



Issued March 11, 1916.

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE LOUISIANA AGRICULTURAL EXPERIMENT  
STATION, W. R. DODSON, DIRECTOR.

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SOIL SURVEY OF WEBSTER PARISH,  
LOUISIANA.

BY

A. H. MEYER, E. S. VANATTA, B. W. TILLMAN,  
AND R. F. ROGERS.

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HUGH H. BENNETT, INSPECTOR, SOUTHERN DIVISION.

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[Advance Sheets—Field Operations of the Bureau of Soils, 1914.]



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1916.

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## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF SOILS,  
*Washington, D. C., July 29, 1915.*

SIR: A soil survey of Webster Parish, La., was made during the field season of 1914, in cooperation with the Louisiana Agricultural Experiment Station. The selection of this parish was made after conference with State officials.

I have the honor to transmit herewith the manuscript and map covering this survey and to recommend that they be published as advance sheets of Field Operations of the Bureau of Soils for 1914, as authorized by law.

Respectfully,

MILTON WHITNEY,  
*Chief of Bureau.*

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

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### MAP.

Soil map, Webster Parish sheet, Louisiana.

# SOIL SURVEY OF WEBSTER PARISH, LOUISIANA.

By A. H. MEYER, E. S. VANATTA, B. W. TILLMAN, and R. F. ROGERS.

## DESCRIPTION OF THE AREA.

Webster Parish is located in the northwestern part of Louisiana, bordering the State of Arkansas, about 25 miles east of Shreveport. It is bounded on the east by Claiborne and Bienville Parishes, on the south by Bienville and Bossier Parishes, and on the west by Bossier Parish. Its length from north to south is 42 miles and its width from east to west ranges from 12 to 17 miles. The parish comprises an area of 609 square miles, or 389,760 acres.

Webster Parish lies wholly within the Coastal Plain province. There are three distinct topographic divisions: (1) The uplands; (2) the alluvial terraces, deposited at a time when the Red River and its branches were flowing at a higher level than at present; and (3) the first-bottom lands, along Bayou Bodcau, Bayou Dorcheat, Black Bayou, and smaller streams.

The upland occurs as a single body, except for a small outlier at Springhill, in the eastern part of the parish. It is known as hill land and has an undulating to rolling topography. In the vicinity of Rocky Comfort School the surface is steeply rolling to almost broken. There is a strip about one-half to one mile wide along Crows Creek and Black Lake Bayou which is somewhat dissected. The western edge of the upland is steeply sloping to precipitous, while the transition from the minor stream valleys to the bottom lands is usually gentle. The most conspicuous topographic features in the uplands consist of high hills known as the "Red Hills," which lie about  $2\frac{1}{2}$  miles south of Leton. The outlier at Springhill rises gradually above the Red River terrace and appears as a rather oval shaped, islandlike extension.

West of Bayou Dorcheat the country consists of a very smooth plain, except narrow fringes along the bayous. It is probably either a very old terrace or the bottom of an estuary formerly extending up the Red River Valley. Well-preserved river terraces lie along Bayou Flat Lick, Black Bayou, and Cypress Creek, and the lower terraces along Bayou Bodcau and Bayou Dorcheat. These are flat and benchlike and have been modified only where upland streams cut through them.



FIG. 1.—Sketch map showing location of the Webster Parish area, Louisiana.



Approximately 20.7 per cent of the area of the parish is first-bottom land, of which the Bayou Dorcheat bottoms comprise the greater part. The topography of the first bottoms is practically level, being relieved only by low ridges, lying parallel to the streams, and intervening depressions, sloughs, cut-offs, and ox-bow lakes. The bottoms are subject to frequent inundations, which are often very destructive.

The parish ranges in elevation from about 200 to 400 feet, the highest point, a small gravel hill, occurring about  $2\frac{1}{2}$  miles south of Leton.

The drainage of the Red Hills area is well established, while that of the areas west of Dorcheat is still inadequate except along the larger streams, there being large, flat areas not reached by any stream. The general direction of the drainage is to the south, through Bayou Dorcheat, Bayou Bodcau, and Black Bayou, which streams empty into Red River. Most of the parish, however, is drained by Bayou Dorcheat. About  $4\frac{1}{2}$  miles below the Vicksburg, Shreveport & Pacific Railway, Bayou Dorcheat widens out to form Lake Bistineau, a very shallow, intermittent lake. Bayou Bodcau drains a narrow strip along the northwestern projection of the parish, and the Black Bayou drainage system a small part of the southeastern corner. In general the streams are very winding and obstructed by logs and tree growth. During high water Bayou Dorcheat is navigable to a point as far north as Minden, but since the building of railroads traffic on the bayou has been practically abandoned. There are no dams or waterpower sites in the parish.

Originally all of the parish was thickly forested with pine, oak, gum, and other hardwoods. At first no value was placed on the timber, which was destroyed indiscriminately, and it is only within the last 20 years that sawmills have been erected. There are three large sawmills in the parish, located at Minden, Cotton Valley, and Springhill, besides numerous smaller ones. The greater part of the forested areas have already been cut over. At present well-forested land is valued at \$20 to \$60 an acre, depending upon the amount of merchantable timber available.

The first settlement in the territory embraced within the parish was made in 1811, several miles east of Minden, but there was no decided increase in population until 1818-19. The parish was organized in 1871 from a part of Claiborne Parish, with Minden as the parish seat. The early settlers came largely from Georgia and South Carolina. At present the farming population consists for the most part of negroes and native whites. The population, according to the census of 1910, is 16,184, of which 84.4 per cent is rural. Minden, the parish seat and largest town, has a population of 3,002. It is a distributing point for supplies of all kinds. Cotton Valley, Springhill, Sibley, Dubberly, Doyline, and Yellow Pine are villages.

The entire parish, with the exception of the northeastern part, has good railroad accommodations. The Louisiana & Arkansas Railway traverses the parish from north to south and connects with the St. Louis, Iron Mountain & Southern Railway at Hope, Ark., which is a direct line to St. Louis. At Alexandria it joins a number of main lines which are direct routes to New Orleans. A branch of this line extends from Minden to Shreveport, the largest commercial center in northwestern Louisiana. The Sibley, Lake Bistineau & Southern Railway extends south from Sibley through Yellow Pine into Bienville Parish. The Vicksburg, Shreveport & Pacific passes from east to west across the southern part of the parish, giving that part direct connection with Shreveport, Monroe, and Vicksburg.

The mileage of public roads is small for the size of the parish, and much traveling is done over settlement roads, which are very poor. In the vicinity of towns the roads are usually graded, crowned with dirt, and kept in good condition, while those farther out in the country receive little attention and quite often become impassable during rainy spells. There are gravel deposits in the parish that can be used for building more substantial roads. There are no toll roads in the parish.

The local towns furnish a good market for most of the surplus farm products, and the remainder can readily be shipped to more distant markets. Cotton is the chief export, and hay, oats, and ham are the chief imports.

The rural free delivery of mail reaches a large part of the parish and telephones are quite common. The public-school system is handicapped by the small number and poor condition of the school buildings.

#### CLIMATE.

Webster Parish has a mean annual temperature of 65.1° F., a mean winter temperature of 47.6° F., and a mean summer temperature of 81.4° F. July is the hottest month, with an average temperature of 82.4° F. The lowest temperature recorded is 1° F. and the highest 112° F.

The average date of the first killing frost in autumn is November 13 and of the last in spring March 14, giving a growing season of about 244 days, which is sufficient to mature a number of crops in succession. The date of the earliest recorded killing frost in autumn is October 18 and of the latest in spring April 12.

There is an average annual rainfall of 44.03 inches. The total amount for the driest year of which there is any record is 27.73 inches and for the wettest year 75.24 inches. The distribution is comparatively uniform, with the spring season the wettest and the fall season the driest. December is the wettest month, with an average precipitation of 5.12 inches, and September the driest, with

2.32 inches. Only a half inch of snow falls, and this usually melts shortly after falling. Droughts occur, but rarely are sufficiently prolonged to become serious.

The prevailing direction of the wind during the winter months is from the northwest and during the remainder of the year from the south. The average velocity of the wind is low, except in March, when it is fairly high. Occasionally storms cause considerable damage to farm and city property, besides endangering life.

The following data, compiled from records of the Weather Bureau station at Minden, which is in the south-central part of the parish, gives the normal monthly, seasonal, and annual temperature and precipitation of the parish:

*Normal monthly, seasonal, and annual temperature and precipitation at Minden.*

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.....	47.3	82	10	5.12	1.03	8.03	0.4
January.....	47.5	85	10	3.53	4.00	6.05	Trace.
February.....	48.0	86	1	3.30	1.44	5.81	0.1
Winter.....	47.6			11.95	6.47	19.89	0.5
March.....	58.2	91	19	4.43	2.30	6.03	
April.....	65.1	92	30	3.79	5.20	11.21	
May.....	72.7	99	35	4.23	2.00	4.57	
Spring.....	65.3			12.45	9.50	21.81	
June.....	79.7	104	52	3.85	4.09	3.50	
July.....	82.4	111	55	4.17	2.13	11.27	
August.....	82.1	112	51	2.62	.05	7.94	
Summer.....	81.4			10.64	6.27	22.71	
September.....	76.9	105	38	2.32	1.18	1.41	
October.....	65.5	99	28	2.54	.07	4.99	
November.....	55.8	94	17	4.13	4.24	4.43	Trace.
Fall.....	66.1			8.99	5.49	10.83	Trace.
Year.....	65.1	112	1	44.03	27.73	75.24	0.5

#### AGRICULTURE.

The first settlers in the territory embraced within Webster Parish supplied their immediate wants by hunting game, with which the thick forest of shortleaf pine, oak, and gum abounded. As soon as the land could be cleared and cultivated this was supplemented by the growing of such food crops as corn, potatoes, and other vegetables,

and the raising of cattle. Cotton soon became the chief money crop. It was transported entirely by ox teams to a point on Bayou Dorcheat west of Minden, known as Crichtens Landing. There it was loaded on flatboats and conveyed to New Orleans.

