

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

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SOIL SURVEY OF LA SALLE PARISH,  
LOUISIANA.

BY

CLARENCE LOUNSBURY, IN CHARGE, 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, 1918.]



WASHINGTON:  
GOVERNMENT PRINTING OFFICE,  
1920.

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U. S. DEPARTMENT OF AGRICULTURE,  
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## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF SOILS,  
*Washington, D. C., October 28, 1919.*

SIR: I have the honor to transmit herewith the manuscript report and map covering the survey of La Salle Parish, La., and to recommend that they be published as advance sheets of Field Operations of the Bureau of Soils, 1918, as authorized by law.

Respectfully,

MILTON WHITNEY,  
*Chief of Bureau.*

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

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### MAP.

Soil map, La Salle Parish sheet, Louisiana.

# SOIL SURVEY OF LA SALLE PARISH, LOUISIANA.

By CLARENCE LOUNSBURY, In Charge, and R. F. ROGERS.—Area Inspected by HUGH H. BENNETT.

## DESCRIPTION OF THE AREA.

La Salle Parish is situated in the north-central part of Louisiana, northeast of Alexandria, La., and west of Natchez, Miss. Little River forms most of the western boundary. The parish measures approximately 45 miles long, from north to south, and averages about 18 miles in width from east to west. It has an area of 617 square miles, or 394,880 acres.

The parish comprises three topographic divisions, viz: The relatively high uplands, extensively developed in the middle and northeastern part; the flat uplands, or flatwoods, occupying a large area in the northwestern part; and the low alluvial "swamp," a portion of the Mississippi flood plain, in the southern part, associated with the various first and second stream bottoms.

The higher uplands have a gently rolling to rolling surface. The principal divide extends in a northeast-southwest direction south of Funny Louis Bayou. There are numerous minor, roughly parallel divides and winding ridges, and between Jena and Rhinehart the surface is rather intricately dissected. In most places, however, the slopes are broader and more regular. The surface about the heads of stream branches is usually more broken and the slopes steeper than farther down the courses. A stretch of country extending north and south through Good Pine is largely flat.

The flatwoods division is characterized by a relatively low, undulating to gently rolling surface.

The alluvial areas have a nearly level surface, though south of Catahoula Lake there are a number of low ridges or swells. These, however, are subject to overflow. The stream bottoms include occasional depressions, usually marking abandoned channels, and slight swells. The terraces are level to slightly undulating, often marked by slight ridges and knolls. Along their outer borders the surface in some places is a little more irregular and dissected.



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

The uplands range in elevation between 100 and 300 feet above sea level, and the bottom lands in the southern part of the parish between 50 and 75 feet. Jena stands at an elevation of about 225 feet, and Standard, Olla, and Urania at approximately 178, 156, and 92 feet, respectively.

The drainage of La Salle Parish is southwesterly or southerly into Little River, which flows along the western boundary of the parish, and then eastward across the southern part into Catahoula Parish, where it empties into the Black River and ultimately into the Mississippi. Catahoula Lake, an expansion of Little River, becomes nearly dry at low river stages.

For the most part the uplands are ramified by an intricate network of drainage ways, which afford ready run-off. A few level areas, however, have no well-defined drainage courses and are swampy. The larger streams have cut their channels well down toward base level, and many of them follow meandering courses over their flood-plains, as is well represented by Funny Louis Bayou. Trout Creek is an exception, as it has a relatively swift current. Many of the smaller streams become dry in summer and fall, but some fed by springs flow perennially.

The first bottoms, including all the southern part of the parish, are subject to overflows. The first bottoms on the small streams may be flooded at any time during the year, but overflows occur most often during the spring and early summer. In some years serious damage is done to crops. Overflows in the southern part of the parish occur as the result of backwater from the Mississippi River and of the accumulation of local drainage waters. Moderate overflows practically every year inundate the lower areas, which include the Little River bottom as far north as a point about 2 miles above the Louisiana & Arkansas Railway crossing. In occasional years this whole lower section is submerged to a depth of 10 to 20 feet, and the residents are forced to flee to the hills. The loss through the damage to crops and the drowning of live stock is often considerable. The last destructive flood occurred in 1912.

La Salle Parish was established January 1, 1910, before which date it formed a part of Catahoula Parish. The residents are largely descended from settlers who came from the more eastern Southern States. Some of the sawmill employees are from various Northern States. Over the uplands the population is fairly well distributed, but the inhabitants in the southern part of the parish live principally along Old River and French Fork of Little River. In 1910 the population of the parish was reported as 9,402, averaging nearly 15 persons per square mile.

Jena, with a population of 689, is the parish seat and principal town. Besides being an important trading point it is a sawmilling

center. Olla, with a population of 260, and Tullos are trading centers in the northwestern part of the parish. Standard, Trout, Good Pine, and Urania have sawmill industries.

The Louisiana & Arkansas Railway leading westward to Alexandria and Shreveport, La., and Hope, Ark., and eastward to Vidalia, on the Mississippi River, passes through the center of the parish. A branch of the Missouri Pacific Railroad passes through the northwestern part and crosses the Louisiana & Arkansas just west of the parish boundary. By rail Jena is 56 miles from Alexandria, 250 miles from New Orleans, 275 miles from Little Rock, and 624 miles from St. Louis.

