corn and the same materials in inverse ratio for cotton. Ordinarily fertilizer applications range from 200 to 300 pounds to the acre. Fields of Ruston fine sandy loam, where highly fertilized and in a good state of cultivation, will easily produce more than 35 bushels of corn and from one-half to one bale of cotton per acre. As much as 125 bushels of corn per acre has been secured with intensive treatment.

Where this type is farmed crop rotations should by all means be practiced. The legumes should be introduced frequently into all rotations, both as a source of needed vegetable matter and nitrogen. Oats can be sown to advantage as a winter cover crop. The smoother areas can be easily built up and put into good agricultural condition by incorporating vegetable matter and by growing the legumes.

Owing to the friable nature of the soil, this type can be cultivated over a wide range of moisture conditions. The badly eroded and washed areas can be reclaimed by proper cultivation, including terracing. The most eroded areas should be seeded to grass.

Peaches and berries do well on this soil, as do also a considerable number of vegetables. Oats, cowpeas, soy beans, sorghum, sugar cane, peanuts, and velvet beans can be successfully grown.

Only about 25 per cent of this type is now in cultivation. It ranges in price at present from about \$3.50 to \$25 an acre. Uncultivated areas are generally covered with a dense growth of broom sedge and carpet grass, which afford fair pasturage.

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

Mechanical analyses of Ruston fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
422109.....	Soil.....	0.4	5.6	8.1	30.2	8.0	36.2	11.2
422110.....	Subsoil.....	1.6	6.0	6.8	25.1	8.6	32.7	19.0

RUSTON GRAVELLY SANDY LOAM.

The soil of the Ruston gravelly sandy loam consists of about 8 inches of a grayish fine to medium loamy sand or light sandy loam. This is underlain by a light or dull-red sandy clay, which continues to a depth of 3 feet or more. Rounded gravel is present on the surface and throughout the soil mass in sufficient quantities to interfere with cultivation. The topography varies from heavily rolling to hilly, and the drainage is good.

Very little of the Ruston gravelly sandy loam is found in Wayne County. Small areas are found in the vicinity of West School and two others north of Reynolds Store. Only a small proportion of the type is under cultivation. It gives fair yields of cotton and corn where well fertilized. Heavy applications of cottonseed meal and phosphate are recommended. The gravelly texture and hilly to rolling topography make this soil better adapted to the growing of fruit than to the production of any crops which require frequent cultivation.

GUIN STONY SAND.

The Guin stony sand consists of a grayish to white, incoherent, medium-textured sand to coarse sand, underlain at 10 inches by a grayish, pale-yellow, or pinkish loamy sand, including occasionally light-red strata. Large quantities of iron-cemented sandstone and platy fragments of conglomerate rocks are scattered over the surface and through the soil. These fragments range from small pieces to chunks a foot or more in thickness. Small patches of varicolored sand, mottled reddish or pinkish, occur here and there throughout the type. Often the subsoil is a sandy clay of a reddish color, and this is seen outcropping in places on the slopes.

The type occurs in Wayne County on steep-sloped, narrow ridges, subject to erosion, and has a rough, broken topography. It is developed in small patches throughout the county and one large body borders the Chickasawhay River on the west side, extending from Goldwood Church south beyond Bethel Church.

None of the type was found under cultivation, and it is generally considered nonagricultural, for the reason that the rough, broken topography, combined with the rock fragments and the open, sandy soil, make profitable farming almost impossible. In its native state it supports a scattering growth of longleaf pine and scrub oak.

In places gulches 40 feet deep have been eroded in the hillsides. In some of these the underlying material was seen to consist of stratified sand of a prevailing coarse texture, and colored white, pink, and red. No gravel was seen, except in places on the surface.

SUSQUEHANNA FINE SANDY LOAM.

The soil of the Susquehanna fine sandy loam is a grayish fine sandy loam, 6 to 10 inches deep. The subsoil consists of red or yellowish-red, heavy plastic clay, usually mottled with gray in the lower part of the profile.

