SOIL SURVEY OF OUACHITA PARISH, LOUISIANA.

By THOMAS D. RICE.

LOCATION AND BOUNDARIES OF THE AREA.

Ouachita Parish occupies a central position in north Louisiana. It is included within parallels 32° 14′ and 32° 42′ north latitude and 91° 50′ and 92° 23′ longitude west from Greenwich. The parish is irregular in shape and contains approximately 640 square miles, of which

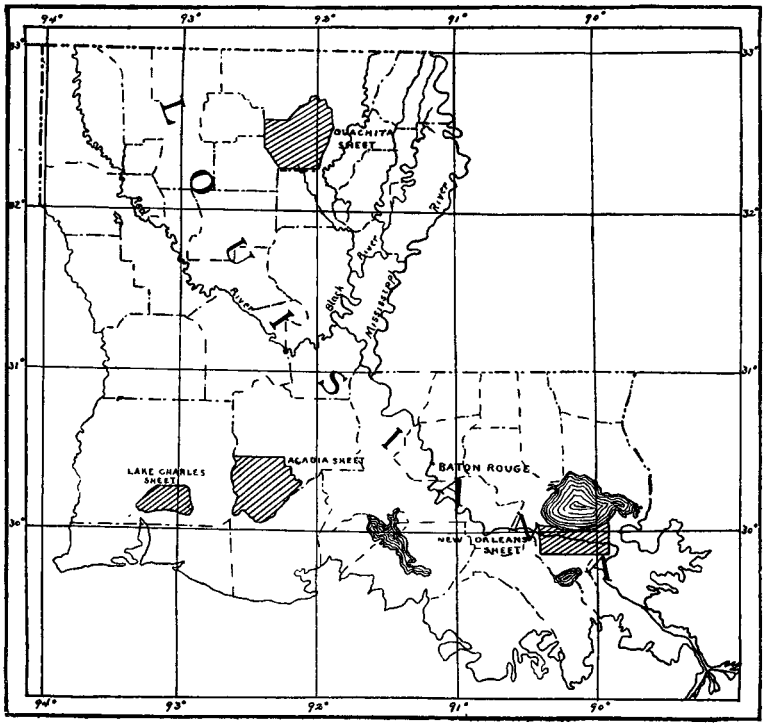

FIG. 18.—Sketch map showing location of the Ouachita Parish area, Louisiana.

about 605 is land surface. The greatest distance from east to west is 29 miles and from north to south 31 miles. Both natural boundaries and the lines of the public land surveys have been utilized in describing the perimeter of the parish. The public land lines have been followed on the south and west. The Ouachita River divides

the parish from north to south and forms the boundary for short distances at both extremities. One of its tributaries, the Choudrant, forms part of the northern boundary west of the river, while the Bayou Lafourche, a former stream channel, forms the northern boundary on the eastern side and extends around the entire eastern side of the parish as its boundary.

Ouachita Parish contains a population of more than 21,000. Monroe, a town of 7,000 inhabitants centrally located on the Ouachita River, is the seat of parish government and the principal market.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

The whites made small advances in agriculture during the eighteenth century. In 1769 Louisiana passed from the French to the Spanish dominion. One of the Spanish governors, Baron de Carondelet, was very desirous to grow wheat in the colony and granted large tracts of land, in what is now the northern part of the State, for that purpose. One of the colonies was located at Trenton, about a mile north of the present town of West Monroe. As might be expected from the nature of the soil and climate, the attempts ended in failure, but the settlers remained and cultivated the rich river bottoms. After Louisiana was returned to the French and sold by them to the United States, settlers poured in rapidly from the older States, especially from Georgia and South Carolina, and about the same time cotton became the great crop of this section.

During the latest period of low prices for cotton, lasting several years, the planters became almost bankrupt, but since higher prices have been realized this class is again prosperous.

CLIMATE.

Within the limits of this survey weather records have been kept at Monroe in the low-river lands and at Calhoun in the hill country. The observations taken at these places indicate a warm but temperate climate with no excesses either of heat or of cold. The growing season is long and uniformly warm, but days of oppressive and dangerous heat are not known. Frosts occur frequently in the winter months, but the cold waves are of short duration and a temperature as low as zero is rarely reached. The average temperature at Monroe is nearly 3° warmer than that at Calhoun, which is accounted for in part by the greater elevation by over 100 feet at Calhoun.

The rainfall of this area is unfortunately not very well distributed. During the months of January, February, and March there is apt to be an excessive rainfall, which floods the lowlands and hinders the early spring planting, while continued droughts are not uncommon in the months of July, August, and September. Droughts during these

months are not so detrimental to the cotton crop as they would be to other crops in case of a system of diversified farming.

The following table, compiled from the records of the Weather Bureau, shows the normal temperature and precipitation at Monroe and Libertyhill and the averages for four years at Calhoun:

Normal monthly and annual temperature and precipitation.

Month.	Monroe.		Libertyhill.		Calhoun.[a]	
	Temperature.	Precipitation.	Temperature.	Precipitation.	Temperature.	Precipitation.
	°F.	*Inches.*	°F.	*Inches.*	°F.	*Inches.*
January	47.5	4.98	47.9	5.41	45.2	4.82
February	50.2	4.10	50.3	3.69	49.7	3.53
March	57.3	5.17	57.4	5.65	58.6	4.54
April	66.5	4.71	66.4	4.90	62.3	4.65
May	73.8	3.53	73.4	3.11	72.7	2.26
June	79.7	5.09	79.8	5.80	79.2	5.37
July	82.5	4.37	82.7	4.33	81.6	3.99
August	81.5	3.32	82.2	2.88	81.6	2.45
September	77.4	2.30	76.8	2.52	75.3	2.84
October	65.2	2.58	67.7	3.23	65.7	3.04
November	55.5	4.38	55.8	4.51	43.2	3.21
December	50.2	3.98	50.2	1.67	42.8	2.51
Year	65.6	48.51	65.9	47.70	63.1	43.21

[a] Figures given for this station are averages for four years.