Agricultural development of the parish was progressing rapidly when it was checked by the breaking out of the Civil War. After the war progress was very slow, and it is only within the last few years that the parish has again reached a prosperous condition agriculturally. Even now some fields that were cultivated before the war are covered with a second growth of pine. The completion of the Vicksburg, Shreveport & Pacific Railway in 1883 opened new markets for farm crops and gave a great impetus to agriculture.

Cotton is still the most important money crop of the parish. According to the census reports, the acreage devoted to the crop steadily increased until 1889, since which time it has fallen off considerably, largely owing to a series of droughts. For the last seven years the ravages of the boll weevil have had a discouraging effect on cotton growing. In 1909 the area in cotton embraced 24,270 acres, as against 29,394 acres in 1889. The production in the former year was 6,075 bales, or 0.3 bale per acre. This crop does well on all the reclaimed soil types, though the highest yields are obtained on the sandy first bottoms where not subject to inundation.

Cotton is generally planted from April 10 to 30. A majority of the farmers at the present time break their fields in lands with 2-horse plows and then lay off in furrows 40 to 48 inches apart, and bed into low, flat rows on these furrows as a center with a 1-horse plow or turning shovel. These beds are thoroughly harrowed and seed planted with 1-horse planters.

As soon as the cotton plants are up, or sooner if the soil is crusted or packed from heavy rains, a V-shaped cultivating harrow or spring-toothed cultivator is run on both sides of the drill, breaking the crust and killing all small weeds and grass. As soon as large enough the cotton is "swept up" with a short shovel and small sweep on Georgia stock. The cotton is then chopped to a stand a hoe's width apart. The crop is cultivated 4, 5, or 6 times more, according to the season, with spring-tooth cultivators and different-sized sweeps. One more thinning and hoeing is given, and in exceptional years two.

Several varieties of cotton are grown, Triumph probably being the most popular.

Although corn occupies a larger acreage than any other crop in the county, it is not an important money crop. Corn is grown on all the improved soil types of the parish, doing best on those of finer texture. According to the census, 29,329 acres were devoted to this crop in 1909, producing 339,316 bushels, or a little over 12 bushels per acre. With proper preparation of the seed bed, fertilization, and thorough



cultivation higher yields are obtained. In boys' corn club contests as high as 158 bushels of ear corn per acre have been grown. The low yields are largely due to poor preparation of the field, but in part to poor seed and insufficient cultivation and fertilization. Corn is planted from March 1 to June 1. It is usually planted in furrows, very little flat planting being done. Most of the corn is fed to live stock, the surplus being sold in local towns or to neighboring farmers.

As a rule the corn is snapped from the standing stalks, stored with the shucks on, and husked as fed. A few farmers, about two weeks before the corn is ripe, strip and cut the better part of the stalks, tie it in bundles, and store it for winter feed. The surplus is sold to liverymen and townspeople. Most farmers, however, pasture their corn land.

The black bug or corn-ear weevil and the flying weevil are the worst enemies of the corn plant, and also destroy a large quantity of corn in the bin. For this reason a variety of corn is being sought which has the ear tightly and completely covered with the husk, and also a hard grain that the weevil can not readily penetrate. Hastings Prolific, Munsons White, Shaws Improved, Champion White Pearl, Hembree Semiflint, and Calhoun Red Cob are grown, though scrub varieties predominate.

The area devoted to oats in 1909 amounted to 2,712 acres. The yield of oats is not high, as a rule, as there is a practice of growing the crop on only the poorest soils. When the land is well fertilized and thoroughly cultivated 25 to 35 bushels per acre are obtained. The Louisiana and the Texas Rustproof varieties give the best results. Oats for seed when imported are largely from Caddo and Bossier Parishes, though some from Kansas are sown.

September and October are considered the best months for sowing oats, and the crop may be pastured lightly during the winter. December sowing is less desirable, because it does not give the oats a chance to develop a large enough root system to withstand the short freezes in winter. The grain matures the last of May or early in June. Cowpeas or peanuts are successfully grown after the oats are cut. Practically all the oats grown in the parish are fed to work stock, and in addition a large quantity is imported.

No rice is grown in the parish at present, although it has been successfully grown at Taylor, Columbia County, Ark., about 7 miles above the parish line.

Approximately 2,200 acres are utilized in the production of cowpeas. They do well on all the soil types, and are an excellent feed as well as an effective soil renovator. Most of the cowpeas are broadcasted, but some are sown between the rows of corn just before the last cultivation. Three to six pecks of seed are required for an

acre, depending on the kind used. For making the best hay the vines are cut as soon as the earliest pods become yellow. When cut at that stage the vines cure much more easily and rapidly than when cut earlier, the total yield is heaviest, and though the hay may not be quite so tender, it is eaten more readily and has a higher nutritive value. The Whippoorwill is the most generally grown variety. It is perhaps the best for seed, and it makes a vigorous, upright growth. The Clay variety has similar characteristics. If the crop is desired for pasturing hogs, the trailing, heavy vine-producing varieties are best, such as the Red Ripper and Unknown. Not nearly enough pea vine hay or seed is grown to supply the farm needs.

Lespedeza, or Japan clover, grows wild throughout the parish. A number of farmers are sowing it for hay, with satisfactory results. It yields ordinarily  $2\frac{1}{2}$  to 3 tons per acre. But one cutting a year is obtained. The hay is fully equal to that of red clover or alfalfa, as the stems are very slender and the bulk of it consists of leaves. The seed is sown in February or March, at the rate of one-half to 1 bushel per acre, following oats which were sown in September or October. It does best on the first bottoms and other low-lying soils, and flourishes on the uplands only in certain localities, particularly where the surface soil has a good clay content.

Bermuda grass predominates in all the permanent pastures, and on a few farms is an important hay crop. It grows most luxuriantly along drainage ways, where the soil is fertile and rather damp, although it makes a fair growth also on the sandier soils of the parish. It is the best crop for the first-bottom lands, making a good quality of hay and yielding 2 to 4 tons per acre. Johnson grass is rather common in Webster Parish. Owing to the difficulty of eradicating it in cultivated fields, it is considered an undesirable grass. It makes a heavy yield of hay and gives good pasturage for one or two seasons.

On cleared areas in low-lying, damp positions there is quite a growth of carpet grass. This makes an excellent pasturage grass, but not a good hay, on account of its creeping habit.

Crab grass is a volunteer plant and generally follows cultivated crops. It makes good pasturage.

Broom sedge is largely confined to cleared areas of the Lufkin very fine sandy loam. Early in the season, when the growth is tender, it is relished by stock, but later it becomes hard and woody and stock refuses it.

The swamps furnish a fair growth of cane for winter pasture, but owing to its continuous grazing down it is not so luxuriant or plentiful as formerly. Other plants in the swampy areas furnish grazing, among them a "blue stem" and a wild vetch that furnishes late winter pasturage.

White clover has sprung up in the vicinity of Minden within the last few years. It does well and makes an excellent early pasture crop.

Small patches have been sown to alfalfa, but as yet the crop has not been successful. The soils on which it has been tried are highly acid, which is true of all the soils of the parish except portions of the Susquehanna clay loam. Two to three tons of ground limestone per acre would be required to fit the soils for this crop, and for that reason it is doubtful whether it could be profitably grown.

Peanuts do very well on the sandier, well-drained upland soils. About 1,412 acres were devoted to them in 1909, producing 19,122 bushels, or about 13 bushels to the acre. Where properly fertilized and cultivated, 30 to 50 bushels per acre are obtained. They are usually planted alone, though occasionally with corn after the manner of planting cowpeas, and sometimes they follow oats. About 50 bushels of ground limestone per acre may be applied broadcast to good advantage just before the ground is plowed. The peanuts are usually pulled the latter part of August or the 1st of September and thrashed by machine. Most of the crop is sold, the remainder being fed to hogs. The peanuts usually bring \$1 per bushel and the hay \$18 per ton. The vines make an excellent hay. The Spanish variety is best for this purpose, as nearly all the nuts will adhere to the stem when pulled.

Sweet potatoes are largely grown for home use and the surplus is generally sold to neighboring towns. They flourish on the sandy soils, but owing to the scarcity of labor and the small outside demand for the crop it has not become very important. The potatoes are bedded about March 1 and transplanted from May 1 to July 1. They are ready for harvesting from August to midwinter. Yields range from 75 to 150 bushels per acre. Key West and Vineless yams and Southern Queen are the chief varieties grown.

A few Irish potatoes are produced, but not nearly enough for home consumption. The Triumph is the most popular variety. The average yield is 75 bushels per acre.

Sugar cane does well and nearly every farmer who has a small area of cleared bottom land produces a small patch for sirup. It does best on the Ocklocknee very fine sandy loam and silt loam, to which it is almost entirely confined. These soils produce 200 to 400 gallons of sirup per acre, while the upland soils produce only about 100 to 150 gallons per acre. The Louisiana purple and the ribbon varieties are mostly grown. There is very little outside demand for the sirup and most of it is consumed at home, although a number of farmers make a business of selling it to neighboring towns and to farmers who have no bottom-land soils on their farms. Sugar cane

is very profitable, from 50 to 75 cents per gallon being obtained for the sirup. It is planted about the first of April and harvested just before the first frost, about the latter part of October or the first of November. Enough stalks are bedded at this time for seed for the succeeding crop.

Some sorghum is grown, and it does well, but can not compete with cane for sirup production. However, it makes an excellent feed for stock and many farmers plant it for that purpose.

When heavily fertilized the soils of the parish produce good yields of truck crops, but owing to the distance from large markets very little attention is given to commercial trucking. A few farmers around Minden produce enough to supply the home demand.

The fruits grown are peaches, pears, and plums. Peaches do well for a time but for some reason the trees are short-lived. The peach borer and blight do considerable damage, though they can be successfully combated by spraying and proper orchard management. On most farms the peach trees receive their only attention when planted. Warm spells in January and February, followed by freezes, which are quite common, cause considerable damage, the buds being brought out only to be frostbitten. Pears are not very profitable, as the trees bear heavily for only a year or so and then die. Plums do well. All small fruits, such as strawberries, blackberries, and dewberries, bear splendidly, but are not grown on a commercial scale. Blackberries and dewberries grow luxuriantly in deserted fields, byways, and openings, and more than supply the home demand.