The principal highways are kept in fairly good condition, and a model dirt road extends about 6 miles southwest from Jena. Rural mail delivery routes reach many, but not all parts of the parish, and telephone service is available in many of the farming sections.

Cotton is sent to market at New Orleans, and some live stock is shipped to St. Louis. The towns within the parish provide a market for considerable farm produce.

#### CLIMATE.

The climate of La Salle Parish is prevailingly one of long and warm summers, short and mild winters, and ample rainfall. The warmer summer weather, from about the 1st of May to October, is not often oppressive, and the nights are usually tempered by breezes. Frosts and freezing weather are of common occurrence during the winter months, and in occasional years there may be a snowfall of 2 or 3 inches, though ordinarily there are but a few flurries of snow or none at all. Farming operations generally can be carried on throughout the winter.

No Weather Bureau station having been established within the parish the records of the station at Alexandria, in the adjoining parish, have been used in compiling the table on page 8. The results are fairly representative of local conditions. The summer temperatures range from 109° F. to 45°, with a mean of 81.2°. For the winter months the maximum temperature on record is 87° and the minimum 3°, while the mean is nearly 50°

There has been a range in the rainfall from 42 inches in the driest year to 78 inches in the wettest year recorded. The annual mean is 57.21 inches. The precipitation is greatest during the spring and early summer, and least during August, September, and October.

The average date of the last killing frost in the spring is given as March 11, and that of the first in the fall, November 8. There is thus a normal growing season of 242 days, which is more than sufficient for maturing all the common crops. The latest killing frost

recorded in the spring occurred April 26, and the earliest recorded in the fall, on October 14.

The following table gives the normal monthly, seasonal, and annual temperature and precipitation as recorded by the Weather Bureau station at Alexandria:

*Normal monthly, seasonal, and annual temperature and precipitation at Alexandria, Rapides Parish.*

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1889).	Total amount for the wettest year (1905).	Snow, average depth.
	° F.	° F.	° F.	Inches.	Inches.	Inches.	Inches.
December.....	49.9	85	10	5.26	0.92	3.92	0.7
January.....	48.9	87	11	4.97	5.81	5.90	.1
February.....	50.9	85	3	6.14	1.04	8.96	.7
Winter.....	49.9	87	3	16.37	7.77	18.78	1.5
March.....	60.6	93	20	5.29	3.86	8.49	.0
April.....	67.1	93	29	4.55	2.20	14.21	.0
May.....	73.5	99	39	5.04	1.19	6.63	.0
Spring.....	67.1	99	20	14.88	7.25	29.33	.0
June.....	79.6	106	45	5.63	14.58	8.43	.0
July.....	82.0	109	59	5.86	6.74	9.71	.0
August.....	82.1	107	48	4.12	.75	2.40	.0
Summer.....	81.2	109	45	15.61	22.07	20.54	.0
September.....	77.3	102	40	2.96	.33	1.91	.0
October.....	66.2	98	27	3.10	.17	2.74	.0
November.....	57.0	88	19	4.29	4.84	5.12	.0
Fall.....	66.8	102	19	10.35	5.34	9.77	.0
Year.....	66.3	109	3	57.21	42.43	78.42	1.5

#### AGRICULTURE.

Farming in this region began with the earliest settlements, some of which were made as early as the latter part of the eighteenth century. Many of the settlers obtained their lands when the territory was under Spanish rule. These grants, usually of irregular tracts, still exist in the south-central part of the parish, known as the "Ricket Survey." They engaged in farming on a small scale and in stock raising, supplementing these to some extent by hunting and fishing. With the substantial gain in settlers in the early thirties, more attention was given to farming, and it is from this time on that the principal agricultural development has taken place. There were

never any extensive plantations in this parish, and at no time has farming been highly developed. With the growth of the lumbering industry several years ago many landowners sold their holdings, and farming has also been handicapped by the attraction of laborers to the lumber camps. The greater part of the parish, probably 85 per cent, has never been in cultivation. Considerable areas of upland yet carry the original growth of longleaf and shortleaf yellow pine, but the cut-over area is steadily increasing in extent. Nearly all of the southern alluvial part of the parish is timbered with various species of oak, pecan, some cypress, and other deciduous trees.

Cotton and corn early became the leading crops. Cotton is grown to some extent on practically every farm, except those situated a considerable distance from ginning facilities. With the advent of the boll weevil and the boll worm cotton production slackened, but as better farming methods have come into use, including earlier planting, the growing of earlier varieties, and improved methods of cultivation, profitable yields are usually obtained. The present high prices are encouraging an extension of the acreage. The production of cotton in 1917 according to the census, based on reports of ginners, was 1,270 bales.

Corn is the most extensively grown crop. It is produced chiefly for consumption on the farm, being fed to work stock, cattle, and hogs, or ground into meal. The census reports 7,088 acres devoted to corn in 1909, with a production of 79,365 bushels.

Oats are occasionally grown in small fields, and the crop usually gives good yields. It is generally sown in the fall, but may be sown at any favorable time, as late as January, the earlier-seeded crop, however, usually giving the best results. The matured grain is fed unthreshed to live stock. The census reports a production of 1,399 bushels of oats in 1909, from 122 acres.