The healthfulness of a country is one of its greatest resources, and no locality can expect desirable immigrants which has an unpleasant or dangerous climate. Ouachita Parish, in common with the State of Louisiana as a whole, has suffered from outside reports of its unhealthfulness. Such a general condemnation is unjust and unsupported by the facts, for the healthfulness of Ouachita Parish is conceded by all who have settled within its borders. The dangerous tropical disorders are unknown here, and, notwithstanding the large swamp areas, malaria is not dreaded. The infrequent cases which appear yield readily to simple remedies. When the least precaution is taken even the lowlands are as healthful as any part of the country. The impression prevails in the hill country of the parish that the river lands are not as healthful as the hills, but the facts are just the opposite, because the dweller on the alluvium gives more attention to the source of his drinking water—cistern water being used. If the people on the higher lands would use more care in this important matter, the epidemics of typhoid which sometimes prevail there might be entirely avoided.

PHYSIOGRAPHY AND GEOLOGY.

The whole of Ouachita Parish lies within the Gulf Coastal Plain of the United States. This physiographic division consists of a vast body of gravels, sands, and clays which at one time formed the floor of the

Gulf of Mexico, and which has reached its present state of development after ages of alternate elevation and depression. Since the final emergence of this region from the Gulf the agents of erosion and deposition have been actively modifying its surface features. In Ouachita Parish the entire eastern side of the area has been covered by deposits from the Ouachita and Mississippi rivers.

There are, therefore, two physiographic divisions in Ouachita Parish. West of the Ouachita River is a large expanse of upland which extends nearly across the northern part of the State. In this area the drainage is toward the Ouachita River, through its tributaries, the Choudrant and the Cheniere au Tonare. These streams and their smaller branches have cut out fairly deep valleys and left the land in long hills and ridges. As usual with such a topography, the hilltops frequently present considerable areas of comparatively level land. The soils here are sandy clays, which have been described under the names Orangeburg fine sandy loam and Lufkin clay. There are also occasional small sandhills which have been classed with the Norfolk fine sand. This upland formation was for a long time thought to belong to the Lower Claiborne; but Harris has recently referred the eastern part, which includes Ouachita Parish, to a later formation, the Cocksfield Ferry beds.

The second division comprises the valley of the Ouachita River. The river is only slightly above base level, as is indicated by its meandering in its flood plain and by cut-off islands and distributary channels. Such a channel is the Bayou Lafourche, which leaves the river and, subdividing, forms the eastern boundary of the parish. The alluvial area inclosed by this bayou may be subdivided into three classes of material: Sandy loam, silt loam, and clay. The sandy loam forms a border along the river and its channels, with its highest elevations near the river and the drainage back toward the lower lying bayous. This material, mapped as the Monroe fine sandy loam, is the most desirable farming land of the area. Back of this formation there is a large part of the eastern side of the parish which is subject to inundation when certain levees break along the Mississippi or Ouachita River during periods of high water. This overflow is gradual and long continued, so that a still-water deposit is laid down. This is the origin of the clay soils, and the difference between these and those of the river front illustrates the sorting power of water. When the river overflowed its banks and the water could spread out, the current was checked, its carrying power enormously decreased, and the materials carried in suspension were unloaded. The sands were quickly dumped along the river bank, building up an elevation of sandy loam. The finer materials which could remain for some time in suspension were carried farther back and laid down undisturbed. The type so formed has been called Sharkey clay.

The origin of the silty loam may not be so easily explained. This soil occupies a considerable area of higher land in the northeastern part of the parish. It is a yellow, sandy loam, containing much silt, with a silty clay subsoil. Its appearance suggests the loess farther east. The silt loam of the Bayou Macon hills is thought by Harris to be the southern representative of the typical loess so strikingly developed about Vicksburg.[a]

The following scheme shows the relationship between the various geological formations of this region and the soils:

Period.	Formation.	Soil type.
Pliocene and Recent	Alluvium	Sharkey clay.
		Monroe fine sandy loam.
		Myatt fine sandy loam.
	Port Hudson	Monroe silt loam.
	Lafayette (?)	No representation.
Oligocene	Grand Gulf	No representation.
	Vicksburg	
Eocene	Jackson	No representation.
	Cocksfield	Orangeburg fine sandy loam.
		Norfolk fine sand.
	Lower Claiborne	Lufkin clay.

SOILS.

The soils of Ouachita Parish have been classified into eight types, including Meadow. The several types usually occupy large, uniform, and well-defined areas. The greatest difficulty encountered in the mapping of these soils in the winter and early spring was to determine the character of the lowlands that were overflowed.

The following table gives the names of the types with the areas occupied by each:

Areas of different soils

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Orangeburg fine sandy loam	172,800	44.6	Myatt fine sandy loam	8,064	2.1
Monroe fine sandy loam	86,272	22.3	Norfolk fine sand	192	0.0
Sharkey clay	67,264	17.4	Lufkin clay	64	0.0
Monroe silt loam	39,232	10.1	Total	387,328	
Meadow	13,440	3.5			

ORANGEBURG FINE SANDY LOAM.