This type is found throughout the area in small, scattered patches from 5 to 40 acres in extent. It is generally characterized by rolling to hilly topography, being found in most cases along or near the crests of ridges, frequently found in areas of Ruston fine sandy loam. Some of the largest areas are situated just east of Big Rock Church, southwest of Clara, near County Line Church, and just west of Bird Creek in the southwestern corner of the county.

Very little of this type is under cultivation, the most of it being covered with pine forests or where recently cut over, with pine stumps and a young growth of scrub oak. The type is not considered a good agricultural soil, owing to the plastic, intractable nature of the subsoil and the low humus content. The areas now in cultivation would be greatly benefited by the growing and turning under of leguminous crops and by applications of burnt lime. Cotton seems to do better than other crops.

SUSQUEHANNA CLAY.

The soil of the Susquehanna clay, which has a depth of about 2 to 5 inches, varies in texture from a brownish-gray fine sandy loam to a stiff red clay. The subsoil is a red to yellowish-red, heavy, plastic clay, showing a pronounced mottling of gray and yellow as the depth increases. The variations in texture of the soil are due to the erosion that has taken place since the type was cleared of forest. When wet the soil becomes soft and sticky, but when moderately dry it becomes tough and tenacious, making cultivation difficult. However, when the moisture conditions are just right this type can be tilled advantageously.

Nearly all of this type is found in the north-central and northeastern parts of Wayne County, where it is locally known as "red

prairie." The topography ranges from hilly to nearly level, the hilly areas having fairly good surface drainage. Owing to its peculiar, heavy, plastic nature, it stays wet for a long time when once saturated.

A large proportion of this type is still covered with longleaf pine, though the forest is being rapidly cleared away by the lumberman. A considerable area is now in recently cut-over lands. At present only a little of the type is under cultivation. With heavy farm equipment and proper cultural methods it can be used for oats and cotton with moderate returns. This soil is fairly well adapted to Johnson grass. Much of it could be used to best advantage for pasturage. It can be bought for \$5 to \$8 an acre.

HOUSTON CLAY.

The soil of the Houston clay consists of a dark-brown to black clay loam to clay. This is underlain at a depth of about 15 inches by a dark-gray to olive-drab or brown, heavy, plastic clay.

The type occupies level to gently rolling country. It is found only in a limited area near Matherville and in the extreme north-eastern part of the county, along the Clarke County line. It is derived from the decomposition of limestone, probably the Vicksburg, and is locally known as "black prairie."

The Houston clay is one of the best agricultural types of the county, but owing to the present inefficient methods of cultivation only fair results are obtained. Most all of this black land is now being worked by negro tenants and renters. The main crops grown at present are cotton and corn. The Houston clay is an excellent soil for alfalfa, of which a little is grown for home consumption. None is shipped from the county. Oats, hay, corn, and most all leguminous crops do well on this soil.

The average price of Houston clay in Wayne County at the present time ranges from \$12.50 to \$15 an acre.

SUMTER CLAY.

The Sumter clay consists of a light-brown or yellowish-brown clay loam to clay, underlain at about 4 or 5 inches by a sticky, plastic, yellow or slightly greenish-yellow clay, mixed with partially decomposed fragments of gray or white limestone. In places these limestone fragments seem to occur in thin layers, 2 to 6 inches thick, in the subsoil. This soil is locally known as "shell prairie."

The Sumter clay has somewhat the structural characteristics of the Houston clay, but the soil contains less organic matter, is lighter in color, not as well drained, and is probably more plastic. With more complete weathering this soil possibly would give rise to the

Houston clay. Both soil and subsoil are usually decidedly calcareous. In spots the soil is almost black. On slopes the type includes a little soil resembling Susquehanna, such material possibly having been derived from clay beds interstratified with the limestone. The topography is flat to gently rolling.

When the type is wet it is very plastic and sticky and hard to cultivate, but under proper moisture conditions it is friable and works into a good tilth. In uncultivated fields during very dry weather the soil bakes and cracks.

The type is derived from the weathering of limestone and calcareous clays or shales of the Vicksburg or Jackson formations, or possibly both.¹

Only a small area of this type was mapped, and this mostly in the vicinity of Matherville and Frostbridge. The timber growth consists principally of oak, hickory, ash, and old-field pine. Areas formerly cultivated now support a heavy growth of grass and a few scattering old-field pines.