Dairying has been badly neglected, only enough dairy products being produced as a rule to supply the home needs. The methods followed are crude, the butter-making operations being carried on by hand. No attention, as a rule, is given to sanitary methods of handling milk, sanitation of barns, care of stock, and balanced rations. The dairy stock is on some farms left to shift for itself in the surrounding range, and during the winter losses are common. Usually four or five cows to a farm are kept, most of them being of a scrub strain, stamped generally with Jersey blood. There are, however, a number of purebred Jersey herds in the county, mainly in the vicinity of Minden, and a number of cows in that vicinity have been shown by the Louisiana Experiment Station to belong in the advanced registry class. On well-managed dairy farms the profits are good. On some farms milk sells for 10 cents a quart, buttermilk for 15 cents a gallon, and butter for about 30 cents a pound, the year round. The Texas fever tick, which is prevalent in the parish, is a serious menace, especially to imported stock. The State government is combating this pest along both educational and practical lines.



The extensive swamps in the parish and the narrow first bottoms along the smaller streams are largely used for ranging cattle. Switch cane is the chief roughage in winter, while Bermuda, carpet, and crab grasses and lespedeza supplement it during the remainder of the year. In 1914, 100 carloads of cattle were exported, some to Kansas City and some to St. Louis.

Hogs constitute the greater part of the live stock of the parish. Pork forms the chief meat diet of the farmers, and very little beef is consumed on the farm. Some hogs are exported, but on the other hand, the parish as a whole imports large quantities of pork products. There are still a good many native "razor-back" hogs ranging in the bottoms, though most of the farmers are beginning to breed up their stock. Poland China is the most popular breed, with Duroc Jersey and Berkshire next. Since the cutting of the oaks less mast is found in the swamps and consequently more corn and peanuts are fed to hogs.

A few goats and sheep are raised, the former being kept mainly to keep down the underbrush in pastures and newly cleared fields.

There is not nearly enough poultry raised to supply the home demand. Chickens, ducks, geese, guineas, and turkeys give profitable returns where even the slightest attention is given to them.

Horses and mules are raised by only a few farmers, but with profitable returns. A team of good mules or horses brings from \$400 to \$600, and cheap pasturage is available the year round. Most of the mules are of a small, inferior kind known as the "cotton mule." Several carloads of horses and mules are imported every year.

No attention is given to the adaptation of crops to soils and no effort is made to find out what crops can be most economically grown. At present cotton and corn are grown on every soil type. The one-crop system predominates, but corn and cotton are sometimes alternated. It is not uncommon for a farmer to have the same field in cotton for a number of years.

The soil is usually plowed to a depth of 2 or 3 inches, and never deeper than 4 inches. Ridge plowing is still generally practiced, but flat plowing is becoming more common. Contour plowing is the practice on slopes. The intertilled crops are planted on beds, except corn, which is planted in furrows. Oats, lespedeza, and cowpeas are broadcasted. While improved machinery is being introduced, including the riding cultivator, walking cultivator, 2-horse disk plow, disk harrow, mowing machine, combination planters, disk cultivator, stalk cutter, and section harrow, most of the farmers still use the 1-horse plow.

A great deal of commercial fertilizer is used, the amount expended therefor in 1909, according to the census, being \$30,325. It is used with corn and cotton on every soil type of the parish, with the excep-

tion of the first bottoms. Fertilizers of the formula 10-2-2<sup>1</sup> are most commonly used for cotton, and of the formula 10-3-2 for corn. Many farmers now mix their own fertilizers, using cottonseed meal, or cotton seed, with phosphate. The methods of applying fertilizer vary greatly. What little barnyard manure accumulates is also applied.

Owing to the large demand for labor in sawmills, hired help is less plentiful than formerly. Monthly wages range from \$10 to \$20 with board, while 75 cents to \$1.25 is paid for day labor. For cotton picking 60 cents a hundred pounds is the usual wage. Most of the work is performed by the farmers and their families.

The percentage of the land in farms is 58.3. The average size of farms is 100.2 acres, of which 42.7 per cent is improved. Much of the land is held in large tracts. Approximately 25 per cent of the total area of the parish is improved farm land. Only 55.6 per cent of the farms are operated by owners, 44.3 per cent being worked by tenants, and 0.1 per cent by managers. Both the cash and the share system are in use, the latter being the most common. Cash rents range from \$1 to \$3 an acre. When the tenant furnishes the stock and tools he retains two-thirds of the cotton crop and three-fourths of the corn crop. When the owner furnishes the stock, implements, feed for horses, and one-half the fertilizer and the tenant does all the work, the crops are divided equally.

#### SOILS.

The soils of Webster Parish are quite varied in texture, structure, color, topography, and origin. The dominant colors of the surface material are gray, brown, black, and red. There are three main physiographic positions: (1) Uplands, (2) terraces or second bottoms, and (3) first bottoms. In the uplands the Susquehanna, Ruston, Orangeburg, Norfolk, Greenville, and Lufkin series occur; on the terraces or second bottoms the Cahaba and Kalmia; and in the first bottoms the Ocklocknee, Bibb, and Johnston series, and Meadow. Most of the soils are sandy in the surface section, light in color, and low in organic matter. The subsoils are predominantly clays—sandy, friable clays to stiff, plastic clays covering a broad range in color.

The upland soils represent old sedimentary materials which, since the recession of the water, have undergone changes resulting from weathering. From these beds of clay, sandy clay, sand, and gravel the present upland soils have been formed.

The gray upland soils with friable to moderately friable subsoils belong to the Orangeburg series if the subsoil is red, to the Ruston if reddish yellow or yellowish red, and to the Norfolk if yellow or yellow mottled with gray. The gray upland soils with compact, plastic

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<sup>1</sup> Respective percentages of phosphoric acid, nitrogen, and potash.

subsoils belong to the Susquehanna series if mottled red, yellow, and drab, and to the Lufkin if mottled yellow and gray. The upland soils of reddish-brown surface color and having friable subsoils of red color belong to the Greenville series.

The soils in the area of country lying west of the Bayou Dorcheat have been correlated as upland rather than terrace soils. The question of the existence of a terrace covering this region has not been definitely determined. The existence of several larger "islands," one containing many square miles, indicates that the terrace, if it be such, is marine rather than a river terrace, and in geographical position really belongs within the coastal flatwoods belt rather than in the river terraces. However that may be, the fact that the edges of the belt have been eroded and the soils leached places the soils occurring within these eroded edges within the Coastal Plain group rather than with the smooth or flat and less leached materials of the true river terraces. The soils on the uneroded part of the belt have been subjected to poor drainage conditions so long that they have reached the same stage in their development as that reached by the soils on areas of similar topography in the true Coastal Plain. These soils have been classified, therefore, with the Lufkin, Norfolk, Ruston or Susquehanna series, the distinction being made on the basis of the color of the soil and color and structure of the subsoil.

The true stream terraces are made up of alluvium, which, as judged by the character of the material, is derived largely from or includes much material from the upland soils of the region. Along Bayou Dorcheat and Bayou Bodcau terraces lower than those whose origin is ascribed to the Red River have been subsequently formed. The character of the material on these and the source of the present drainage water both indicate origin from the regional uplands. Two series are ascribed to the terraces, the material of which is believed to have been washed from the Coastal Plain or regional upland soils. These are the Cahaba and Kalmia. The Cahaba series is characterized by brownish-gray soils and reddish-yellow or yellowish-red friable subsoils; the Kalmia by gray soils and yellow friable subsoils which are usually mottled with gray in the lower portion.

The alluvium, or the first-bottom soil, of the streams of Webster Parish is of most recent formation and, in fact, in most places is still in process of formation, being added to by each overflow. The brown alluvium is included in the Ocklocknee series, the black in the Johnston, the light in the Bibb, and the mixed material is classed simply as Meadow. The Johnston and most of the Bibb soils are confined to the broader bottoms.

The following table gives the name and the actual and relative extent of each of the soils mapped in the parish:

*Areas of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Ruston very fine sandy loam..	120,512	30.9	Norfolk very fine sandy loam..	7,168	1.8
Susquehanna very fine sandy loam.....	48,128	12.4	Bibb silt loam.....	6,912	1.8
Ocklocknee very fine sandy loam.....	38,720	10.0	Lufkin silty clay loam.....	3,904	1.0
Lufkin very fine sandy loam..	38,528	9.9	Orangeburg fine sandy loam..	3,904	1.0
Ruston fine sandy loam.....	31,232	8.0	Meadow.....	2,688	.7
Ocklocknee silt loam.....	18,496	4.8	Norfolk fine sand.....	1,984	.5
Susquehanna gravelly sandy loam.....	18,368	4.7	Kalmia very fine sandy loam..	1,664	.4
Bibb very fine sandy loam....	12,736	3.3	Ruston fine sand.....	1,536	.4
Cahaba very fine sandy loam..	11,456	2.9	Cahaba fine sand.....	896	.2
Susquehanna clay loam.....	11,456	2.9	Greenville clay loam.....	448	.1
Susquehanna fine sandy loam..	8,576	2.2	Johnston clay.....	448	.1
			Total.....	389,760	.....

## SUSQUEHANNA SERIES.

The Susquehanna soils are gray to reddish in color and are underlain by mottled red and gray or red, gray, and yellow, plastic, heavy clay subsoils. Red is nearly always the predominant color in the subsoil, the other colors appearing only as mottlings, usually in the lower portion of the soil section. These may vary, often being red, white, drab, yellow, and sometimes purple. The heavier members are difficult to handle on account of the intractable subsoil. In this parish four Susquehanna types are mapped, the very fine sandy loam, fine sandy loam, gravelly sandy loam, and clay loam.