The Orangeburg fine sandy loam is the most extensive soil type found within the borders of Ouachita Parish. The top soil consists of a loamy gray or brown fine sand with an average depth of 10 inches. The size of the sand grains may be described as ranging from fine to medium. The subsoil is a yellow or red sandy clay with a depth of

[a] The Tertiary geology of the Mississippi Embayment. 1892. p. 37.

more than 3 feet. The subsoil has not the deep-red color which this type usually has, and in this respect is a slight departure from typical Orangeburg sandy loam. There are a few local variations in this type which are not extensive enough to be classed as separate types, but are worthy of consideration. The most important of these is where the overlying sandy layer is entirely absent and the red sandy clay comes to the surface. This phase is presented in small patches near the Ouachita River and on the experiment farm at Calhoun. The latter area comprises about 8 acres, and in the report on crop experiments it is referred to as the "red land." There is another phase near Myatt in which the sand in both soil and subsoil is coarser, but otherwise there is no departure from the general characteristics of the type.

The Orangeburg fine sandy loam stretches over the entire western side of the parish, broken in its extent only by narrow strips of Meadow and a few spots of Lufkin clay.

The fairly rapid erosion of this soil has produced its characteristic topography, a continuation of which extends over a large part of northern Louisiana. This topography consists of a broken, hilly country, with the hills usually lengthened into ridges. There is no perfectly level land, and the nearest approach to it is found on the tops of the ridges.

The Orangeburg fine sandy loam, as might be expected of a soil occupying such a topography, is well drained. The larger streams, the Choudrant and the Cheniere, are the outlets for scores of smaller streams, which have their origin in springs in the hills. The rainfall runs off immediately, and washing and gullying take place so rapidly that straight rows or regularly shaped fields are an impossibility. The Orangeburg fine sandy loam belongs to the Gulf Coastal Plain deposits.

Harris, in the Report of the Geological Survey of Louisiana, 1902, accounts for the origin of this formation as follows: "Lagoon or swamplike conditions prevailed over the upper portion of the Embayment area during the lower portion of Eocene times while the Cocksfield beds were being laid down, these conditions evidently prevailed over regions farther south, even in central Louisiana and Mississippi. The result is that over the marine Lower Claiborne beds of Louisiana came lignitic sands and clays, having a thickness of perhaps 400 or 500 feet where well developed." Since the elevation of the land from these conditions the surface has undergone considerable modification from the agencies of erosion, and the difference between soil and subsoil has been brought about by the ordinary processes of weathering and sorting.

The Orangeburg fine sandy loam, while it may not be rich in available plant food, is physically adapted to the cultivation of cotton and truck except in one important respect, viz, its very low power of

retaining moisture. Even short droughts in summer months are likely to cause poor crops. Because of this fact the utmost care must be taken in the tillage of this soil to apply those methods of treatment and fertilizers which are calculated to conserve the water supply. This failure of the soil to retain moisture almost precludes the possibility of cultivating, with any success, tobacco and other crops which demand a considerable amount of moisture during the summer months. Cotton, the plant most resistant to drought, is no doubt the crop best adapted to this soil. In this region fair crops of cotton have been grown without a good rain from the time of planting to harvesting.

The North Louisiana experiment station is located on this type of soil, and the results which have been obtained should be of interest to every farmer who has to meet the difficulties incident to the management of this particular type. It is of importance that alfalfa has been successfully grown at the experiment station. The drought-resisting power of this legume is wonderful. With the present high prices both for beef cattle and dairy products the growing of alfalfa and other forage crops should be encouraged. Industries might be opened up which would be more pleasant and profitable than the production of cotton, consuming as it does almost the entire year and requiring the labor of the entire family during several months of this time.

In favorable seasons and under careful cultivation surprisingly larger yields than the average may reward the farmer. Forty bushels of corn have been grown, but the average under indifferent methods is from 10 to 20 bushels per acre. Cotton yields one-third to one-half bale on an average, but under good cultivation the yield is three-fourths of a bale. These two crops, with a small but yearly increasing production of cowpeas, make up the agricultural interests of this soil. Potatoes and truck do well, and it is surprising that the farmers do not take advantage more generally of the great demand and high prices which prevail for these products in the local markets. One progressive farmer near Okaloosa, who is too far from the markets to dispose of more perishable truck, clears enough each year on a small patch of potatoes to pay his household expenses for the year.

Not one-fourth of the hill country is cleared, and still less is at present under cultivation. The uncleared land supports a heavy growth of pine and hardwood forest. Near the railroad the sawmills are rapidly removing this timber, but in the southern part of the parish large, inaccessible tracts are at present untouched. In this region the splitting of rough barrel staves from the abundant oak is a favored industry during the winter months. These staves are rafted to New Orleans, where they find a ready market.

The following analyses show the mechanical composition of the Orangeburg fine sandy loam:

Mechanical analyses of Orangeburg fine sandy loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8584	Sec. 10, T. 17 N., R. 2 E.	Sandy loam, 0 to 8 inches.	0.40	0.02	0.20	2.16	69.56	8.30	16.32	3.32
8582	Sec. 12, T. 16 N., R. 2 E.	Brown loamy sand, 0 to 9 inches.	.61	.06	.12	.90	68.32	10.60	16.08	3.82
8580	Sec. 1, T. 16 N., R. 1 E.	Loamy sand, 0 to 8 inches.	1.81	.18	.36	.60	49.98	10.56	31.94	6.00
8581	Subsoil of 8580....	Red sandy clay, 8 to 36 inches.	.43	.00	.04	.30	36.70	7.84	36.18	18.94
8583	Subsoil of 8582....	Red sandy clay, 9 to 36 inches.	.35	.04	.10	.62	58.22	7.84	12.80	20.08
8585	Subsoil of 8584....	Red sandy clay, 8 to 36 inches.	.37	.04	.06	1.16	54.30	5.50	9.60	29.04

LUFKIN CLAY.