Cotton, corn, sorghum, cowpeas, and most of the legumes do exceptionally well on this type of soil, which is calcareous. A few farmers have tried alfalfa, with profitable results where the proper care was given. Ordinarily corn yields from 15 to 35 bushels, cotton from one-fourth to three-fourths bale, oats 20 to 30 bushels, and hay from one-half to 1½ tons per acre. A good growth of alfalfa or melilotus averages about a ton of hay to the cutting per acre, with from two to three or four cuttings a season.

The Sumter clay is an exceptionally good soil for general farming, but of little value for vegetables or fruit. Some areas containing more than the average amount of organic matter have been under cultivation for over 50 years and still produce good yields. Areas where the soil is underlain at shallow depths by the rotten limestone are less productive. Here the content of organic matter is usually low.

A large proportion of this type is left uncultivated under the impression that it is worn out. Proper tillage, deep fall plowing, a cover crop of oats or soy beans during winter, and some leguminous crop turned under would build this poorer phase of the type up to its former condition. The yields of all crops would be greatly increased by a more diversified agriculture, combined with deep and thorough level cultivation, systematic rotation of crops, and drainage.

The price of this type varies considerably with difference in location and other conditions. Its value is advancing rapidly, and the average price at present is from \$12 to \$18 an acre.

¹ See "Cement Materials," Mississippi Geological Survey, 1907.

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.
		<i>Per cent.</i>						
422117.....	Soil.....	2.8	8.3	9.0	26.2	3.7	25.8	23.4
422118.....	Subsoil.....	2.4	8.5	9.2	25.2	3.5	25.7	24.6

The following samples contained more than one-half of 1 per cent calcium carbonate (CaCO_3): No. 422117, 4.81 per cent; No. 422118, 13.18 per cent.

SUMTER STONY CLAY.

The Sumter stony clay consists of a pale-yellow to yellowish-brown loamy clay, 8 inches deep, underlain by a pale-yellow to grayish-white, heavy plastic clay. Limestone fragments from 6 to 15 inches in diameter are found scattered over the surface and throughout the soil.

Most of the type found in the area occupies the slopes and knolls of the uplands bordering the Chickasawhay River bottoms east and southeast of Davis School and along Buckatunna Creek, northwest of Big Rock Church.

Very little of the Sumter stony clay is under cultivation, the large quantity of limestone boulders making it difficult to till. Except for this, the soil is well adapted to cotton, corn, cowpeas, oats, alfalfa, and melilotus. In patches where the stones have been removed and proper drainage exists the yields of cotton and corn are good. In general this soil may be made a desirable one by removing the largest boulders. It may be greatly improved in physical condition by growing leguminous crops, to which, being a calcareous soil, it has a special adaptation.

The type is derived from limestone, with possibly some associated clay or arenaceous shales.

The timber growth consists of gum, hickory, oak, and scattered pines.

This is not considered a valuable farming soil, and may be bought for \$3 to \$5 an acre.

Below are given the results of mechanical analyses of samples of the soil and subsoil of the Sumter stony clay:

Mechanical analyses of Sumter stony clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
422139.....	Soil.....	6.3	10.7	7.4	10.5	5.9	26.5	32.9
422140.....	Subsoil.....	.4	1.1	2.7	8.9	9.8	32.0	45.1

OCKLOCKNEE FINE SANDY LOAM.

The Ocklocknee fine sandy loam consists of a light-brown to brown fine sandy loam, grading at 8 to 12 inches into a brownish fine sandy clay, often mottled with grayish or rusty brown colors. With increase in depth the subsoil generally becomes heavier, more plastic and more mottled.

Only a very small area of this type is found in the county, most of it being located in the first bottoms of the Chickasawhay River, west of Winchester, and along Eucutta and Buckatunna Creeks. The Ocklocknee fine sandy loam is strictly an alluvial soil, being formed by deposition of material by the streams along which it occurs. The type is usually overflowed every year. It is considered one of the most fertile bottom-land soils of the area.