## SUSQUEHANNA VERY FINE SANDY LOAM.

The soil of the Susquehanna very fine sandy loam is a grayish loamy very fine sand, 4 to 8 inches deep, grading through a pale-yellow or reddish-yellow very fine sandy loam into a red tough plastic clay at about 8 to 18 inches. On the average the subsoil becomes mottled with drab at about 24 inches, though the mottling may not appear above a depth of 30 inches, while again it may begin in the upper subsoil and continue in increasing conspicuousness through the subsoil. Frequently the subsoil is yellowish red in the upper section and brighter red or brick red below. Below 30 inches the subsoil is frequently variegated with yellow, reddish-yellow, purplish-red, bright-red, and drab colors. There are small included bodies in which the clay is not reached much above 2 feet, and still other places where it is reached within 5 to 10 inches of the surface. The soil is usually deepest on the more gentle slopes and most shallow on the sharp divides about heads of gullies and on the shoulders of slopes. Exposures of red, tough, plastic clay are frequent in culti-

vated fields and give them a spotted appearance. As the color indicates, the soil is low in organic matter. In timbered areas the soil is a shade darker, owing to the organic matter present. Quartz and chert pebbles and fragments of ferruginous rocks are frequently strewn over the surface.

The Susquehanna very fine sandy loam differs from the Ruston very fine sandy loam in having a much more plastic subsoil and more intense and frequent mottling in the lower subsoil. Owing to their intimate association, it is frequently difficult to draw a satisfactory boundary line between the two types.

The Susquehanna very fine sandy loam is well developed in Webster Parish, being the second most extensive soil type. It occurs in fairly large areas in the northeastern part of the parish, extending from Caney Creek to the northern boundary line, and in smaller patches in the eastern and southeastern parts.

It occupies undulating to rolling country, and has good surface drainage. The subsoil is so dense that internal circulation of air and moisture is impeded. In the southeastern part of the parish the type occurs largely along stream slopes. In places there are small, flat areas which are poorly drained. The area about one-half mile southeast of Mims School and a number of others, too small to designate, represent this condition typically. Owing to the tough, impervious clay subsoil, the loose, porous surface soil becomes saturated quickly during rains, causing the water to run off the surface and thus bringing about excessive sheet erosion and gullyng. Contour plowing is general and many farmers are terracing the slopes with good results.

The native growth of timber consists of shortleaf pine, white oak, red oak, post oak, ironwood, sweet gum, and dogwood. Approximately 30 per cent of this type is under cultivation and the remainder is cut-over land used largely for pasturage.

Cotton and corn are practically the only crops produced on this type. With a fairly heavy application of commercial fertilizer, 15 to 20 bushels of corn or one-fourth to one-half bale of cotton are obtained per acre. Without the application of the fertilizer the yields are about half those given. Both Irish and sweet potatoes do well, but the production is just enough to supply home consumption. Occasionally a few acres on each farm are devoted to cowpeas, which do well on the type. Two to three tons of hay are obtained, and when left to mature the peas make excellent hog feed.

No attention is given to crop rotation, though corn is occasionally alternated with cotton. When a field becomes worn out it is left to grow up in old-field pines.

The 1-horse plow is used almost entirely on this type, and ridge plowing is the common practice. The preparation of the land for cotton and corn is done largely in February and March. Owing to



its sandy surface soil, this type can be handled under a wide range of moisture conditions, except where the clay comes close to the surface. Large quantities of commercial fertilizer are applied, consisting usually of cottonseed meal, acid phosphate, and kainit, in varying proportions. Very little barnyard manure is used. Under the present system of farming the fertility of the soil is steadily decreasing. A few farmers use a rotation including lespedeza and cowpeas.

The present selling price of improved land ranges from about \$10 to \$15 an acre, depending on improvements and location. Cut-over land can be bought for \$5 to \$10 an acre. Practically all of the merchantable timber has been removed from this type.

#### SUSQUEHANNA FINE SANDY LOAM.

The soil of the Susquehanna fine sandy loam is a grayish fine sand, 4 to 8 inches deep, grading into a yellowish to reddish loamy fine sand. It is underlain at about 8 to 18 inches by a red tough plastic clay, which usually shows increasing drab mottling with depth. In places the clay is as deep as 30 inches, and in others it comes within 5 to 10 inches of the surface. The organic-matter content is prevailingly low, and the soil is very acid, as evidenced by an abundant growth of sorrel. The surface soil of the timbered areas has a decidedly darker color than that of cultivated fields.

This type is rather inextensive. The largest areas occur northeast and southeast of Minden, and a few smaller ones are scattered throughout the southeastern part of the parish.

The topography is undulating to rolling and the surface is well drained, although the subsoil has poor drainage. Owing to its coarser surface soil, this type is less retentive of moisture than the Susquehanna very fine sandy loam.

Shortleaf pine, post oak, red oak, sweet gum, ironwood, and dogwood are the characteristic growth. Approximately 30 per cent of this type is under cultivation and the remainder is in abandoned fields and cut-over land.

Cotton and corn are the principal crops. Under ordinary conditions cotton produces one-fourth to one-third bale and corn 15 to 20 bushels per acre with the application of commercial fertilizers. Without fertilization these crops can not be profitably grown. Oats yield fairly well for this region.

Owing to its sandy nature, this soil can be handled under a wide range of moisture conditions. Large quantities of commercial fertilizers are used, but scarcely any manure except what little accumulates in the barnyards. The fertility of this soil is rapidly decreasing, owing to the methods of farming in use.

The present valuation of the type ranges from about \$3 to \$15 an acre.

## SUSQUEHANNA GRAVELLY SANDY LOAM.

The Susquehanna gravelly sandy loam is a grayish-brown or brownish-gray fine sand to fine sandy loam, with an average depth of 4 to 6 inches. The soil passes into reddish-brown or reddish-yellow fine sandy loam, and this is underlain at about 10 to 20 inches by plastic red clay mottled with drab, especially in the lower subsoil. The depth to the clay subsoil varies considerably. On the flatter areas the heavy clay is often not reached above 24 to 30 inches, while on shoulders of hills and badly eroded spots it comes within 5 to 8 inches of the surface and is often exposed. Gravel pebbles of quartz and chert and small angular fragments of ferruginous rock are abundant on the surface and through the surface soil. The subsoil has less gravel and fragments than the surface soil. Cobblestones, boulders, and even ledges of ferruginous rock are present in places.

Within this type, as mapped, there are included areas of Susquehanna very fine sandy loam too small to show separately, and, on the other hand, some patches of Susquehanna gravelly sandy loam have been included with the other members of the Susquehanna series. Numerous areas of Rough stony land, too small to indicate, were also mapped with the Susquehanna gravelly sandy loam.

The largest areas of this type occur to the west, northwest, and southwest of Shongaloo, and numerous smaller ones throughout the eastern and northeastern parts of the parish.

Typically the topography of the Susquehanna gravelly sandy loam is rolling, the type occurring along stream slopes and occasionally on narrow, rather flat divides. The area about 2 miles south of Leton, closely associated with the Greenville clay loam, is steeply rolling to almost broken. Ordinarily the soil has good drainage, though that of the subsoil is somewhat deficient. On account of the large proportion of coarse material in the soil, erosion has not been severe. When properly tilled the soil withstands extended droughts, though not so well as the Susquehanna very fine sandy loam.

The native vegetation is largely pine, post oak, red oak, sweet gum, ironwood, and dogwood. Only a small part—about 10 per cent—of this type is cleared, the remainder being mostly cut-over land.

As with other members of the series, cotton and corn are the principal crops grown on the Susquehanna gravelly sandy loam. With ordinary fertilization and cultivation, one-fourth to one-third bale of cotton or 15 to 20 bushels of corn per acre are obtained. The large percentage of gravel interferes more or less with cultivation, and in places the soil is so gravelly and stony as to be unfit for cultivation. Commercial fertilizers are used liberally, but very little barnyard manure is applied.

The selling price of the Susquehanna gravelly sandy loam at present ranges from about \$5 to \$10 an acre, depending on the improvements.

## SUSQUEHANNA CLAY LOAM.

The Susquehanna clay loam consists of a grayish very fine sandy loam, passing quickly into pale-yellow fine sandy clay loam, and underlain at an average depth of 6 inches by a light-red to red, tough, plastic clay, which shows drab or gray mottling in the lower subsoil, the drab color becoming more conspicuous with increase of depth. The mottling may begin near the upper part of the subsoil, or again it may not be encountered until a depth of 2 feet is reached. Black concretions, apparently ferruginous, are very common in the lower stratum. In the area 3 miles southwest of Yellow Pine the uniformly red color persists to a depth of 36 inches and the substratum is calcareous. In places the surface soil is lacking and the clay subsoil is exposed. There are some dome-shaped mounds of Ruston very fine sandy loam in this type, most of which are confined to the large areas northeast of Cotton Valley.

The areas northeast of Cotton Valley have a higher percentage of silt in the surface soil than the typical soil, and in places approach a silt loam. Along Bayou Bodcau a dark-red, heavy clay is frequently seen in deep cuts, and in places appears at the surface. This stratum is highly calcareous and contains numerous lime concretions. In sec. 11, T. 21 N., R. 10 W., a heavy, waxy, black clay, occurring on the stream slope at the intersection of the stream and the public road, showing little change in color or texture throughout the 3-foot section, is included with this type. It is calcareous, and appears to be the Brewer clay, which has been mapped elsewhere on similar terraces. It is forested and poorly drained.

The type is rather inextensive. It occurs in small areas, mostly in the western and southwestern parts of the parish. The largest areas are found in the southwestern part and northeast of Cotton Valley. It occurs typically along stream slopes and includes "flatwoods" areas. The latter have a flat to undulating topography. The type is fairly well drained, except in the last named positions. Where it occurs along stream slopes it is subject to erosion.

West of Bayou Dorcheat this soil is derived from old Red River alluvium. It has a very small quantity of quartz pebbles or ferruginous rock on the surface. The substratum contains an abundance of lime concretions. Of several tests made with hydrochloric acid each indicated a high percentage of lime in the substratum. In the areas northeast of Cotton Valley numerous lime concretions are visible in shallow cuts not over 2 feet in depth.

Where extensively developed the type is referred to as "post-oak flats," indicating the chief growth of timber. There is also a scattering of shortleaf pine and elm, white and red oak, dogwood, and other hardwoods. Most of this soil is still in cut-over land.

Very little of this type is utilized for crop production beyond small areas occurring in other soil types. When it is properly tilled and



reclaimed good yields of cotton and corn are obtained. Bermuda and carpet grass do well. Owing to the calcareous nature of this soil, alfalfa should prove a profitable crop. Most of the cleared land is utilized for grazing.