The soil of the Lufkin clay, to a depth of 8 inches, consists of a gray sandy loam, somewhat heavier in texture than the soil of the Orangeburg fine sandy loam. The subsoil is usually a tough, impervious brown clay, passing into a white silty clay loam at lower depths.

This type occurs in small areas, generally along stream courses. Many of the spots of this soil are too small to be indicated on a map of the scale used by this survey, so only three of the larger areas are shown. The largest of these, and the one in which the type is best developed, is found between Cheniere and Calhoun on the old Claiborne road.

The drainage of a soil so impervious as the Lufkin clay is naturally poor, and difficult to improve artificially. During rainy seasons the roads which pass through this soil become almost impassable. The only remedy is to corduroy by cross-laying with poles. The Lufkin clay is also subject to rapid erosion, and large gullies are a common feature of the landscape.

The Lufkin clay was no doubt laid down under swamp conditions, perhaps before the Orangeburg fine sandy loam, but this is a matter of doubt. It may be an exposure of the Lower Claiborne, but no fossils have yet been found to bear out the theory. Lerch, in his report on the geology of this region in 1892, devotes some space to a discussion of these gray clays under the name of "Arcadia clays," but there

seems to be no reason to regard them as a separate formation, but rather as a member of either the Lower Claiborne or the Cocksfield beds.

The Lufkin clay has but little agricultural value. Where spots of it are included within a field, yields are so small that they are soon left as pasture.

The following table shows the texture of this soil type:

Mechanical analyses of Lufkin clay.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8586	Sec. 28, T. 18 N., R. 2 E.	Sandy loam, 0 to 8 inches.	0.64	0.20	0.24	0.26	39.24	30.70	17.74	11.08
8588	Subsoil of 8586....	White clay loam, 18 to 36 inches.	.18	.00	.10	.06	32.68	29.44	13.34	23.70
8587	Subsoil of 8586....	Stiff clay loam, 8 to 18 inches.	.25	.26	.34	.12	18.64	13.54	25.24	41.86

NORFOLK FINE SAND.

The Norfolk fine sand is a widely distributed type found along the Atlantic seaboard in various localities which have been mapped and described in other reports of this survey.

The surface soil of this type consists of a fine sand to a depth of 8 inches. It is of dark-brown color, this being due to small quantities of organic matter. The subsoil is of similar texture to a depth of more than 3 feet, but of a lighter brown or yellow color.

This soil occurs in two small areas; one near Indian Village, the other about 1 mile south of Calhoun. It forms abrupt hills within the limits of the Orangeburg fine sandy loam, but is not so leachy as the typical Sandhill type of the Carolinas.

The origin of these hills can not be determined accurately; they may have been formed as sand bars along an ancient shore, or, more probably, are due to the action of the wind.

This type, having so small an area, is of no importance agriculturally. Cotton and corn are grown at present, giving small yields. Soils of this nature make the valuable trucking regions along the Atlantic, and were these areas of sufficient size early vegetables might be grown with success here. The native forest growth here is pine and scrub oak. A species of sand oak, rare in this section, grows on the Indian Village area.

The following table gives mechanical analyses of this soil:

Mechanical analyses of Norfolk fine sand.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8589	Sec. 3, T. 17 N., R. 1 E.	Brown fine sand, 0 to 8 inches.	0.79	0.02	0.74	13.72	68.98	5.40	7.90	3.02
8590	Subsoil of 8589....	Yellow fine sand, 8 to 36 inches.	.34	.00	.64	14.30	70.16	4.20	7.86	2.68

MONROE FINE SANDY LOAM.

The Monroe fine sandy loam, both on account of its situation and physical condition, is highly esteemed as a farming land. The soil is a fine, mellow, brown sandy loam, from 10 to 20 inches in depth, with an average depth of 15 inches. The subsoil is a fine reddish-brown loam, somewhat sticky in texture, with a depth of 36 inches or more. Below this, and sometimes 6 or 8 feet in depth, either sand or buckshot strata may be encountered.

This soil extends as a margin from 1 mile to 5 miles in width along the Ouachita River and its eastern distributary channels. It extends throughout the length of the parish and covers an area of approximately 135 square miles. The areas are slightly elevated above the alluvial lands farther away from the river. The drainage is therefore away from the river, toward the lower lying streams of the interior, which enter the river farther down in its course. The drainage over the greater part of the Monroe fine sandy loam is good. On some of it the excessive rains in January, February, and March cause water to stand on the surface, but rarely long enough to prevent or seriously hinder the planting of the crops. No systematic drainage is practiced, but it would be of much value in carrying off the water in the early spring. At present, in the anxiety of the farmer to get his crops started, the ground is plowed too wet, and clods are formed which bake hard and are a detriment to cultivation for a long time.

The Monroe fine sandy loam is wholly of recent alluvial origin and represents the coarsest member of the series which has been assorted and deposited by varying river currents. The simple laws of this important process have been discussed in the chapter on physiography. The distribution of the Monroe fine sandy loam may be explained by a reference to the map. It will be seen that at the extreme northern end of the parish the Ouachita River emerges from

a single channel, and would, if swollen, spread over a large scope of country were it not for this barrier of Monroe fine sandy loam, and the system of distributary channels of which the Bayou De Siard is the shortest. The natural levee of the Monroe fine sandy loam, which has been built up by the throwing down of the coarser materials from the overflow waters near the river banks, is now so nearly complete that it has been necessary to construct artificial levees at only a few short intervals along the river in Ouachita Parish.