Where high water does not interfere, fine crops of cotton and corn can be grown. Under normal conditions of rainfall as much as 40 to 60 bushels of corn can be produced and 1 bale of cotton to the acre is not considered an unusual yield. At present very little fertilizer is used on this type and the organic matter in the soil is being exhausted. Phosphoric acid is needed to hasten maturity, especially in the case of cotton. Late cabbage and tomatoes can be successfully grown. A good drainage system is necessary to insure the best results.

OCKLOCKNEE CLAY.

The Ocklocknee clay to a depth of 6 to 15 inches consists of a brown silty clay loam to silty clay, often faintly mottled with rusty or dingy brown. The subsoil is a light-brown, somewhat plastic clay or silty clay, usually mottled with rusty brown iron stain. The soil of some areas is almost black. The texture in such places is usually a heavy stiff clay.

Typical areas of this soil are found along the Chickasawhay River, near West King Junction, along Dry Creek where it joins Buckatunna Creek, and in the fork formed by the union of Buckatunna Creek with the Chickasawhay River.

The Ocklocknee clay is of recent alluvial origin and occupies the first bottoms, the larger proportion of its area being flat and rather poorly drained and subject to overflow. Owing to the imperviousness of the clay subsoil, especially in areas having a stiff black clay soil, underdrainage is poor and crops are apt to suffer from excess moisture during wet periods. Much of this type is intersected with old sloughs, which hold water for weeks and even months after overflows. During the summer months overflows are rare and the type becomes dry, often cracking open from loss of moisture. The river channel is usually deep enough to permit sufficient fall for artificial drains. Deep canals or broad open ditches leading to the river will

in most cases drain large areas of this type and make it profitable for cultivation.

The Ocklocknee clay is considered a very fertile soil, being capable of producing a bale of cotton to the acre under favorable conditions, without the application of commercial fertilizers. Corn, sorghum, lespedeza, and Johnson grass would do well. At present only a very small proportion of this type is under cultivation, most of it being covered with a dense growth of forest and underbrush. As the county becomes more thickly populated more of this type will be put under cultivation. It can be bought for \$5 to \$8 an acre.

THOMPSON FINE SANDY LOAM.

The Thompson fine sandy loam, locally called "gallberry flats," is a grayish-brown fine sandy loam. This is underlain at a depth of from 6 to 15 inches by a yellow fine sandy clay, usually mottled with gray and yellowish-brown colors. The subsoil in many cases is somewhat plastic, having at a depth of from 20 to 25 inches a rather impervious layer resembling the compact subsoil ("hardpan") of the Bibb soils.

The type is derived from recent alluvium and occupies the first bottoms of streams where overflows are frequent.

Very little of the Thompson fine sandy loam is under cultivation, most of it being covered with a dense growth of longleaf pine. The type in its natural condition is poorly drained and supports a dense growth of native grasses, such as sedges and carpet grass.

The Thompson fine sandy loam is typically developed along the first bottom of Thompsons and Little Thompsons Creeks, Piney Woods Creek, and Big Creek, being badly in need of drainage. Proper drainage can be effected by the use of open ditches or possibly by breaking up the compact subsoil with dynamite. Most of the big streams found throughout the county have cut deep channels, and drainage by means of open ditches is feasible.

The type in its native state has been found to produce good crops of rice. When properly drained and humus added to the soil good crops of corn, cotton, sugar cane, and oats can be grown. It is not well suited for early crops.

THOMPSON SAND.

The Thompson sand is a light-gray to nearly white sand, in places grading below into a grayish-brown sand. Small pockets of coarse and fine-textured sand are sometimes found intermingled with the medium sand, owing to variation in velocity of the current by which it was deposited. The type really represents river wash in places. It occurs in the first bottom of the Chickasawhay River and Bucka-

tunna Creek, is alluvial in origin, and is subject to overflows of long duration.

None of this type was found under cultivation. It is generally covered with a dense growth of scrub oak and gallberry bushes. Two of the largest areas in the county lie along Buckatunna Creek, just east of Buckatunna, and along the Chickasawhay River, southeast of Chicora.