Owing to the retentive nature of this soil, commercial fertilizers have a lasting effect. However, the soil is rather difficult to handle.

Farm values on this soil at present range from about \$3 to \$5 an acre.

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

*Mechanical analyses of Susquehanna clay loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
431621.....	Soil.....	0.8	0.8	0.7	4.8	44.0	39.3	9.3
431622.....	Subsoil.....	.2	.2	.3	1.2	20.6	37.1	40.5

#### RUSTON SERIES.

The Ruston soils are gray to grayish brown, and are underlain by reddish-yellow to yellowish-red or dull-red, moderately friable subsoils, prevailing of sandy clay. The series holds an intermediate place between the Orangeburg and Norfolk soils in the color of its subsoils, and a similar place between the Orangeburg and the Norfolk on the one side and the Susquehanna on the other in point of subsoil structure. Occasionally the lower subsoils are mottled with gray and shades of yellow. The soils are closely associated with the Orangeburg and Susquehanna, and are probably derived from practically the same formation as the Orangeburg. In Webster Parish the very fine sandy loam, fine sandy loam, and fine sand members of this series are mapped.

#### RUSTON VERY FINE SANDY LOAM.

The typical Ruston very fine sandy loam is a light brownish gray to gray very fine sand to very fine sandy loam, underlain at about 4 to 8 inches by a pale-yellow or yellowish-gray loamy very fine sand or very fine sandy loam. The subsoil, beginning at any point from about 10 to 20 inches, is a reddish-yellow, yellowish-red, or dull-red friable fine sandy clay. In places the upper subsoil is a little compact and plastic, but the lower subsoil is friable or moderately friable, and not infrequently shows mottlings of red and gray. In places, however, in the small areas in the western part of the parish, the subsoil becomes denser with depth. Along slopes and about heads of gullies the reddish, friable sandy clay is frequently exposed. There are some gravel spots mapped with the type, mostly along the edge of Bayou Dorchest swamp, the gravel consisting in places of quartz and chert

and elsewhere of fragments of ferruginous rock. The area of this type in secs. 30 and 31, T. 21 N., R. 9 W., approaches the Susquehanna very fine sandy loam in structure and the Orangeburg fine sandy loam in color. This type is closely associated with the Susquehanna very fine sandy loam, and in places it is rather difficult to draw a satisfactory boundary line between the two.

The Ruston very fine sandy loam is the most widely distributed type of the Ruston series. It is most extensively developed in the western part of the parish, and also occurs throughout the southeastern and eastern part.

The surface is undulating to gently rolling, and the drainage is generally well established. In the areas west of Bayou Dorcheat the subsurface drainage could in many places be advantageously improved. Where the type is closely associated with the Susquehanna very fine sandy loam it usually occupies the smoother divides and lower situations along drainage ways. Erosion is not a very serious factor in farming on this type, though contour plowing and terracing have been practiced with profitable results on many farms. Owing to its fine texture and friable subsoil the type absorbs and retains a good deal of the rainfall, and therefore withstands protracted drought.

An abundant growth of sorrel is found on this type, which indicates that it is very sour. The forest vegetation consists of shortleaf pine and oak, sweet gum, ironwood, and other hardwoods.

About 50 per cent of this type is cleared and devoted to crop production. Cotton and corn are the principal crops grown, and where the soil receives an application of commercial fertilizer they do well. Cotton yields ordinarily one-fourth to one-half bale and corn 14 to 25 bushels per acre. Most of the corn is fed to the live stock. With good farm management and thorough cultivation much larger yields are obtained. Oats do well. Peanuts, sweet and Irish potatoes, cowpeas, and lespedeza have proved very profitable crops, but they are grown to only a small extent. There are a few peach orchards on this type, usually where the surface soil is strewn with gravel, but apparently no commercial orchards.

No attention is given to crop rotations, though corn is occasionally alternated with cotton. When a field becomes very unproductive it is abandoned and left to grow up in pine seedlings. The 1-horse plow is generally used, except by a few up-to-date farmers, who are beginning to use the 2-mule hitch. Ridge plowing is the universal practice. The soil is very easy to handle and can be cultivated under a wide range of moisture conditions. Under the present system of farming the fertility of the soil is gradually decreasing.

This type is now valued at about \$5 to \$25 an acre, depending on the improvements and distance from market.

## RUSTON FINE SANDY LOAM.

The soil of the Ruston fine sandy loam is a brownish-gray to gray fine sand to loamy fine sand or sand with an average depth of about 6 inches, a subsurface layer of pale-yellow or yellowish-gray fine sand between the surface soil and subsoil beginning at a depth of about 10 to 20 inches. The subsoil is a reddish-yellow, yellowish-red, or dull-red friable sandy clay. Like the subsoil of the Ruston very fine sandy loam, the upper portion of some areas is rather compact and somewhat plastic and frequently the lower subsoil shows reddish, grayish, and yellowish mottlings. Along the steeper slopes and about the heads of gullies the subsoil clay is frequently exposed. There are some spots where chert and quartz gravel and occasionally fragments of ferruginous rock are abundant, but these are too small to show on the scale used. The two areas northeast of Grove have a very light gray to almost white surface soil, underlain by the typical subsoil. Areas occur in which quartz and chert gravel and fragments of ferruginous sandstone or limonite are plentifully strewn over the surface and disseminated through the soil and to a less extent through the subsoil in places sufficient to make it impenetrable with an auger. Such areas have been indicated on the map by gravel symbols. Like other members of this series, this type is very low in organic matter and is acid according to the litmus test.

This type is not so extensive as the Ruston very fine sandy loam. It occurs largely in the vicinity of Minden and in the southeastern part of the parish and in a number of small areas in the northern and eastern parts.

The topography ranges from gently undulating to rolling, and the type is thoroughly drained. During protracted spells of drought it becomes very dry and crops suffer, but under normal conditions it supplies enough water for crops. Owing to the friable subsoil and rather loose surface soil it absorbs a large amount of rain water, which lessens the liability to erosion. Contour plowing is practiced to advantage on the type.

Shortleaf pine, oak, and sweet gum are the important trees. About 50 per cent of the type represents cut-over forest land.

Cotton and corn are the chief crops grown, and the former is by far the most important. When heavily fertilized with commercial fertilizers, acreage yields of one-fourth to one-half bale of cotton and 15 to 20 bushels of corn are obtained. Without fertilization the crops are unprofitable.

The present value of this type of land ranges from about \$7 to \$25 an acre, depending on improvements.

## RUSTON FINE SAND.

The soil of the Ruston fine sand is a gray fine sand, which in the lower part of the 3-foot section grades into a light reddish yellow fine

sand. A sticky, reddish-yellow fine sandy loam is usually encountered at about 36 inches. In places the texture ranges to a medium sand. The type is very low in organic matter, owing to its open and porous structure.

The Ruston fine sand occupies 2.4 square miles of territory in this parish. It occurs principally in the southeastern part of the parish. The type characteristically occupies the tops of knolls and ridges. It is very irretentive of moisture and leachy, owing to its porous structure.

Most of this type is under cultivation. Cotton and corn are the chief crops grown. Cotton yields generally one-fourth bale and corn 10 bushels to the acre.

#### NORFOLK SERIES.

The Norfolk soils are characterized by the light-gray to grayish-yellow color of the surface soils and by the yellow color and friable structure of the subsoils. They occupy nearly level to rolling uplands throughout the Atlantic and Gulf Coastal Plain. The members of this series are variously adapted to early, medium, and late truck crops and to general farm crops. The sandy members predominate. These soils are usually deficient in organic matter, which should be added in liberal quantities to enable them to retain a favorable supply of moisture. In this parish two types are found, the Norfolk very fine sandy loam and the fine sand.

#### NORFOLK VERY FINE SANDY LOAM.

The soil of the Norfolk very fine sandy loam is a gray or yellowish-gray very fine sandy loam with an average depth of about 6 inches. It is underlain by a pale-yellow very fine sandy loam, which at any point from about 12 to 24 inches passes into a yellow friable fine sandy clay. Over some of the lower, more nearly level bodies dome-shaped mounds are common, the soil being deeper on these, while that in the intervening depressions is somewhat darker and less well drained. In poorly drained positions light-gray and red mottlings occur in the lower portion of the subsoil. These imperfectly drained areas, however, are not typical, as the Norfolk soils are characteristically well drained.

In the vicinity of Vaughns Chapel areas occur in which the surface soil is a loamy very fine sand to very fine sandy loam. There is also an area west of Springhill, having a somewhat coarser surface soil, which was included within this type on account of its small extent.

The type is most extensive in the southeastern part of the parish and also embraces one area northeast of Leton and one west of Vaughns Chapel. The largest area lies just south of Heflin. The type has an undulating to gently rolling topography, occupying generally a lower position than the surrounding Ruston soils. It is not so thoroughly drained as the Ruston very fine sandy loam, though



most of it has what would be considered good drainage, except those flatter areas which must be provided with artificial drainage to insure the best results.

Owing to the poorer drainage conditions, this type has not been so thoroughly oxidized as the Ruston or Orangeburg soils. It is very deficient in organic matter and is sour according to the litmus test.

Shortleaf pine, and oak, sweet gum, and other hardwoods are the chief timber growth. Apparently one-third of this land is improved. Under ordinary conditions cotton produces one-third to one-half bale and corn 15 to 25 bushels per acre. Oats do well if sown in the early fall. Bermuda grass makes a good growth and is largely utilized for pasturage. Truck crops should prove profitable on this type with the opening of markets.

The Norfolk very fine sandy loam is easy to handle, and like the other types of the parish receives very shallow stirring. Commercial fertilizers are used for the production of oats and corn. Scarcely any organic matter is incorporated by green manuring or the application of barnyard manure.

At the time this survey was made the better farm land of this type was valued at about \$8 to \$10 an acre, depending on improvements.

#### NORFOLK FINE SAND.

The Norfolk fine sand is a gray loose fine sand underlain at 4 to 8 inches by a yellowish-gray or pale-yellow fine sand of the same structure as the soil. It is obviously deficient in organic matter and is acid to litmus, at least in places.