Some hay is made from various grasses and clovers, and from cowpeas. The wild broom sedge is sometimes cut, but Bermuda grass and lespedeza (Japan clover) are preferred. Most of the hay is made on the stream bottoms and in lowland swales. Some coarse wild grass is often cut from the bed of Catahoula Lake during the usually dry fall season. With the exception of cowpeas no special attention is given to forage or grass crops, and they have no regular place in the cropping system. Two or three cuttings are often made of the native grasses, and the annual yield of hay varies from one-half ton to 1½ tons per acre. Cowpeas are frequently grown separately for soil improvement as well as for the forage. In 1909 wild hay was reported cut from 348 acres, and tame hay from 290 acres, the total production amounting to 584 tons. Not enough hay or forage is produced to carry the live stock through the winter.

Sugar cane for sirup is grown by nearly every farmer, mostly in small patches. The cane is worked up in small mills on the farm. Most of the sirup is for home consumption, but a small surplus is sold locally. For 1909 the census reports a production of 1,471 tons of sugar cane, from 199 acres.

Peanuts, soy beans, and velvet beans are frequently grown as forage crops and to improve the soil. In 1909 there were produced 2,303 bushels of peanuts, from 129 acres.

Sweet potatoes are grown by almost every farmer, principally for home use, though nearly every year a small surplus is shipped to outside markets. In 1909 there were 507 acres in this crop, producing 44,671 bushels. Irish potatoes are grown in small patches by many farmers, almost entirely for home use. They are among the earliest vegetables planted in the spring, and are harvested by the latter part of May. The usual garden vegetables are grown to supply home needs.

Peaches are the principal tree fruit. The 1910 census reports a total of 4,580 peach trees in the county. On many farms there are a few apple, plum, and fig trees, or a few grapevines. Considerable quantities of pecans are gathered in favorable seasons.

Cattle raising has always been an important industry in all parts of the parish. Cattle generally have free range on both the timbered and cut-over lands. During the growing season there is ample pasturage for all stock, but with the approach of the drier fall and winter weather the grasses become shorter and stock sometimes suffers unless fed. The pasture grasses include broom sedge, crabgrass, carpet grass, and lespedeza, with white clover on the bottoms and in moist situations. Wild cane is abundant along some of the stream bottoms, and furnishes considerable winter grazing. Spanish moss is often fed upon in the swampy bottoms, and it is relished by cattle when winter grazing becomes short. In a few instances silos are used, and stock raisers are beginning to recognize their value.

The cattle for the most part are of nondescript breeding and of small size. Some show traces of Jersey or Hereford blood, and a few stock raisers are developing herds of more nearly purebred animals. The prevalence of the cattle tick has retarded cattle raising and before the adoption of the recently enacted State dipping law no general effort was made in tick control. Dipping vats are now (1918) being established at convenient points throughout the parish. A large part of the beef stock is sold to local butchers who cater to the various mills and towns. Some stock is handled by small shippers. For 1909 the census reports a total of 1,951 cattle sold or slaughtered. In view of the large areas well adapted for pasture and for producing forage crops there seem to be very good opportunities for extension of the industry.

Ordinarily only enough milk cows are kept to meet the home demands for milk and butter, but some milk is marketed at several small towns. The census reports the value of dairy products marketed in 1909 at \$14,166. Most of the dairy cattle are of indifferent breeding, but a few are good Jersey grades and some are said to be purebred. In 1909 there were 2,288 dairy cows on farms in this parish.

Hogs are raised on practically every farm. Like the cattle they usually range over the open country, and are produced at comparatively little expense. In the stream and swamp bottoms there usually is in the fall and early winter an abundant supply of mast, consisting of acorns and beechnuts, on which large numbers of hogs are fattened. Pine mast and the roots of young pines afford considerable feed for hogs in the uplands. Mast-fed hogs are considered inferior to corn-fed hogs on the market, and the animals are often finished on corn. Hogs are sometimes pastured on such crops as cowpeas, peanuts, and velvet beans. Owing to the lack of care, considerable loss results from cholera and worms and at times from drowning, when the swamp bottoms become inundated. Practically all the hogs are of indifferent breeding, though most of them show traces of Poland-China, Berkshire, or Duroc-Jersey blood. Hogs are generally shipped to outside markets, but many are disposed of locally or butchered and consumed on the farm.

Small flocks of sheep or goats are kept on some farms. The raising of sheep or goats is generally considered profitable when they can be protected from the ravages of dogs and wolves. There were 216 sheep and goats sold or slaughtered in the year 1909.

Poultry of various kinds is kept on every farm and is the source of considerable income. There is nearly always a brisk demand for poultry and eggs. The census gives the value of the poultry and eggs produced in 1909 as \$28,193.

More mules are used for work stock than horses. Both mules and horses are raised to some extent in this parish, but considerable numbers are brought in from Texas, Missouri, and other States. The horses are usually of small to medium size, and not much care is taken in their breeding.

Farmers recognize the crop adaptation of their soils in a general way. The better drained alluvial soils of the Ochlockonee series are considered better for corn than the upland soils, but they are often not so desirable for cotton, as the stalk frequently makes a rank growth and the lower and damper location favors the increase of the boll weevil. The poorly drained condition of the Bibb and Myatt soils and the flatter areas of the Caddo soils is everywhere recognized, and they are usually considered worthless for any use other than pasture.