This type is very deficient in humus. Owing to its small extent and frequent unfavorable situation, it is of little importance.

A mechanical analysis of a sample of soil gave the following results:

Mechanical analyses of Thompson sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
422145.....	Soil.....	0.0	1.4	10.7	75.4	8.3	2.7	1.5

THOMPSON SILT LOAM.

The Thompson silt loam consists of a grayish-brown to light-brown silt loam, underlain at 6 to 10 inches by a yellow silt loam, which grades below into a silty clay loam. The subsoil, especially the lower portion, is usually mottled with gray or shades of yellow and brown.

This soil is typically developed in the first bottoms of streams. The most important area is the one on Thompsons Creek, near the Perry County line. Only a very small area of this soil was encountered, and it is consequently of little importance here.

None of the Thompson silt loam mapped is under cultivation, most of it being either covered with a dense growth of grass or forested with longleaf pine. Overflows are frequent. It is an excellent type for pasturage. When well drained it will produce good crops of corn, oats, grass, and forage. Cotton is apt to mature too late to be profitable under prevailing boll-weevil conditions.

MEADOW.

The Meadow in Wayne County comprises all the low-lying, flat, and swamp areas found bordering streams and "slashes." The type is extensively developed around the headwaters of Big Creek, Thompsons and Little Thompsons Creeks, and most of the streams that rise in the county.

None of the areas mapped as Meadow were found to be in cultivation. As a general rule all of the Meadow areas contain a large quantity of decayed vegetable matter, but owing to the poor drainage the type in its present condition can be classed largely as a non-agricultural soil.

A phase of Meadow found locally is formed by material washed from the valley slopes, and thus, at least in part, is colluvial. The areas of this phase are generally covered with switch cane, gallberry bushes, and a dense growth of water-loving grasses, producing excellent pasturage both in winter and summer.

Large areas of Meadow could be reclaimed by clearing out the streams and leading ditches into them.

When cleared and well drained, Meadow will produce large yields of lowland rice, in addition to the more commonly grown farm crops of the region.

CAHABA LOAMY SAND.

The Cahaba loamy sand consists of a grayish-brown to light-brown fine to medium loamy sand, underlain at about 10 inches by a brown to dark-brown or reddish-brown sticky sand, which grades into a brown or reddish-brown sandy loam at about 30 inches.

The type is closely associated with the Cahaba fine sandy loam, and, like it, occupies the flat stream terraces lying above normal overflow along the Buckatunna Creek and Chickasawhay River. It represents weathered material which was deposited by overflow water when the streams were flowing at higher levels.

This type was originally forested with magnolia, beech, gum, water oak, red oak, and pine, but a large proportion is now cleared and under cultivation.

Cotton and corn are the principal crops. The yields of cotton are light and those of corn only fair. From one-fourth to three-fourths bale of cotton and from 10 to 25 bushels of corn per acre can be made when the land is well fertilized and the season favorable.

The type seems well adapted to pecans and the few pecan grooves found in the area were doing exceptionally well. Watermelons, sweet potatoes, peanuts, cowpeas, and early vegetables make good yields. Grapes do well, though very few are produced in the county. Sugar cane and sorghum are two profitable crops on this type. The sugar cane yields from 350 to 600 gallons of sirup per acre and sorghum from 200 to 350 gallons. The sugar-cane sirup finds a ready market in Waynesboro at prices ranging from 50 to 75 cents a gallon, while the sorghum sirup is mostly used for home consumption. Many of the farmers grow sorghum for feed and stock eat it readily. Where animals are not accustomed to it care must be taken not to feed too much.

The Cahaba loamy sand is easily built up by the turning under of green crops, heavy applications of barnyard manure, and by practicing a rotation of crops.

This type rents for \$2 and \$3 an acre and has an average selling price of about \$10 an acre.

CAHABA FINE SANDY LOAM.

The Cahaba fine sandy loam consists of a grayish-brown to light-brown fine sandy loam, underlain at 6 to 14 inches by a light reddish-brown, friable heavy fine sandy loam to fine sandy clay.