The type occurs on knolls and ridges and is found in a few small areas in the eastern and northeastern parts of the parish. The drainage is excessive and the soil is very droughty. Owing to its loose, porous condition, fertilization is not very lasting. It is more or less subject to wind erosion, which occasionally damages crops.

Only with heavy and constant fertilization and in the absence of protracted droughts can crops be grown successfully on this type. Of the general farm crops cotton appears to do best, and the ordinary yield is about one-fourth bale to the acre. Early truck crops do well generally, and trucking should become an important industry with increasing demand for better transportation facilities.

The present value of this type ranges from about \$3 to \$5 an acre.

#### ORANGEBURG SERIES.

The soils of the Orangeburg series are marked by their gray to reddish-brown color and open structure. The subsoils are red friable sandy clay. These soils are confined to the uplands of the Atlantic and Gulf Coastal Plain, being most extensively developed in a belt extending from southern North Carolina to central Texas. They

are derived from unconsolidated Coastal Plain deposits. In the present survey only the fine sandy loam type was mapped.

#### ORANGEBURG FINE SANDY LOAM.

The soil of the Orangeburg fine sandy loam, to a depth of 4 or 5 inches, is a yellowish-gray to brownish-gray fine sand resting on a grayish-yellow to reddish loamy fine sand to fine sandy loam. At any point between 10 and 20 inches a red, friable fine sandy clay occurs. Some quartz and chert gravel are encountered, and the area about 3 miles south of Leton approaches a gravelly sandy loam. As no attention has been directed to the restoration of organic matter, the soil in the older fields is very deficient in humus. The Orangeburg fine sandy loam may be distinguished from the Susquehanna fine sandy loam through the fact that the subsoil of the latter is a stiff, plastic clay, nearly always mottled in the lower depths.

The largest areas occur in the southeastern part of the parish. Other small areas are found throughout the eastern and northwestern parts. It is a well-drained soil and usually occurs on slopes, ridges, and knolls.

The principal trees on the Orangeburg fine sandy loam are pine and oak, gum, and other hardwoods. Probably about 60 per cent of the type is under cultivation. It is considered one of the best general farming soils in the parish. Owing to its friable texture and retentive character, the soil is very desirable for cotton, corn, winter oats, cowpeas, peanuts, and sweet potatoes. Cotton yields ordinarily from one-third to one-half bale, corn about 20 bushels, and sweet potatoes 50 to 200 bushels per acre. Peaches do well and should prove profitable.

This type is very easy to work and can be cultivated under a wide range of moisture conditions. Owing to the one-crop system, the productive capacity of the soil has been considerably reduced in spite of liberal applications of commercial fertilizer.

The present price of this type of land ranges from about \$10 to \$20 an acre, depending on improvements and distance from market.

#### GREENVILLE SERIES.

The Greenville soils are reddish brown to dark red, and generally loamy. The subsoils are red and friable. The types occupy level to gently rolling areas in the Coastal Plain uplands. They are closely associated with the members of the Orangeburg series in their distribution and, like them, are derived from Coastal Plain material. In some localities there appears to be some influence from the underlying limestone. As a rule the soils are more retentive of moisture than the corresponding members of the Orangeburg series. The clay loam type is the only member of this series mapped in this parish.

## GREENVILLE CLAY LOAM.

The Greenville clay loam is a dark-red or reddish-brown heavy loam to clay loam, about 4 to 6 inches deep, underlain usually by a red sandy clay of moderately friable structure carrying ocherous-yellow material of powdery nature. The subsoil is considerably more compact in the lower part. Small angular fragments of ferruginous rock, mostly sandstone and limonite, are present throughout the body of the soil in sufficient quantity to give some of the areas a decidedly gravelly character. The soil is locally spoken of as "red land." In sec. 12, T. 21 N., R. 9 W., there are some areas of Greenville gravelly loam, but on account of its small total extent this soil was included with the clay loam type.

The Greenville clay loam occupies about the highest topographic position in the parish. It occurs on broad, undulating divides. It is well drained, and on account of its heavy subsoil withstands protracted droughts.

Most of this type was originally forested with shortleaf pine, with a scattering of oak and other hardwoods. About 50 per cent of it is now under cultivation. The greater part is utilized for the production of cotton and a small part for corn. With proper tillage, yields of one-half to three-fourths bale of cotton and 20 to 30 bushels of corn are obtained. It is undoubtedly the most fertile upland soil in the parish. No attention is given to crop rotation, but corn is occasionally alternated with cotton.

In comparison with the sandy types of the parish, the Greenville clay loam is rather difficult to handle. Unless it is cultivated under the right moisture conditions the soil becomes puddled and hard lumps form, which are difficult to reduce.

The present selling price of the Greenville clay loam varies from about \$5 to \$15 an acre.

In the following table the results of mechanical analyses of samples of the soil and subsoil of the Greenville clay loam are given:

*Mechanical analyses of Greenville clay loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
431601.....	Soil.....	3.5	3.3	4.6	15.4	11.8	39.3	21.9
431602.....	Subsoil.....	4.0	2.6	3.4	14.6	10.0	29.6	36.8

## LUFKIN SERIES.

The surface soils of the Lufkin series are light gray. They are underlain by impervious, plastic, gray to mottled gray and yellow

subsoils. The difference in texture between the surface soil and subsoil in the case of the sandy members is very marked. The topography is prevailingly flat, and this, together with the impervious subsoil, renders surface and underdrainage poor, water often standing for long periods after heavy rains. These soils are locally known as "flatwoods land" and "dead land." In this parish the Lufkin series is represented by the silty clay loam and very fine sandy loam types.

#### LUFKIN SILTY CLAY LOAM.

The typical Lufkin silty clay loam is a gray or mottled yellowish and gray silty clay loam, grading quickly into mottled yellow and gray silty clay loam, which is underlain at 5 or 6 inches by plastic, sticky clay, mottled yellow and gray. The gray color becomes more conspicuous with increased depth and the material becomes more dense and compact. Some reddish mottlings are common in the lower subsoil. Small iron concretions are usually present throughout the soil section. There are a few dome-shaped mounds of brownish very fine sandy loam. The soil in the area north of Leton is somewhat lighter in texture, and the intermediate layer is about 3 to 8 inches deep.

The type occurs in the vicinity of Yellow Pine, north of Leton, and west of Springhill. It occupies level, poorly drained areas, locally styled "flatwoods land." According to the litmus test it is highly acid, and the color of the surface soil indicates a low organic-matter content.

A growth of pine, oak, and gum is commonly supported by this type. Scarcely any of the type is cleared, and at present it is entirely used for the ranging of cattle and hogs. The first step in its reclamation is the establishment of thorough surface and subsoil drainage by some comprehensive system, followed by extensive green manuring to mellow and improve the physical character of the surface soil. When reclaimed this type should prove a good soil for rice.

Where the merchantable timber has been removed the Lufkin silty clay loam now sells at approximately \$3 to \$5 an acre.

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

*Mechanical analyses of Lufkin silty clay loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
431655.....	Soil.....	0.0	0.6	0.8	4.9	19.4	53.6	20.9
431656.....	Subsoil.....	.0	.4	.5	3.0	14.7	44.5	36.8



## LUFKIN VERY FINE SANDY LOAM.

The soil of the Lufkin very fine sandy loam is a grayish to mottled grayish and yellowish very fine sandy loam, underlain at an average depth of about 6 inches by heavier, yellowish or mottled grayish and yellowish very fine sandy loam, which at any point from about 10 to 30 inches passes into a rather compact fine sandy clay to silty clay loam of a mottled yellowish and grayish color. Reddish-yellow tints are common throughout the subsoil and occasionally quite red splotches appear in the lower part. Frequently the gray mottling of the third-foot section has a decidedly bluish cast. The color of the surface soil shows variations from brownish gray through yellowish gray to dark gray, though where typically developed it is gray or mottled yellowish and gray. Some black concretions, probably oxide of iron, are present in the lower, more compact portion. This soil is apparently low in organic matter. Within this type are included small depressed areas of Lufkin silty clay loam, which differs from the very fine sandy loam principally in texture. Pin oak is the characteristic growth on such spots. Along the margin of areas of this type the texture is typical, but in the interior it tends toward a silt loam. In the area north of Springhill the soil in places approaches a fine sandy loam.

The Lufkin very fine sandy loam is extensively developed in the western part of the parish on the Red River terrace.

This soil occupies the broad, flat areas of the Red River terrace, though quite frequently it appears in low, sloughlike, depressed positions. In places the large number of dome-shaped mounds give it a billowy configuration. As the topography indicates, the drainage of the type is very inadequate, but by artificial drainage it could be reclaimed and made a valuable soil.

The Lufkin very fine sandy loam is derived from old Red River alluvium. Wells and deep cuts indicate a high percentage of lime, in the form of concretions, below a depth of 5 or 6 feet, and sometimes, though rarely, calcareous material is reached in the third foot.

The forest vegetation consists of shortleaf pine, post oak, white oak, and red oak, with a few holly, dogwood, and persimmon trees. Practically all of this type occurs as cut-over land, as most of the merchantable timber has been removed.

The drainage of the Lufkin very fine sandy loam is mostly too poor to permit satisfactory utilization. Good yields of cotton are produced on some of the better drained marginal strips. Corn has not done well. When cleared this type makes very good grazing land, supporting an excellent growth of carpet grass and other wild grasses. At present it is used largely for hog and cattle ranges. At Taylor, Columbia County, Ark., rice has been grown successfully on this type.

The land at this time sells for about \$3 to \$5 an acre. Where still in native timber higher prices are asked, depending on the amount of merchantable timber.

#### CAHABA SERIES.

The surface soils of the Cahaba series are brown to reddish brown and the subsoils are yellowish red to reddish brown. The series occupies well-drained situations on old stream terraces, lying above overflow or normal overflow. These soils are most extensively and typically developed in the Gulf Coastal Plain. The component material consists largely of wash from Coastal Plain soils. In this parish the fine sand and very fine sandy loam types are mapped.