Usually only the cultivated fields and small pasture lots are fenced. The houses are generally constructed of sawed lumber or of logs, and provided with fireplaces and chimneys at one or both ends. Small barns of inexpensive construction, provided with stalls for work stock and cribs for corn and feed stuffs, usually meet the requirements of the climate. The field equipment consists of light-weight turning plows and shovel plows and occasionally multiple-tooth cultivators, fertilizer distributors, and planters for cotton and corn. Nearly all farm operations are done with a single horse or mule, though double teams are sometimes used when the land is flatbroken.

The ground is prepared in much the same manner for all the cultivated crops. When the soil is flatbroken a small turning plow is generally used and the plowing is usually not over 3 or 4 inches deep. Most farmers, however, bed the land, without previous preparation, a short time before planting. Some attention is given to pulverizing and smoothing the seed bed, and the fertilizer, when used, is drilled in. Frequent cultivation or weeding with hand hoes is given the growing crops.

More care is used in growing cotton than any other crop. Some farmers consider the use of commercial fertilizer profitable with cotton, while others depend on the barnlot manure produced. Cotton is planted early in April, the seed being drilled in. After the plants have come up the rows are "barred off" by turning the soil away from each side, after which thinning or "chopping" with hand hoes takes place. Several cultivations with turning plows, shovels, or sweeps follow from time to time, the aim being to move the soil toward the row. When the bolls have set, which is usually by the latter part of July or early in August, the crop is "laid by," and picking begins about the 1st of September. Among the principal varieties of cotton grown are Simpkins, King's Improved, King's Early, Bank Account, and Half-and-Half. Long staple is sometimes grown. Much of the cotton has been classed on the market as middling, but lately more of it is graded strict middling and good middling.

Corn is planted before cotton, usually during the first two weeks in March, but sometimes during the latter part of February, if the season is favorable. Later plantings are sometimes made, but late-planted corn is not so likely to develop satisfactorily in the later dry weather. Corn is planted in rows  $3\frac{1}{2}$  to 4 feet apart, and the stalks are thinned out to intervals of 18 to 24 inches. Several cultivations are given and if the crop is very weedy it is hand hoed. At the time of the last cultivation it is a common practice to plant cowpeas between the rows. These are often gathered for seed, and the vines furnish considerable forage. In addition, the crop is of

great value as a soil improver. Corn is gathered from the standing stalks and stored unhusked. Some damage is often done by the corn weevil. Yields on the upland are seldom higher than 15 to 25 bushels per acre, and the average is much lower. On well-drained bottom lands as much as 30 or even 15 bushels is often obtained. Hastings Prolific is one of the most popular varieties grown. Some yellow dent corn and miscellaneous varieties also are produced.

Few farmers follow any well-balanced crop rotation. Frequently the same crop is planted year after year, though it is a common practice to alternate cotton with corn, cowpeas being grown with the latter. Oats and cowpeas are occasionally grown as separate crops, but they do not often have a regular place in the cropping system.

In 1909 only 103 farms used commercial fertilizer, at a total cost of \$1,568. At present the commercial fertilizers used consist largely of acid phosphate, and some farmers use acid phosphate alone. Some cottonseed meal is used. Most of the fertilizer is applied to the cotton crop, which receives 200 to 300 pounds per acre. The small quantities of barnyard manure produced are used on corn, cotton, or miscellaneous crops.

Most of the farms are small, and the labor is usually performed by the operator and members of the family. Occasionally either white or colored help may be employed. Reliable white hands are paid about \$25 a month and board. Colored laborers generally receive somewhat lower wages. At certain busy seasons day hands may be employed, the wage averaging about \$1 a day.

The 1910 census reports a total of 700 farms in the parish. These occupy 14.3 per cent of its total area, and have an average size of 89.7 acres each. The average farm includes only 24.3 acres, or slightly over 27 per cent, of improved land.

According to the 1910 census, 81 per cent of the farms are operated by owners and 19 per cent by tenants. The percentage operated by owners apparently is now much greater than in 1910. Land is often rented on equal shares, the renter furnishing the implements and work stock. When the landowner furnishes the equipment the tenant receives one-fourth of the crops. Cash rentals are rarely paid.

The better drained, improved land of the stream bottoms is valued at \$30 to \$35 an acre. On the more or less rolling upland improved land is usually valued at \$15 to \$25 an acre, varying with the location and degree of improvement. Cut-over lands are valued at correspondingly low figures, some of the rougher or poorly drained areas being rated as low as \$5 an acre, while better located tracts bring \$10 to \$15 an acre.