This type is extensively developed in the second bottoms of the Chickasawhay River and Buckatunna Creek. The color of the surface material is often determined by the position of the area, the poorer drained lower levels and depressions showing a dark grayish color in the soil, while the more elevated areas show varying shades of brown, denoting better drainage.

The Cahaba fine sandy loam is derived from the older alluvial deposits of the large streams. Although it occupies a position called second bottom, it is sometimes overflowed in places during times of exceptionally high water. This type is considered a very well drained soil, the structure being sufficiently porous to permit a rather free percolation of water.

A small proportion of the area of this soil is still in forest, being covered with maple, white oak, post oak, longleaf and other pines, and gum. Most of the type is now under cultivation, being farmed to a great extent by negro tenants. As a general rule the Cahaba fine sandy loam is a friable soil, easily handled, retentive of moisture, responds readily to fertilizers, and offers possibilities for a wide diversification of crops. When properly managed it has a high productiveness.

In Wayne County the type is used chiefly for the production of cotton and corn, giving yields of one-fourth to three-fourths bale of cotton and from 10 to 30 bushels of corn per acre with applications of 200 to 400 pounds of the ordinary grades of commercial fertilizer. It can be made an excellent truck soil by proper treatment, producing fine watermelons, strawberries, cabbage, beans, cucumbers, and eggplants. Sugar cane, oats, apples—summer varieties—peaches, and pecans are also successfully grown.

The Cahaba fine sandy loam is deficient in organic matter. Stable manure would be the best material for the upbuilding of this soil, but the supply is inadequate. A leguminous crop, such as cowpeas or soy beans, plowed under every two or three years will keep up a sufficient supply of vegetable matter.

This type of soil can be bought at prices ranging from \$10 to \$20 an acre.

Cahaba fine sandy loam, high-terrace phase.—The Cahaba fine sandy loam, high-terrace phase, consists of a reddish-brown or light-brown fine sandy loam to loam, underlain at 4 to 10 inches by a red friable fine sandy clay, extending to a depth of 36 inches or more.

The surface soil has occasionally a brownish tinge and is usually slightly darker in the first few inches than below.

Areas of this phase of the Cahaba fine sandy loam occupy the highest terrace in the county on the east side of the Chickasawhay River, extending as a benchlike formation from northeast of West King to east of Boyce. Other areas are found north and northeast of Waynesboro, the largest occurring as a flat in the forks of the Chickasawhay River and Buckatunna Creek.

This phase resembles the Orangeburg fine sandy loam in color, texture, and structure. It differs, however, in its flat terrace topography and in having been more recently deposited. The terraces on which it is developed stand well above any possible overflow under present-day conditions. On account of the thorough aeration consequent to good drainage, oxidation has reached an advanced stage and given a much brighter red color to the subsoil than is usual in case of the typical soil. Since the Orangeburg fine sandy loam stands at higher levels and has been subject to oxidation for a longer period it is possible that its material is even more completely oxidized than that of this type. Whatever the similarity of the two soils the topographic position and comparatively recent alluvial origin is at present considered sufficient grounds for differentiating this soil from the Orangeburg fine sandy loam of the uplands proper. Locally the type is called "red flats."

The surface drainage of the Cahaba fine sandy loam, high-terrace phase, is good, and the rather loose, open structure permits the ready absorption of moisture and puts the soil in an excellent condition for plowing immediately after rain. The timbered areas are forested chiefly with oak, hickory, and some pine.

The Cahaba fine sandy loam, high-terrace phase, is adapted to many of the crops grown in this section. Berries, certain varieties of grapes, figs, and summer apples are grown. Peaches are the principal fruit crop, however, and do very well. Cotton and corn are the leading crops, and when fertilized good yields are obtained. The former yields from three-fourths to one bale and the latter from 20 to 50 bushels per acre. Oats, soy beans, sorghum, and sugar cane are satisfactory crops. A few farmers use oats as a winter cover crop, following with corn or cotton in the spring, with good results. Wheat also gives fair yields with proper tillage, but very little is grown in the county.