#### CAHABA VERY FINE SANDY LOAM.

The Cahaba very fine sandy loam consists of a grayish to brown loamy very fine sand to very fine sandy loam, underlain at an average depth of about 8 inches by yellowish-red to reddish-brown, friable fine sandy clay. The lower subsoil is often of a reddish-yellow color. Faint mottlings of red and yellow are present in the lower subsoil of some areas. There are included patches, too small to map, of Kalmia very fine sandy loam which has a yellow subsoil, others of Chattahoochee very fine sandy loam which have a reddish-brown soil and red subsoil, and some of Leaf very fine sandy loam which has a mottled red and gray, plastic subsoil. There are also some dome-shaped mounds and hummocks of deeper very fine sandy loam.

The Cahaba very fine sandy loam is similar to the Ruston very fine sandy loam in color and texture, but is different in that it occupies a flat, benchlike position instead of undulating to rolling upland.

The type is derived from alluvium which was deposited when the streams were flowing at a higher level. It occurs largely along Cypress Creek, Indian Bayou, Black Bayou, Bayou Flat Lick, Bayou Dorcheat, and Crows Creek, besides numerous other watercourses.

It occupies undulating to almost flat, benchlike positions along streams. It is well drained and when properly handled withstands droughts well.

The native trees of this type were mostly shortleaf pine, oak, elm, and ironwood. About 90 per cent of the soil is under cultivation.

As on the other soils, cotton and corn are the chief crops grown, and when fertilized both do well. Cotton yields ordinarily one-half bale and corn 25 bushels per acre, though with thorough cultivation and proper farm management higher yields are obtained. Some lespedeza is grown, and it has given very satisfactory results, yielding 2 to 3 tons per season. Cowpeas do well and the tendency is to grow more of this legume. Only enough Irish and sweet potatoes are grown to supply the home demand.

The Cahaba very fine sandy loam is easy to handle and can be worked under a wide range of moisture conditions. Practically every farmer uses some form of commercial fertilizer, generally cottonseed meal and acid phosphate, while a few apply kainit in addition. No attention is given to crop rotation, save that corn is occasionally alternated with cotton. The productive capacity of the soil is gradually decreasing.

The present price of this type of soil varies from about \$10 to \$18 an acre, depending on location and improvement.

#### CAHABA FINE SAND.

The soil of the Cahaba fine sand consists of a yellowish-brown to brownish-gray or brown fine sand, underlain at 10 to 12 inches by yellowish fine sand, which usually passes immediately into yellowish-red, reddish-yellow or dull-red fine sand. Occasionally the intermediate yellowish layer extends to a depth of 24 to 30 inches before any reddish material is noticeable, and again it may be entirely absent.

The type is very inextensive, occurring as small areas along Bayou Bodcau, Bayou Dorcheat, and Brushy Creek. It occupies low, distinctly benchlike areas along the major stream courses, usually about 10 feet above the first bottoms. It is well drained and owing to its deep sandy nature is less drought resistant than the Cahaba very fine sandy loam.

The chief native trees on the Cahaba fine sand are shortleaf pine, oak, and sweet gum. It is estimated that about 80 per cent of the type is under cultivation.

Cotton and corn are successfully grown on this soil, and yields of one-fourth to one-half bale of cotton and 20 to 30 bushels of corn per acre are obtained. The methods of cultivation and fertilization are the same as practiced on the other sandy types.

#### KALMIA SERIES.

The surface soils of the Kalmia series are gray, and the subsoils are yellow mottled with gray. The series is developed along streams of the Coastal Plain region on terraces lying largely above overflow. The soils occur typically and most extensively in the Gulf Coastal Plain region of Mississippi and Alabama. The component material of the Kalmia series is derived largely from the Coastal Plain soils, although on the larger streams issuing from the Appalachian Mountains and Piedmont Plateau more or less of the soil from this region is present. In the better drained situations the subsoil color is yellow, causing such areas to resemble very closely the corresponding members of the Norfolk series. These soils are closely related to the Cahaba series, differing essentially in their poorer drainage and the

consequently less oxidized condition of their subsoils. The surface is usually flat, and the drainage on this account is inadequate in most cases. In this survey only the very fine sandy loam type was recognized.

KALMIA VERY FINE SANDY LOAM.

The soil of the Kalmia very fine sandy loam consists of a gray to yellowish-gray very fine sand to loamy very fine sand, grading at 6 to 8 inches into yellow or pale-yellow very fine sandy loam. The subsoil, beginning at about 12 to 20 inches, is a mottled yellow and gray, friable fine sandy clay. Frequently the lower subsoil is compact, and reddish mottlings are not uncommon, especially where the type approaches the Cahaba very fine sandy loam, and gray or drab mottlings are conspicuous in some places. Dome-shaped mounds and irregular hummocks of Cahaba very fine sandy loam are common.

This type is very inextensive and occurs for the most part along Cypress Creek, Black Bayou, and Bayou Flat Lick. Other areas occur in the vicinities of Sibley and Sykes Ferry. It occupies flat terracelike positions and is rather poorly drained.

Practically all of this type is forested, but most of the merchantable timber has been removed. The native growth consists mainly of willow oak, white oak, water oak, sweet gum, black gum, and pine, with an undergrowth of smilax and yellow jasmine.

Cotton does fairly well on the better drained areas, but the soil is too wet for good results with corn. It could be improved by drainage. Rice would do well on some tracts.

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

*Mechanical analyses of Kalmia very fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
431609.....	Soil.....	0.3	0.5	1.2	22.4	27.0	42.2	6.1
431610.....	Subsoil.....	.3	.2	1.0	24.0	25.0	39.4	9.7

BIBB SERIES.

The Bibb series is characterized by light-gray surface soils and compact, plastic, and very light gray to mottled light-gray and yellowish subsoils. Often the subsoil color is quite whitish. These soils are developed in the first bottoms of streams and are subject to overflow and to intermittent wet and dry stages. The material has been washed principally from Coastal Plain soils. In Webster Parish two members of the series are mapped—the Bibb silt loam and very fine sandy loam.

## BIBB SILT LOAM.

The typical Bibb silt loam consists of a light-gray to nearly white silt loam, usually mottled somewhat with rusty brown or yellowish brown and underlain at about 4 to 8 inches by a nearly white silty clay loam, mottled with yellowish, and to some extent with rusty brown. Thin strata of very fine sandy loam are common throughout the substrata, and black concretions, apparently oxide of iron, occur throughout the soil section, in places imparting a distinctly gritty feel. This type includes some mounds and ridges of Ocklocknee very fine sandy loam. Where it borders the Ocklocknee silt loam it grades imperceptibly into that type.

This type is very inextensive and occurs for the most part in the first bottoms of Bayou Bodcau, Bayou Dorcheat, and Cypress Creek. It occupies low, flat positions, characteristically along the bluff line away from the stream channels, with the soils separating it from the stream. It is poorly drained and subject to inundation.

May haw, pine, sweet gum, and water pine, white and red oak, with an undergrowth of palmetto, are the characteristic growth on this type. Most of the salable timber has been removed, though quite a little oak is left. None of the type has been cleared, and it is entirely used for pasturing hogs and cattle.

## BIBB VERY FINE SANDY LOAM.

The Bibb very fine sandy loam consists of a light-gray very fine sandy loam, often mottled with yellowish brown. This is underlain at an average depth of about 8 inches by a light-gray to almost white very fine sandy loam to fine sandy clay mottled with yellow. Small black concretions are abundant in the lower subsoil. Thin layers of sandy material or of clay are encountered in places in the subsoil. There are some small sand mounds of Ocklocknee very fine sandy loam, too small to map, included with this type.

The Bibb very fine sandy loam occurs largely in the swamps along Bayou Bodcau and Bayou Dorcheat, though a few areas are found on the first bottoms of the smaller streams. It occupies low, poorly drained positions, usually along the outer edges of first bottoms, though occasionally it extends to the drainage channel proper.

Where it occurs in broader areas, post oak, water oak, pin oak, cypress, and May haw are the chief growth, while in the smaller areas oak, sweet gum, and pine are common.

None of this type has been drained, and it is at present utilized only for the ranging of hogs and cattle.

The present selling price of Bibb very fine sandy loam is very low. Where it has a growth of merchantable timber, higher prices, ranging from \$10 to \$25 an acre, are asked.



Mechanical analyses of samples of the soil and subsoil of the Bibb very fine sandy loam are given in the following table:

*Mechanical analyses of Bibb very fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
431615.....	Soil.....	0.6	0.7	1.0	20.2	24.4	45.7	7.4
431616.....	Subsoil.....	.4	.4	.9	18.8	23.6	42.9	12.7

#### OCKLOCKNEE SERIES.

The Ocklocknee soils are dark gray to brownish, with gray, yellow, and brownish subsoils. They represent overflowed alluvial first-bottom land along the streams of the western Coastal Plain. The material is derived largely from soils of the Norfolk, Orangeburg, and Susquehanna series. The silt loam and very fine sandy loam types are mapped in Webster Parish.

#### OCKLOCKNEE SILT LOAM.

The typical Ocklocknee silt loam consists of a brown to dark-brown silt loam, underlain at about 6 to 12 inches by yellowish-brown to mottled yellowish-brown, rusty-brown, and gray silty clay loam. Generally this mottling does not appear conspicuously until the lower part is reached, though it is not uncommon to find it immediately below the surface soil. Black concretions, apparently of a ferruginous nature, are common in the lower portion of the subsoil. In the area south of Bayou Flat Lick, where it enters Bayou Dorcheat, the soil consists of dark-brown to almost black heavy silt loam, 8 to 10 inches deep, underlain by light-brown heavy silt loam, which passes immediately into a brownish-yellow silty clay loam. At about 24 to 30 inches the color is light gray, mottled with yellow and rusty brown. This really represents a development of the Johnston silt loam. An important variation occurs as a marginal type between the Bibb and Ocklocknee silt loams. Often an area as wide as one-fourth mile stands intermediate to these two types. The surface soil is a brown or rusty-brown heavy silt loam, mottled with light gray and having an average depth of about 8 inches. The surface appears to be brown, though in some places gray mottlings are encountered. The subsoil consists of a mottled brown and gray silty clay loam, the gray becoming more conspicuous with increasing depth. Occasionally yellowish-red mottlings are encountered throughout the 3-foot section of this variation. In general the Ocklocknee silt loam along the smaller streams is lighter in color as well as in texture

than on the broader bottoms, where it approaches a silty clay loam. Seams of sand are not uncommon throughout any part of the soil section and spots of Ocklocknee very fine sandy loam, too small to map, have been included with the type as shown on the map.