## SOILS.

La Salle Parish lies within the Gulf Coastal Plain and the upland soils therefore are of sedimentary origin, being formed from varying deposits of unconsolidated sands and clays. According to the best geological evidence the sediments forming these deposits were carried down by drainage waters from the older and more elevated regions to the north, and deposited in comparatively shallow water when this region was occupied by a sea. Since the recession of the sea, or the elevation of the land surface, the agencies of erosion and weathering have been instrumental in developing the various surface, structural, and color features. Percolating water has carried downward, and run-off water has washed away, the finer particles of the surface layer, and accounts in part for the sandy surface soils overlying clay subsoils in the more rolling areas. The accumulation of organic matter from decayed vegetation has produced the prevailing dark colors of the surface soils, while in the subsoils the degree of completeness of drainage has controlled oxidation, resulting in color variations ranging from mottled gray, yellow, and yellowish brown in poorly drained areas through the yellow to the yellowish red and red of the better drained situations. A characteristic of the more poorly drained level to moderately sloping areas is the presence of ferruginous concretions, and often of a compact, dense stratum in the lower subsoil.

The alluvial soils of the stream terraces and first bottoms are of more recent formation than the upland types. They consist of materials carried down by drainage waters from the upland, and, with the decreased velocity of the water at lower levels, laid down over the flood plains. The terraces or second bottoms are remnants of former flood plains, existing at a time when the streams flowed at higher levels than at present. The terrace soils, like those of the upland, have been modified to a considerable extent by erosion and weathering, so that they have developed a similarity to the latter in color, structure, and drainage features. In the first bottoms a considerable range in texture often exists, but there is less variation in color and structure. This uniformity is due to slow oxidation, resulting from the exclusion of air by reason of the excess of water and to the periodical deposits of fresh alluvium.

The various soils of the parish are grouped into series, which are subdivided on the basis of texture into soil types. The soils of the upland are included in the Orangeburg, Ruston, Susquehanna, Caddo, Montrose, and Sumter series; those of the terraces or second bottoms in the Cahaba, Kalmia, and Myatt series; and those of the first bottoms in the Ochlockonee, Bibb, Chastain, Sharkey, and Waverly series.

The Orangeburg series, which includes the best-drained soils of the upland, has grayish to light-brownish surface soils overlying a red, friable sandy clay subsoil. The topography is gently rolling to rolling. These soils are developed on well-drained slopes, and grade on the more nearly level uplands, where the drainage is not so well established, into types having lighter colored subsoils.

The Ruston soils are gray, ranging to grayish brown, and overlie light-red to reddish-yellow, friable sandy clay, which in places is slightly mottled with red, gray, or yellow in the lower part of the 3-foot profile.

The Susquehanna soils are grayish to light brownish in the surface portion, and mottled red, yellow, and gray or bluish gray in the subsoil, which consists of plastic, heavy clay. The heavy subsoil retards underdrainage and aeration and in the level areas the drainage is usually deficient. Elsewhere it is adequate for agriculture, as the sloping surface causes good run-off.

The soils of the Caddo series are grayish to yellowish gray with mottled gray and yellow, or gray, yellow, and red subsoils, frequently stiff in the lower part. Low dome-shaped mounds or hummocks are of common occurrence in the areas of Caddo soils. The surface varies from nearly level to only slightly sloping, and the drainage, especially of the subsoil, is poor.

The Montrose series is characterized by light-brown to yellow surface soils overlying heavy, plastic, yellow subsoils, mottled more or less with bluish gray and occasionally with red. This series differs from the Caddo in having a denser clay subsoil, in having a very heavy clay rather than a compact sandy clay in the lower subsoil, and in the practical absence of concretions. It differs from the Susquehanna in having comparatively little red mottling in the subsoil. The Montrose soils occupy flatwoods country with a low, nearly level surface. Drainage is imperfect.

The Sumter series has a brown to yellowish surface soil and a lighter brown to yellowish or greenish-yellow subsoil. It closely resembles the Houston series, except that the latter has a dark-brown to black surface soil. The Sumter series is derived from limestone.

The surface soils of the Cahaba series are brown, ranging to reddish brown, and the subsoils are yellowish red to reddish brown. The Cahaba soils occupy old stream terraces lying largely above overflow, and comprise the best drained lands of the second bottoms. The material consists of wash from Coastal Plain soils with some admixture, along the larger streams from the Appalachian Mountains and Piedmont Plateau, of material from the soils of those regions.

The surface soils of the Kalmia series are gray, ranging to grayish yellow, and the subsoils are mottled gray and yellow. This series

is developed along streams of the Coastal Plain region on terraces lying largely above overflow. It occurs most extensively in Mississippi and Alabama. The soils are composed largely of material washed from Coastal Plain soils, but along the larger streams issuing from the Appalachian Mountains and Piedmont Plateau more or less sediment from those regions is mixed with the deposits. In the better drained situations the subsoils are yellow, the type in such areas resembling very closely the corresponding member of the Norfolk series.

The Myatt soils are gray to light gray. The subsoils range from gray to mottled gray and yellow, and are rather impervious. These soils occupy the most poorly drained areas of the terraces.

The Ochlockonee soils are prevailingly brown, ranging to dark gray. The subsoils are brown or mottled brownish, yellowish, and gray. This series comprises the darker colored soils of the first bottoms of Coastal Plain streams which receive wash largely from such upland soils as the Caddo, Ruston, Orangeburg, and Susquehanna. They are subject to overflow, but between periods of overflow the drainage is good.

The soils of the Bibb series consist typically of grayish to white compact material. The subsoils are white or yellowish in color or mottled white and faint yellow, and are compact and plastic. The Bibb soils are subject to overflow and to intermittent wet and dry stages. Drainage is poor. The material is derived mainly from adjoining upland Coastal Plain soils.