With adequate tillage, the use of winter cover crops, and systematic crop rotations, including winter cover crops and a legume to be plowed under every two or four years, the productiveness of this soil could be greatly increased.

The high-terrace phase sells for an average price of \$15 an acre.

The following table shows the results of mechanical analyses of typical samples of the soil and subsoil of the Cahaba fine sandy loam and of the high-terrace phase:

Mechanical analyses of Cahaba fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
Typical:		<i>Per cent.</i>						
422125.....	Soil.....	0.1	1.5	12.2	49.5	2.4	22.9	11.2
422126.....	Subsoil.....	.0	1.7	13.6	43.6	1.5	15.1	24.3
High-terrace phase:								
422123.....	Soil.....	.2	3.4	12.9	26.6	3.7	36.9	16.1
422124.....	Subsoil.....	.1	2.7	10.5	21.5	2.8	36.1	26.1

CAHABA CLAY.

The Cahaba clay to a depth of 5 inches consists of a light-brown to brown silty clay loam to silty clay. This is underlain by a reddish-brown or chocolate-brown clay of a somewhat plastic structure, though slightly friable when dry.

The type is of alluvial origin, being found in the second bottoms of the Chickasawhay River. It stands above normal overflow, but is inundated during periods of exceptional high water. The largest areas lie west of Winchester, west of Robinson Junction, and north-west of Battle Flag Station.

Only a very small area of this type is found in the county. About 50 per cent of it is under cultivation. It is naturally a strong soil and gives good crops without the use of fertilizers. Phosphate carriers would probably increase the yields and lime should be applied following drainage. Cotton and corn are the only two crops grown on this type at present, both giving good results. Oats, cowpeas, and vegetables will also do well.

Cotton yields from one-fourth to three-fourths bale to the acre, and where heavily fertilized and well worked sometimes produces a bale or more. The average production of corn is about 20 bushels per acre.

This type can be bought at prices ranging from \$7 to \$15 an acre.

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

Mechanical analyses of Cahaba clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
422135.....	Soil.....	0.4	1.9	1.8	4.8	4.2	59.4	27.2
422136.....	Subsoil.....	.0	.2	.4	1.9	2.3	42.7	52.4

KALMIA SAND.

The surface soil of the Kalmia sand consists of a light-gray to yellowish-gray, loose, incoherent, medium to fine sand. The subsoil is a pale-yellow sand of about the same texture as the surface. The material is fairly uniform to a depth of 3 feet or more.

This type was found only in small areas, being typically developed on the second bottoms and occurring as isolated slight ridges standing above normal overflow in the stream bottoms.

It is alluvial in origin and owing to its sandy, porous nature becomes very droughty during dry seasons. It is of little agricultural value, most of it being covered with scrub oak and a few scattering pines, and gallberry bushes.

KALMIA FINE SANDY LOAM.

The soil of the Kalmia fine sandy loam consists of a grayish-brown fine sandy loam, 6 to 8 inches deep. This is underlain by a yellow, slightly plastic fine sandy clay, mottled with drab, gray, and shades of yellow and brown. In some cases the mottling resembles iron oxide stains.

The Kalmia fine sandy loam occurs as a high terrace with fairly good drainage. It is developed around Waynesboro and also in a belt from Winchester to north of Buckatunna along the Chickasawhay River. Only a small proportion of the type is now in cultivation. Along the Alabama State line east of Frostbridge a belt of well-drained Kalmia fine sandy loam resembling somewhat the Norfolk fine sandy loam in material characteristics was found, part of it being in cultivation and the rest being in forest of virgin pine.

With drainage and proper management the Kalmia fine sandy loam can be made quite a productive soil. One farm near Lucas Ferry, where an adequate drainage system has been installed, is growing excellent crops of cotton and corn.

The main stream channels along which this type is found are deep enough to provide good drainage. The brush and logs should first be cleared from the stream courses and lateral drains or ditches run across the fields. Care should be taken to obtain the proper fall. Tile drains in this soil are not necessary, as the coherent nature of the soil enables the ditch banks to stand for years.

Where the soil has been in constant cultivation, with good drainage, it loses some of its gray and yellow colors and assumes more a brownish color, the mottling appearing only in the lower depths.