The Monroe fine sandy loam is devoted almost entirely to cotton and corn, and has been planted in these two crops for three-fourths of a century without any systematic rotation, and in many cases without even an alternation between these two. It is indeed an excellent soil that has withstood these faulty methods without any serious decrease in productiveness.

The yield under the various degrees of skill in cultivation ranges from one-half bale to 1¼ bales of cotton per acre. The average production may be placed at three-fourths bale per acre. Corn produces from 20 to 40 bushels, with 30 bushels per acre as an average when the usual cultural methods are employed.

A soil of the texture of the Monroe fine sandy loam should lend itself admirably to purposes of general farming and dairying, but the ease with which a cotton crop may be produced with the available negro labor, and the present high price of the staple, will tend to confine the attention of the farmer to cotton for some time to come. Though not generally known, the efforts to grow alfalfa have given promise of success, and there is no reason why this forage crop should not be of great benefit to Ouachita Parish. There is a steady demand for dairy products at Monroe, which is not at present half supplied, and if this demand should be satisfied the neighboring towns would take the surplus at fancy prices. The Monroe fine sandy loam is also adapted to the trucking industry. Fruits and vegetables might be grown in abundance, both for market and for canning purposes. Rice has been grown with success on this type of soil a few miles south of Monroe, and the area of cultivation will doubtless be extended, as much of the lowland is adapted to this crop.

A phase of the Monroe fine sandy loam, having a deeper soil than the greater part of the type, occurs in the northern part of the parish, and on account of the differences in depth and crop-producing power deserves special mention. The soil is a very fine sandy loam, having a depth of not less than 10 inches, and in places reaching a depth of 3 feet. The subsoil is a brown, very fine sandy loam, usually more friable than the subsoil of the Monroe fine sandy loam in other parts of the parish. This phase is restricted to one area, which occupies the northern part of what is known as Bartholomew Island, a tract of land inclosed by the Ouachita River and Bayou De Siard.

In the present stage of agricultural development, this phase of the Monroe fine sandy loam holds first place among the soils of the parish in the estimation of the planters. This would not be the case if a system of more diversified farming was practiced. The management of this soil may be more safely intrusted to tenant labor, and therefore a large percentage of its area has passed into the hands of a few extensive planters.

This soil is more highly esteemed for the cultivation of corn than of cotton, though the latter crop is successfully grown. From 30 to 40 bushels of corn per acre may be grown, even though this crop can not be produced to its greatest advantage under the tenant system. No systematic rotation is practiced, nor is much attention paid to the improvement of the land. Alfalfa has been grown with gratifying success, but subsequent failures have served to discourage the production of this valuable legume.

Cotton produces nearly a bale to the acre under the best conditions, but for several years the scarcity of labor in the cotton-picking season has been keenly felt by the planters in this part of the parish.

The following table shows the texture of the soil and subsoil of this type. Samples Nos. 8607, 8605, 8606, and 8608 represent the phase of the soil just described.

Mechanical analyses of Monroe fine sandy loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8607	Sec. 20, T. 20 N., R. 4 E.	Gray loamy sand, 0 to 18 inches.	0.70	0.02	0.14	0.14	0.54	32.30	64.10	2.80
8591	Sec. 7, T. 15 N., R. 4 E.	Fine sandy loam, 0 to 18 inches.	.30	.02	.14	.12	16.20	59.06	20.24	3.70
8605	Sec. 10, T. 19 N., R. 4 E.	Brown sandy loam, 0 to 12 inches.	.64	.02	.04	.04	.30	31.50	62.18	5.82
8593	Sec. 20, T. 18 N., R. 4 E.	Fine sandy loam, 0 to 18 inches.	.29	.10	.42	.20	3.30	41.10	48.26	6.62
8606	Subsoil of 8605....	Brown sandy loam, 12 to 36 inches.	.22	.04	.36	.10	3.70	44.46	48.84	2.46
8592	Subsoil of 8591....	Brown loam, 18 to 36 inches.	.24	.16	.24	.18	4.32	39.06	45.30	10.64
8594	Subsoil of 8593....	Fine loam, 18 to 36 inches.	.29	.06	.44	.14	2.70	31.36	52.70	12.36
8608	Subsoil of 8607....	Brown sandy loam, 18 to 36 inches.	.30	.04	.08	.06	.18	22.59	64.54	12.50

SHARKEY CLAY.

The Sharkey clay, first mapped and described by members of the soil survey in the Yazoo area of Mississippi, and locally known as "buckshot land," is by far the heaviest soil found in Ouachita Parish. There is normally a top soil of heavy clay loam with a depth of 5 or 6 inches, which by virtue of its content of organic matter and silt is less difficult of tillage. In color this top soil ranges from a chocolate brown to black, depending upon the amount of incorporated organic matter.

The subsoil consists of a brown or drab clay, very tough, waxy, and impervious in character. The drab color predominates on those areas which are subject to frequent and long-continued overflows. Both soil and subsoil shrink remarkably when drying, and the surface is checked by sun cracks having a depth of 6 or 8 inches, and not infrequently a width of half an inch.

The Sharkey clay occupies a large and continuous area on the eastern side of the parish in what are known as the Lafourche bottoms, as well as smaller areas in depressions along the Ouachita River.