The Chastain series is distinguished by grayish surface soils and gray to mottled gray and yellow subsoils. There is usually a substratum of mottled red and gray, impervious, plastic clay, which hinders drainage. The material giving rise to the Chastain soils consists of sediments derived from Coastal Plain uplands. They occupy first bottoms and have imperfect drainage.

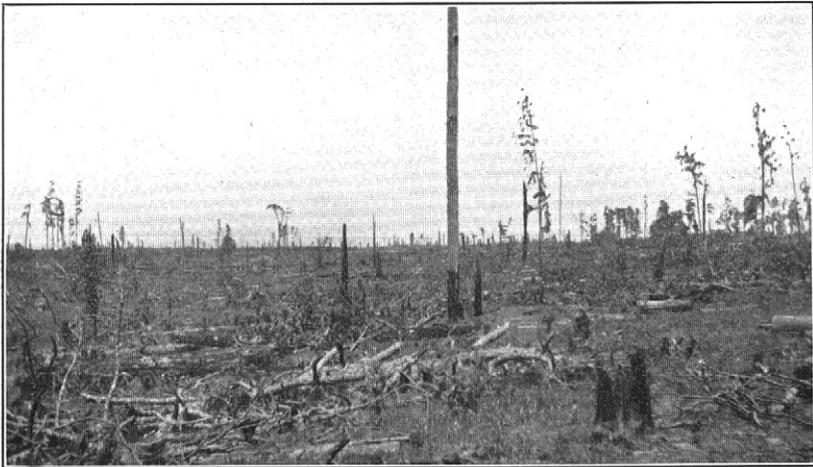
The Sharkey series has soils of yellowish-brown to drab color, with mottled rusty-brown, bluish, drab, and yellowish subsoils, of plastic structure. In the slight depressions where water stands for a good part of the year accumulations of organic matter impart a nearly black color to the soil. The heavier types contain a high percentage of clay in both soil and subsoil. The Sharkey soils occupy bottom lands subject to overflow from the Mississippi River. They consist of material most of which has been deposited some distance back from the river by slow-moving or quiet backwater. On drying, the soil cracks readily, forming small aggregates, and this condition gives rise to the local name of "buckshot land." These soils are poorly drained and subject to annual overflow.

The Waverly soils are light gray in color and overlie gray or mottled yellowish and grayish subsoils. They are subject to annual



**FIG. 1.—FIELD PLANTED TO CORN ON RUSTON FINE SANDY LOAM, ONE-HALF MILE SOUTH OF JENA.**

Note rows following contours.



**FIG. 2.—CUT-OVER AREA OF LONGLEAF PINE ON ORANGEBURG FINE SANDY LOAM, 3 MILES EAST OF WHITE SULPHUR SPRINGS.**



FIG. 1.—BURNED-OVER AREA OF CADDO SILT LOAM, NEAR GOOD PINE.



FIG. 2.—SHARKEY SILTY CLAY LOAM ALONG OLD RIVER, 1.25 MILES SOUTHEAST OF RHINEHARTS FERRY.

Note the high-water line halfway up the window of the house.

overflows of Mississippi River backwater, and it is mainly in this respect that they differ from the Bibb soils, which receive their flood waters from the adjacent uplands.

In following pages of this report the various soils of La Salle Parish are described in detail and their relation to agriculture discussed. Their distribution is shown on the accompanying map. The table below gives the name and the actual and relative extent of each type:

*Areas of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Montrose silty clay loam.....	36,928	9.4	Susquehanna fine sandy loam.....	2,112	} 2.8
Orangeburg fine sandy loam.....	32,320	8.2	Mixed phase.....	8,896	
Sharkey clay.....	30,912	7.8	Caddo very fine sandy loam.....	9,216	2.3
Ochlocknee silt loam.....	29,760	7.5	Susquehanna very fine sandy loam.....	8,960	2.3
Ruston very fine sandy loam.....	29,568	7.5	Ochlocknee fine sandy loam.....	6,144	1.6
Sharkey silty clay loam.....	25,600	6.5	Bibb silty clay loam.....	5,248	1.3
Ruston fine sandy loam.....	25,024	6.3	Cahaba very fine sandy loam.....	4,032	1.0
Caddo silt loam.....	24,896	6.3	Myatt very fine sandy loam.....	2,496	.6
Waverly silty clay loam.....	21,952	5.6	Orangeburg silt loam.....	2,048	.5
Myatt silt loam.....	18,304	4.6	Sumter clay.....	1,152	.3
Montrose silt loam.....	16,512	4.2	Chastain very fine sandy loam.....	384	.1
Ruston silt loam.....	14,848	3.8	Sharkey sandy loam.....	320	.1
Susquehanna clay.....	13,504	3.4			
Susquehanna silty clay loam.....	12,544	3.2	Total.....	394,880	-----
Kalmia silt loam.....	9,984	} 2.8			
Light phase.....	1,216				

RUSTON FINE SANDY LOAM.