This soil is largely deficient in nitrogen and organic matter. Heavy applications of cottonseed meal and barnyard manure will be found beneficial in supplying the deficiency. Cowpeas do well and improve the soil by supplying needed organic matter and adding

nitrogen. A crop should be plowed under occasionally. Cotton, corn, oats, sugar cane, and cowpeas do well on this type. Rice also has been successfully grown.

The Kalmia fine sandy loam can be bought for \$10 to \$15 an acre.

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

Mechanical analyses of Kalmia fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
422143.....	Soil.....	0.2	0.4	6.8	47.3	14.0	19.1	12.1
422144.....	Subsoil.....	.0	.6	8.2	44.9	12.0	17.1	17.1

KALMIA SILT LOAM.

The soil of the Kalmia silt loam consists of a grayish-brown to light-brown silt loam, about 6 to 10 inches deep. The subsoil is a silty clay loam of a yellowish or yellow color, mottled with gray. This frequently grades below into a heavier material, usually silty clay of a rather plastic structure.

The type is developed along the streams on the second bottoms or terraces occupying a position above overflow. The most important area is the one on the Chickasawhay River, near West King Junction. Smaller areas are developed along Dry and Cypress Creeks.

With proper treatment the type gives good results with corn, forage crops, and oats. It would probably also produce good crops of peanuts and Irish potatoes.

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

Mechanical analyses of Kalmia silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
422121.....	Soil.....	0.3	1.3	1.4	7.3	12.3	60.9	16.1
422122.....	Subsoil.....	.4	1.5	2.5	11.4	12.6	52.8	18.1

SUMMARY.

Wayne County, situated in the southeastern part of Mississippi, has a total area of 524,800 acres, or 820 square miles. The surface is in general rolling to hilly, with some level country, known locally as "Flats," situated on the east bank of the Chickasawhay River and along the Buckatunna Creek.

Waynesboro, the county seat, is located on the Mobile & Ohio Railroad, 52 miles from Meridian and 83 miles from Mobile. The Mobile & Ohio Railroad traverses the county from north to south.

There has been little recent immigration and the present inhabitants are mainly the direct descendants of the first settlers, who came principally from North and South Carolina.

The agricultural development of the area has been slow. It is improving, and much of the cut-over land is being converted into farms. A considerable area of the bottom land must be drained before it can be placed in cultivation.

In the southwestern part are found large areas of virgin longleaf pine, held by lumber interests, and lumbering and the gathering of turpentine are the two principal industries. A large proportion of the population is engaged in some phase of these industries.

Cotton is the most important crop. Corn is grown extensively, but a majority of the farmers do not produce enough for their own needs. The more progressive are beginning to grow enough hay, oats, and corn for the support of their stock. Very little fruit or truck is grown, although there are soils in the county admirably adapted to this kind of special-crop farming.

The agricultural methods in use are inadequate. At present very little attention is paid to the methods of cultivation and to the use of labor-saving implements. There are many farms throughout the county where modern farming machinery could be used to great advantage.

The county has a great diversity of soils, 27 types in all being recognized. These fall naturally into three general divisions—the upland soils, bottom-land soils, and prairie soils. Under the first division come the Norfolk fine sandy loam, Norfolk sand, Orangeburg fine sandy loam, Orangeburg sand, Orangeburg sandy loam, Guin stony sand, Susquehanna clay, Susquehanna fine sandy loam, Ruston fine sandy loam, Ruston sand, Ruston sandy loam, and Ruston gravelly sandy loam. The second division includes the Ocklocknee fine sandy loam, Ocklocknee clay, Cahaba fine sandy loam, Cahaba clay, Cahaba loamy sand, Kalmia fine sandy loam, Kalmia silt loam, Kalmia sand, Thompson fine sandy loam, Thompson silt loam, Thompson sand, and Meadow. In the third division are placed the Houston clay, Sumter clay, and Sumter stony clay.

The Ruston fine sandy loam and Norfolk fine sandy loam are the most extensive types. With proper farming these two types may be considered two of the best all-round agricultural soils in the county.

[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.]

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