The surface is low and flat. In seasons of high water or even excessive local rainfall these bottoms may suffer an inundation of still water for weeks or months at a time. These overflows occur to a great depth in the eastern area only when the levees break at certain points along the Mississippi, and will occur less frequently as the levee system is improved.

On account of the slight decrease in elevation toward the natural outlets and the resistance which these impervious clays offer to the passage of water the drainage of this soil is necessarily poor, which adds much to the problem of properly cultivating this type of soil. While drainage is difficult it is by no means impossible, but it is a work that will require concerted effort by the several owners. Large areas which are now overflowed to a shallow depth by backwater might be protected by slight embankments, and a system of interior drainage to some point of lower elevation could be constructed to form an outlet for all standing water.

The Sharkey clay owes its origin to such overflows as have just been described. It is composed of those fine particles which may remain in suspension for a long time in quiet water, and has been laid down in the manner outlined in the chapter on physiography.

Scarcely any of the Sharkey clay is under cultivation. On account of the difficulties connected with its cultivation, as well as the cheapness of the surrounding lands, which may be more easily subdued, the cultivated areas of Sharkey clay are not rapidly extended. Except in the more swampy tracts, open forests of large timber, free from undergrowth, prevail. The white oak, Spanish oak, red oak, black

oak, water oak, cypress, sweet gum, and ash grow here. The open woods furnish good pasturage for cattle and hogs.

The Sharkey clay is very productive. One bale of cotton per acre may be grown, and 30 to 40 bushels of corn.

The following table gives the mechanical analyses of several typical samples of this clay soil:

Mechanical analyses of Sharkey clay.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8599	Sec. 16, T. 15 N., R. 4 E.	Brown clay loam, 0 to 6 inches.	3.56	0.06	0.40	0.80	7.88	11.90	39.64	39.02
8601	Sec. 4, T. 15 N., R. 4 E.	Brown clay loam, 0 to 8 inches.	1.73	.12	.66	.30	1.28	3.96	49.64	43.96
8603	Sec. 8, T. 18 N., R. 4 E.	Brown clay loam, 0 to 5 inches.	.92	.04	.18	.14	.46	1.10	31.38	66.54
8602	Subsoil of 8601.....	Stiff waxy clay, 8 to 36 inches.	.56	.06	.18	.14	.76	2.32	48.14	48.20
8600	Subsoil of 8599.....	Brown clay, 6 to 36 inches.	.67	.08	.16	.30	1.44	3.46	42.18	52.34
8604	Subsoil of 8603.....	Stiff waxy clay, 5 to 36 inches.	.72	.00	.10	.06	.34	.84	27.98	72.64

MONROE SILT LOAM.

The Monroe silt loam, to a depth of 10 inches, is a very fine sandy loam containing much silt. The subsoil is a silty clay, yellow or red in color, and usually mottled with white and brown below 2 feet.

A large area is occupied by this type in the northeastern part of the parish and a smaller area southeast of Monroe. Both areas lie between the flood-plain types of Ouachita River and Bayou Lafourche.

The Monroe silt loam makes up a series of hills of no great elevation and cut by few stream channels. Along the Bayou Lafourche the land is low and subject to standing water during wet seasons.

This formation was for a long time classed, in regard to geological age, with the Port Hudson—Pleistocene—but is now regarded by some as a recent alluvium. Its correlation is still a matter of dispute. The silty nature of the soil suggests the probability of a deposition of the same origin as the extensive loess formation farther east, which has been recognized as the Memphis silt loam.

The results of the attempts which have been made up to the present time to cultivate the Monroe silt loam have not been such as to cause it to be valued as a farming land. Cotton can hardly be brought to yield one-half bale per acre, and the yield of corn is still less encouraging. The country is sparsely settled, and the people who depend upon this soil for an income as a rule have few of the comforts of life.

Those who enjoy a small measure of prosperity have secured it by hard work and close management worthy of better environments. Many cattle feed on the common range, but there has been little attempt to improve the breed.

The larger part of the area is in valuable forests of oak and pine, which are being converted into lumber by several sawmills. The largest plant for this purpose is at Swartz.

Mechanical analyses of this soil are given in the following table:

Mechanical analyses of Monroe silt loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8595	Sec. 12, T. 18 N., R. 4 E.	Fine sandy loam, 0 to 12 inches.	1.35	0.04	0.18	0.30	3.60	12.38	75.38	7.54
8597	Sec. 13, T. 18 N., R. 4 E.	Fine sandy loam, 0 to 12 inches.	1.38	.06	.40	.58	14.92	24.60	46.54	12.88
8598	Subsoil of 8597....	Fine sandy loam, 12 to 36 inches.	.58	.10	.28	.40	13.50	21.46	50.96	13.24
8596	Subsoil of 8595....	Fine sandy loam, 12 to 36 inches.	.58	.30	.64	.80	13.14	17.44	45.14	22.36

MEADOW.

The term Meadow is variously used in different localities. In this report the name is applied to the borders along the smaller stream courses in low areas, which are so subject to overflow as to be of little agricultural value. The soils of these narrow flood plains have been dumped down by currents of varying velocities and consequently present variations in texture too changeable and unimportant to map.

As the areas of this kind are too small to justify an expenditure in protecting them from overflow, it is not likely that they will ever be of agricultural value, except as pasture land. The Meadow is confined to the courses of the Choudrant and the Cheniere, with their larger tributaries west of the Ouachita River, for in the alluvial belt on the eastern side the streams when swollen spread over large areas and give rise to definite soil types.

As a rule the Meadow is covered by a heavy growth of water oak, willow, gum, and cypress, and a tangled undergrowth of shrubs and vines.

MYATT FINE SANDY LOAM.