In the typical Ruston fine sandy loam the surface soil is a grayish-brown to brownish-gray loamy fine sand to fine sandy loam, grading at 5 or 6 inches into pale-yellow fine sandy loam, which passes at 8 to 12 inches into dull-red to reddish-yellow, friable fine sandy clay. This usually becomes lighter colored, yellowish or reddish yellow, and more sandy, in the lower part of the 3-foot section. In places this lower, more sandy stratum is somewhat compact, although quite friable in the hand sample. Gray and orange-yellow mottlings may appear in the lower subsoil, and here and there small concretions are present in this part of the 3-foot section. The texture in the lower subsoil may be as light as a fine sandy loam.

Most of the type in the eastern part of the parish has the mottled condition in the lower subsoil, and here also, especially east of Ruston, the sandy surface material is coarser, approximately a loamy sand to sandy loam. In some places along the lower slopes the soil is deeper than at the higher elevations.

The type grades into Ruston very fine sandy loam and Caddo silt loam and very fine sandy loam on the more nearly level areas and lower slopes, and it includes patches of these soils and of Ruston silt loam, which it was impracticable to separate in mapping. The characteristics distinguishing this type from the Orangeburg fine sandy loam, which has a redder and more thoroughly oxidized subsoil, are frequently difficult to determine and the map often shows a rather arbitrary separation. Rounded chert and quartz gravel are present in places, especially in the section immediately west of Rhinehart. There are included with the type some eroded patches of clay and clay loam.

The largest and most typical area of Ruston fine sandy loam is in the eastern part of the parish, extending from Collins Creek southward to a point near Rhinehart and westward to the south of Jena. A smaller area is mapped 4 to 8 miles north and northeast of Jena. Smaller developments occur in other parts of the upland. The topography ranges from rolling to slightly hilly and broken. There are many winding ridges and lateral divides, varying from a few yards to a quarter of a mile wide, on the crests. The slopes are often rather gentle, but along many of the stream courses, especially on the northward-facing slopes, the surface is more or less deeply eroded and often unsuited for cultivation. The type has good surface and internal drainage.

Only small scattered tracts of this soil are cultivated, but a considerable proportion of the type will make good farm lands. The unimproved areas are either cut-over or forested with longleaf and shortleaf pine. There is some scrubby blackjack oak, white oak, hickory, and sweet gum, the latter tree occurring mostly in ravines. Cotton, corn, garden vegetables, and a few other crops are grown, and give about the same yields as on the Ruston very fine sandy loam. Some cattle and hogs are raised.

Owing to its sandy nature this is an easy soil to cultivate. Some attention has been given to establishing leveled terrace ditches on sloping positions, and to the laying out of crop rows on contour lines so as to minimize erosion. (See Pl. I, fig. 1.)

Improved land of this type is reported to be worth \$15 to \$20 an acre.

This soil should be broken moderately deep, and farmers should not rely wholly on the bedding-up system. A suitable rotation in which some legume or green-manuring crop is included should be more generally adopted. All but the gently sloping areas should have terrace ditches established before being cultivated, in order to prevent injurious erosion. The growing of peanuts as a field forage crop for hogs and for the production of peanut oil and meal probably

could be made a profitable industry on this soil, which has proved well suited to this crop throughout the Southern States. There seems to be no reason why hogs, cattle, and sheep could not be raised profitably in much larger number than at present.

RUSTON VERY FINE SANDY LOAM.

The Ruston very fine sandy loam consists of a brownish-gray to light-brown very fine sandy loam, which passes at 5 to 6 inches into pale-yellow very fine sandy loam and at 10 to 12 inches into dull-red, friable fine sandy clay. This frequently is more yellowish, more sandy, and more compact in the lower 6 to 8 inches of the 3-foot section. Frequently mottlings of brownish and yellowish brown or gray mark this lighter colored lower subsoil section. Brownish and dark-colored concretions and concretionary substances are sometimes present, particularly in the lower subsoil, and especially where the type occurs in association with the Caddo soils. There are included with the type some small irregular areas of Orangeburg fine sandy loam which are difficult to separate.

The Ruston very fine sandy loam is developed in widely scattered areas throughout the upland, closely associated with the Ruston silt loam, the Caddo soils, and the Orangeburg fine sandy loam. The largest areas occur in the vicinity of Jena and to the northeast of that place. The type occupies gently rolling to rolling country, with smooth slopes and well-rounded ridges. It is frequently developed on the lower slopes below the Ruston or Orangeburg fine sandy loams. Drainage is fairly well established.

Only a small percentage of this type is in cultivation, but the proportion is somewhat larger than in the case of the Ruston fine sandy loam. The greater part of the type exists as cut-over land or supports a forest growth of about the same character as that on the Ruston fine sandy loam. Corn and cotton are the principal crops. Some oats, sugar cane, cowpeas, sweet potatoes, Irish potatoes, and minor crops are produced. Under the prevailing methods of farming, corn yields 20 to 25 bushels and cotton one-fourth to three-fourths bale per acre. Before the advent of the boll weevil cotton frequently yielded 1 bale or more per acre.