This is one of the most extensive bottom-land soils in the parish. It chiefly occupies the swamps of Bayou Bodcau, Bayou Dorcheat, Cypress Creek, Indian Bayou, Black Bayou, and Bayou Flat Lick. Other areas are found along the smaller streams.

This type usually adjoins the Ocklocknee very fine sandy loam, the highest lying soil in the swamps. In the swamps of Bayou Bodcau and Bayou Dorcheat it occupies an intermediate position between the Ocklocknee very fine sandy loam along the streams and the Bibb series along the edges of the swamps. It is poorly drained, traversed by a network of sloughs, and subject to frequent inundation.

Along the smaller streams the soil is forested chiefly with sweet gum, oak, ironwood, beech, maple, elm, pine, and holly, while in the broader bottoms the main growth is oak, sweet gum, and black hickory, with a dense undergrowth of switch cane. Most of the merchantable timber has been removed. Practically all of this type is still forested.

Here and there small patches of this soil have been cleared and planted to sugar cane, which does admirably when there are no overflows to injure it. It yields 300 to 500 gallons of sirup per acre. When cleared it makes excellent grazing land. Carpet grass does well on it. At present it is utilized mostly as a range for hogs and cattle. The quantity of mast available for hogs has been greatly reduced by the removal of a large number of oak trees.

The Ocklocknee silt loam is now valued at about \$3 to \$8 an acre, depending on improvements.

#### OCKLOCKNEE VERY FINE SANDY LOAM.

The soil of the Ocklocknee very fine sandy loam, to a depth of 8 to 12 inches, is a brown to grayish-brown or yellowish-brown very fine sandy loam to loamy fine sand. It is underlain by a yellowish-brown or mottled yellowish-brown and gray or drab very fine sandy loam to fine sandy clay. Rusty-brown mottlings are common in the subsoil. Usually there is a yellowish transitional layer between the soil and mottled subsoil. Frequently the soil extends to a depth of 18 or 20 inches and the mottlings are not encountered above 30 inches. There are hummocks and low ridges of brownish very fine sandy loam with better drainage and less mottling in the subsoil than in the typical soil. The subsoil in such places usually has a reddish-yellow cast. Immediately along stream courses the material is usually coarser in texture and of a more uniform color

to a depth of 3 feet. Areas of Ocklocknee fine sand, too small to map, are included with this type, of which the areas in Bayou Dorcheat swamp where the Louisiana & Arkansas Railway crosses it deserve mention. In general, south of this railroad the Ocklocknee very fine sandy loam in the swamps of Bayou Dorcheat approaches a fine sandy loam and carries a lower percentage of silt and clay. Along the smaller drainage ways much of colluvial material is included with this type.

The type occupies the first bottoms of the smaller streams of the parish and also occurs in the broader bottoms. It is subject to frequent overflows, though well drained between inundations. The areas adjoining Lake Bistineau are frequently inundated for weeks at a time. The topography is flat. Crops do not suffer from drought on the very fine sandy loam to any important degree.

Most of the type is forested, the principal trees being oak, sweet gum, black gum, beech, pine, sweet bay, and fringe tree. About 5 per cent of the type is under cultivation. Sugar cane is the principal crop and does well, producing a fine quality of sirup, at the rate of 200 to 400 gallons per acre. Lespedeza, Bermuda grass, and carpet grass flourish, yielding 2 or 3 tons per acre. Corn and cotton are very profitable crops if not injured by overflows. Under ordinary conditions corn yields 25 to 40 bushels per acre and cotton one-half to one-fourth bale.

The type is very easily tilled and works up into a very mellow seed bed. No commercial fertilizers are used, and when not overflowed during the growing season this is a very productive soil. At present it is possible to clear only the areas along the smaller streams. The stream channels should be cleaned and straightened and the natural drainage supplemented by a standard system of ditches.

The price of the Ocklocknee very fine sandy loam is variable, ranging at present from about \$5 to \$25 an acre, depending upon its drainage improvements.

Results of mechanical analyses of samples of the soil and subsoil of the Ocklocknee very fine sandy loam are given in the following table:

*Mechanical analyses of Ocklocknee very fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
431629.....	Soil.....	0.2	0.9	2.5	27.4	35.6	27.8	5.5
431630.....	Subsoil.....	.3	.6	2.0	21.6	37.6	30.2	7.5

JOHNSTON SERIES.

The Johnston series comprises soils of black color and high organic-matter content and gray or mottled gray, yellow, and brownish



subsoils. These soils occupy the first bottoms of streams in the Coastal Plain region. They are alluvial in origin and subject to overflow. The material is derived from Coastal Plain soils, with a varying admixture of material from the soils of other provinces. Near the Piedmont boundary, for example, there is present much material from the Piedmont soils. In Webster Parish this series is represented by the clay member only.

#### JOHNSTON CLAY.

The typical Johnston clay is a dark-gray to black silty clay, underlain at 8 to 12 inches by a heavy, waxy clay of the same color as the soil or a little lighter. Usually at about 30 inches the subsoil is dark gray or grayish mottled with shades of brown. A superficial layer of black mucky material varying from about 2 to 18 inches in thickness is encountered in places. Both the soil and subsoil are high in organic matter. Where the soil has been upheaved by the roots of fallen trees the material, upon drying, crumbles into small aggregates, some of which are of cubical shape.

About a mile northwest of Big Mound there is a surface layer of light-gray fine sandy loam or very fine sandy loam over the typical clay. There are also some included areas of Ocklocknee silty clay loam.

This type is very inextensive and occurs entirely in the Bayou Dorcheat swamps. It occupies flat, low positions along the edges of swamps. As its topography indicates, it is very poorly drained and is subject to frequent overflows.

The native vegetation is largely cypress, with a scattering of pin oak. No attempt has as yet been made to clear this type.

#### MISCELLANEOUS MATERIAL.

##### MEADOW.

Meadow includes first-bottom alluvial material of such variable structure, color, and texture in the vertical section that satisfactory separation into series or types is impracticable. The soil consists entirely of different grades of sandy loams. It occurs as comparatively narrow stream bottoms and is for the most part forested. It is poorly drained, subject to inundation at frequent intervals, and is largely utilized for pasturage. It is very small in extent and occurs largely in the vicinity of Minden.

#### SUMMARY.

Webster Parish is located in the northwestern part of Louisiana and comprises an area of 609 square miles, or 389,760 acres. The topography varies from flat to rolling, and the drainage is effected through Bayou Bodcau, Bayou Dorcheat, and Black Bayou.

The first permanent settlement was made in 1811, and the parish was organized in 1871. The first settlers came largely from Georgia and South Carolina.

With the exception of the northeastern part, the entire parish has good railroad facilities. Telephones and rural free delivery routes reach most of the homes in the parish.

The mean annual precipitation is 44.03 inches, and the mean annual temperature 65.1°. The average growing season is 244 days.

The one-crop system of farming is still generally followed. Cotton and corn are the principal crops, and oats, sweet potatoes, Irish potatoes, cowpeas, peanuts, sugar cane, and hay are minor products. Rice could be made an important crop on the flat areas in the western part of the parish. Truck farming is carried on only sufficiently to supply home markets. Peaches and small fruits do well on the Ruston and Orangeburg soils.

The average size of farms is 100.2 acres. A little over half the farms are operated by owners, and most of the remainder by tenants.

Eleven soil series, including 21 soil types in addition to 1 miscellaneous type (Meadow), were recognized and mapped in the parish.

The upland soils are classed in the Susquehanna, Ruston, Norfolk, Orangeburg, Greenville, and Lufkin series. The Susquehanna soils are the most extensive. The very fine sandy loam is considered by far the best soil of the Susquehanna series and is well adapted to cotton and corn.

The Ruston series embraces three types. These soils are closely associated with the Susquehanna and Orangeburg series. The Ruston very fine sandy loam is considered the best soil for general farm crops and the coarser textured members of this series for truck crops.

The Norfolk series is subordinate in importance. The very fine sandy loam has a rather smooth topography and the drainage is only fair, while the fine sand occupies knolls and ridges and is excessively drained. The former is best suited to general farm crops and the latter to early truck crops.

Only one member of the Orangeburg series, the fine sandy loam, was mapped. It is a valuable soil type and is devoted to the same crops as the Ruston series.

The Greenville clay loam is characterized by the red color of its soil and subsoil. This type is inextensive. It is probably the best and most durable upland soil in the parish. Corn, cotton, and oats do very well on it.

Of the Lufkin series two types were mapped. The silty clay loam, owing to its flat, poorly drained character, is used entirely for the ranging of cattle and hogs. The better drained areas of the very fine sandy loam produce good yields of cotton. The type is largely used for hog and cattle ranges.

The very fine sandy loam and fine sand were mapped in the Cahaba series. These soils occupy old stream terraces, and the component material consists of wash from Coastal Plain deposits. They are good general farming soils. Cotton, corn, and grasses do well.

The Kalmia series is represented by the very fine sandy loam type. This type is closely related to the Cahaba very fine sandy loam, differing essentially in its poorer drainage and the consequently less oxidized condition of the subsoil. The only use of the Kalmia very fine sandy loam at present is as a range for cattle.

The first-bottom or flood-plain alluvium is separated into the Bibb, Ocklocknee and Johnston series, and Meadow.

Two types in the Bibb series, the very fine sandy loam and silt loam, were mapped. These are poorly drained, first-bottom soils derived from Coastal Plain deposits, and are used for hog and cattle range.

Two types were mapped in the Ocklocknee series, the silt loam and very fine sandy loam. The types are subject to inundation at frequent intervals and on the broader first bottoms support a good growth of switch cane. When properly drained these soils produce good yields of sugar cane, corn, and cotton.

The Johnston clay occurs in low, poorly drained positions along bluffs. It is alluvial in origin and subject to frequent overflows. None of the type is improved.

Only a small area of Meadow was mapped in Webster Parish. This type includes first-bottom alluvial and colluvial material of such variable character that no satisfactory separation into types could be made.



[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 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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