The Myatt fine sandy loam varies in composition but may be described in a general way as a gray sticky sand, often coarse in texture, with an average depth of 10 inches. The subsoil, to a depth of 3 feet, is a drab or gray sandy loam of a tough consistency. The subsoil

usually contains a large percentage of iron concretions and is mottled by iron stains.

This soil extends along the western bank of the Ouachita River from a point 2 miles above Myatt southward in a continuous area, only broken by occasional strips of Meadow. The best development of the type is near Myatt.

The soil lies both on the lower hillsides and on the low-lying bottoms, where it might be regarded as a Meadow type or swamp. The drainage on the lower areas is necessarily poor. Many of them are subject to frequent overflow by the Ouachita River and the smaller streams.

The Myatt fine sandy loam is purely alluvial in origin. It is evidently the washings from the Orangeburg fine sandy loam brought down by the streams, added to and modified by the sediment-bearing overflows.

Very little of the Myatt fine sandy loam has been brought under cultivation. Crop yields, where it has been cultivated, are only moderate. With proper drainage and treatment, there is no doubt that it could be brought to a fair productiveness.

Nearly the whole of the area is covered by thick forests of gum, cypress, and oak. The oaks, especially, grow to perfection and the greater part of the staves shipped down the river are obtained from this type of soil.

The following results of mechanical analyses show the texture of the soil and subsoil of this type:

Mechanical analyses of Myatt fine sandy loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct*	*P. ct*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8611	Sec. 5, T. 16 N., R. 3 E.	Gray sandy loam, 0 to 10 inches.	0.87	0.24	2.22	5.70	40.68	14.60	30.94	5.26
8613	Sec. 10, T. 16 N., R. 3 E.	Gray sandy loam, 0 to 10 inches.	.95	1.60	4.04	9.06	23.84	7.88	43.60	9.94
8614	Subsoil of 8613....	Gray sandy loam, 10 to 36 inches.	.29	.92	3.02	7.80	19.74	6.32	43.46	18.74
8612	Subsoil of 8611....	Medium sandy loam, 10 to 36 inches.	.46	.06	1.00	3.48	25.28	9.00	36.88	24.28

RECLAMATION OF SWAMP AND WORN-OUT SOILS.

The reclamation of swamp land in Ouachita Parish presents a problem for the near future. At present, when land is so cheap, the cost of clearing and draining swamps is too great for the small planter, while the areas are not large enough to induce, up to this time, the

formation of large corporations for the purpose. But there is likely to be a growing demand for lands suited to the growing of rice, as this industry in the southern parishes has proved very profitable, and extensive tracts of lowland in both the Monroe silt loam and the Sharkey clay types will be found valuable for the production of this crop, being level and well adapted to the flooding necessary in its culture.

The improvement of the soils, deteriorated by the continuous growing of the same crop year after year, is of more immediate interest. In the hills commercial fertilizers are extensively used. They are of temporary benefit, but the farmer should look forward to a permanent improvement of his soil. The greatest need of these soils is nitrogen, and this element can be most cheaply secured by growing leguminous crops, such as the cowpea and alfalfa. The river plantations can also derive great benefit from these sources, and crop rotation can not be too highly commended for any of the soils of the area.

AGRICULTURAL METHODS.

There is nothing peculiar to this area in the method of tillage, but there are several practices which are condemned by the better class of planters. One of the damaging practices is that of plowing the lowlands when too wet. This is common when the planting has been delayed by spring rains. In some cases the water stands in the furrows behind the plow. When dry weather comes hard clods result from such plowing. Deterioration of the land can not fail to follow this practice.

Another evil general in this section is the one-crop system. Cotton and corn are grown either continuously or alternately, and as a rule no beneficial rotation with other crops is carried out.

The cowpea is sometimes sown with the corn or cotton as feed for stock and as a restorer of nitrogen, and its use is rapidly spreading.

Careful experiments have demonstrated that wonderful results may be obtained by a simple rotation of corn, cotton, cowpeas, and oats.

Owing to the character of the farm labor employed and to the small areas cultivated, which will be explained later, the use of improved machinery has been neglected. The level river lands are admirably adapted to the use of modern machinery, and when a more diversified farming shall take the place of the one-crop system great saving of labor can be made by its use.

Irrigation is practiced in growing rice a few miles below Monroe, with good results. There are large areas which may be irrigated without difficulty.

AGRICULTURAL CONDITIONS.

The influence of the character of the soil upon the progress and general prosperity of the farming class is strikingly illustrated in Ouachita Parish. In the poorer soils of the hills in the western part

of the parish the people have made little progress in the accumulation of wealth or in their mode of living, although they equal the other people in intelligence. In saying this, exceptions must be taken into consideration, but the majority of these people have become reconciled to the lack of luxuries and even comforts which characterized the early years of their settlement in this region. This has produced a state of mind which is slow to adopt new ideas in agriculture, and the benefit of any new cultural methods or manner of living must be thoroughly demonstrated before it will be accepted. It is for this reason that the example of a few progressive farmers will be of the greatest value to this part of the parish. The farms here are comparatively small. The tenant system is practiced to some extent. Both the smaller landowner and the tenant pay exorbitant rates of interest for fertilizers and provisions, giving the merchant a mortgage on the crop as collateral. When bought on credit these supplies cost from 30 to 60 per cent more than when cash is paid. It would be a better proposition for the landowner to mortgage his farm and borrow money at 10 per cent with which to buy supplies.

On the area of Monroe silt loam conditions are even worse, and there is no prospect of immediate improvement. On the other hand, the planter of the rich river lands is highly prosperous during the present time of high-priced cotton. We find here the typical southern plantation communities. The dwelling house of the planter is surrounded by the cabins of the negro tenants and other farm buildings, which always include a barn for the work animals, a cotton gin, and a small plantation store. The planter class, having in mind the depression which prevailed a few years back, are keenly watching for methods and implements which may increase the efficiency of their available farming force and counterbalance the loss of labor, which is felt more keenly every year. With cotton at the present high prices, and with the present grade of labor, it is folly to ask men of the intelligence of these planters to give up a crop which is so profitable, even taking cash rents into consideration, and which is so easily produced, and to grow other crops and to raise cattle where profits are small and uncertain. But these other industries might be carried on in conjunction with the production of cotton, affording needed rotations and a steadier employment of labor throughout the year.

We learn from the Twelfth Census of the United States that of the 1,720 farms[a] in Ouachita Parish, 748 were operated by the owners, 21 by part owners, 25 by managers, 353 by cash tenants, and 573 by share tenants. Of these farmers 751 were white and 969 were colored. Of the white farmers 62.8 per cent own the land which they till; of the colored farmers 20.7 per cent are landowners. Twenty-two per cent

[a] In the classification used by the Census each area worked by a separate tenant was returned as a farm, irrespective of the actual ownership.

of the white farmers and 78.4 per cent of the colored farmers are tenants, either paying a cash rent or giving a certain part of the crop to the landholder. The cash rent varies widely, but in the river lands, where the system largely prevails, $5 an acre may be taken as an average. Under the share-tenant system the owner usually furnishes everything—land, farm animals, provisions, and even his own service as supervisor—and receives in return one-half of what the land produces. If a failure of crop should result he loses not only the return from his land, but his own labor and the supplies which he has furnished the tenant and his family. For several years crops have been large and prices high, and landholders have had large returns from their lands.

Every large plantation has a store at which the tenant is encouraged to trade up to the value of his prospective crop. If, however, the tenant should realize any cash at the end of the year it is soon squandered and he begins the next crop in debt.

The extensive system of agriculture is practiced in Ouachita Parish, especially in the alluvial lands, and large farms are common. The average farm, as shown by the census figures, contains 105.8 acres. The greatest number of farms are found to be between 50 and 150 acres. Twenty plantations comprise more than 1,000 acres each, and large tracts of timbered land, held by a few lumbering companies, are not considered in this enumeration. Several of the largest plantations are owned by nonresidents and are operated by managers. There is a tendency with the more successful planters to increase their holdings, but the growing scarcity of tenant labor must inevitably cause a decrease in the size of the plantations.

Land varies in price according to quality and position. The Orangeburg fine sandy loam of the hill country is valued at from $1 to $10 an acre, where large tracts of cleared and uncleared are taken. The loams of the river valleys bring from $10 to $30, according to state of improvement. The cash rent obtained for the use of these lands amounts to from 20 to 25 per cent of the original cost. The low-lying Sharkey clay is worth on an average about $4 an acre. The productiveness and earning capacity of every soil of Ouachita Parish would seem to justify a doubling of land prices.

The planters are almost entirely dependent on the negro population for labor, and every year it becomes a more uncertain quantity. Some of the old plantations have families which have been on the land for several generations, but the great mass of the negroes, especially of the younger generation, are attracted by the higher wages and more congenial surroundings offered by the towns and sawmills. The negro farm laborer may be classed as entirely unskilled. The average negro can not manage improved machinery, and the attempts to teach him have been too destructive on the crop to be tolerated.

Nor can the farmer dispense with the negro labor and cultivate the same amount of land himself because of the help required in picking cotton. It takes the entire negro family—men, women, and children—to pick the cotton which one member may cultivate, so the planter must support this family throughout the year in order that the crop may be saved.

From the earliest settlement of this region the agricultural interest has been in the production of cotton and corn. Nearly 25,000 bales of cotton are grown in the parish, which represents an average yield of two-thirds of a bale per acre. Such yields, with the present prices, make the production of cotton a profitable industry. The average yield of corn gives a crop of 350,000 bushels to the parish, which is not enough for home needs.

In addition to these crops, oats and cowpeas are grown in small quantities.

Ouachita Parish has excellent transportation facilities. Two main lines of railway traverse the parish—one from north to south, the other from east to west. Trains are run on schedules which would favor the truck grower and the dairyman in shipping to distant markets if the home market should be oversupplied.

The Ouachita River is a great natural avenue of transportation, being navigable by the largest steamboats for about nine months in the year. Two of these boats leave Monroe weekly for New Orleans and stop at almost every plantation to put off merchandise and take on cotton and staves. Locks and dams, by which the river may be kept navigable during the entire year, are now in process of construction a few miles south of Monroe. Smaller packets ply regularly between Monroe and points farther up the river.

The country roads radiate conveniently from Monroe, but during the rainy seasons they are in a deplorable condition. This is in part excusable, as the roads, especially in the hills, wash and gully rapidly, and there are no road-making materials with which they can be permanently improved. The only remedy seems to be to improve the drainage and to corduroy the worst places.

A public market, where meats and country produce are sold, is kept up by the town of Monroe. It is to be regretted that so small a part of these necessities is of local production, but we may confidently expect that a few years will work a great change in this respect, and the great demand for garden and dairy products will be supplied by the community.

Monroe is an important cotton market, buying annually nearly $3,000,000 worth of the staple. A large part of this amount is taken by the compress, where the bales are reduced in bulk to meet the demands of the exporters. It is then shipped to New Orleans by river packet and there reloaded on ocean steamers.

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