This soil is usually prepared for crops by turning it into bed rows with light turning plows, ordinarily drawn by a single horse or mule. Occasionally farmers "flat break" the land to shallow depths, generally less than 4 inches. Cultivation is done with a small turning plow or shovel plow, sweeps and wings being used during the later stages of crop growth. In a few instances multiple-tooth cultivators are used. No definite crop rotations are followed, but farmers generally recognize the ill effect of growing one crop continuously on the

same land. Barnyard manure produced in small quantities on the farm is the principal fertilizer used. Some commercial fertilizer is applied to cotton, but farmers generally consider that the small benefits usually obtained do not justify the expense.

Unimproved land of the Ruston very fine sandy loam is worth \$12 to \$15 an acre. Little of the well-improved land is changing hands, but its estimated value is \$20 to \$25 an acre.

In general this soil should receive more thorough preparation in the way of deeper plowing with somewhat heavier equipment. Crop rotations should be adopted in which green-manuring crops, such as cowpeas, velvet beans, soy beans, or peanuts, have a prominent place. If these are grown at suitable intervals and occasionally plowed under, the increase in organic matter should be sufficient to allow profitable yields of the other salable crops, improve the moisture-holding capacity of the soil, and materially lessen its tendency to injurious erosion. There is no doubt that the declining productiveness of this and other soils is due largely to the exhaustion of the original supply of organic matter. If more attention were given to the raising of live stock, especially some of the purely beef types of cattle, such as the Shorthorn or Hereford, soil-improving forage crops could well be grown more extensively. A good crop rotation would consist of corn, with cowpeas between the rows, followed by fall-sown oats the first year; the second year after harvesting the oats, cowpeas sown for hay; and the third year, cotton or corn. In place of growing cowpeas after oats, velvet beans or peanuts could be substituted. By having at least three fields in a rotation system of this kind, annual harvests of each crop could be obtained.

#### RUSTON SILT LOAM.

The Ruston silt loam consists of a light-brown to grayish-brown silt loam passing at 5 to 6 inches into pale-yellow silt loam, and at 6 to 10 inches into dull-red, moderately friable silty clay. This is usually lighter red or yellowish, or somewhat mottled with gray and yellowish brown, at about 30 inches, where the material is more friable, containing more sand.

This soil is most extensively developed in a strip 8 to 12 miles wide extending along the southern part of the upland north of Catahoula Lake. It also occurs north of Collins Creek along the Catahoula Parish line, and in smaller scattered areas elsewhere. The surface varies from gently rolling to rolling. Some benchlike areas are nearly level, but along some of the streams, such as Indian Creek, the surface is rather deeply dissected and broken. Drainage is generally well established.

Probably between one-fourth and one-third of this type has been brought more or less thoroughly under cultivation, and most of the

areas are well suited to agriculture. The unimproved land is forested, mostly with longleaf and shortleaf pine, the shortleaf variety predominating in places. Other trees include sweet gum, hickory, white oak, and red oak. All the general-farm crops common to this region are grown, principally corn, cotton, oats, cowpeas, and sweet potatoes. Yields are about the same as on the Ruston very fine sandy loam, and the methods of farming are similar.

Improved land of this type seldom changes ownership, but it is usually valued at \$25 to \$30 an acre.

Owing to its heavier texture this soil requires somewhat more thorough preparation than the sandier types, for best results, and in most instances heavier equipment should be employed. Deeper plowing, to a depth of at least 6 or 7 inches, with subsequent pulverizing, is necessary to work up a satisfactory seed bed. The light plows generally used are not well suited for preparing the land for crops.

#### ORANGEBURG FINE SANDY LOAM.

The Orangeburg fine sandy loam to a depth of 5 to 8 inches is a brownish-gray to light-brown fine sandy loam, which changes below to a pale-yellow fine sandy loam or loamy fine sand. The subsoil, beginning at 8 to 10 inches, consists of red, friable sandy clay. At about 30 inches it in many places becomes lighter colored or yellowish red, and more sandy. Slight yellow, red, or gray mottlings occur here and there in the lower subsoil. Some small areas of Orangeburg very fine sandy loam are included in this type. Gravel consisting of mainly rounded chert with some of quartz is plentiful in both soil and subsoil along some of the rougher slopes bordering streams and bluffs. The more gravelly areas are indicated on the map by symbol.

This soil is extensively developed between Nebo and White Sulphur Springs and in the region lying to the north toward Trout. A few areas are mapped in other parts of the parish. The type occupies ridges and slopes, and the surface varies from rolling to gently rolling. Most of the type is topographically well suited for cultivation, and it has excellent natural drainage.

Nearly all of this soil remains unimproved, consisting either of cut-over land or of timbered areas covered principally with longleaf pine. Plate I, fig. 2, shows a cut-over area of this soil near White Sulphur Springs. About the same crops are grown as on the Ruston fine sandy loam and very fine sandy loam, and the yields are equally good. Land values have about the same range on the two types.

Because of its productiveness and relatively smooth surface this soil should become of considerable agricultural importance. With thorough methods of cultivation and fertilization it should yield

30 to 50 bushels of corn and upwards of 1 bale of cotton per acre, and a wide range of vegetables and forage crops could be produced satisfactorily. This is one of the most valuable and productive upland soils in other parts of the Coastal Plain region. In Georgia and other southern States it has been found well adapted to growing peaches.

ORANGEBURG SILT LOAM.

The Orangeburg silt loam has a surface soil of brownish or grayish-brown silt loam, 6 to 8 inches deep. This passes rather abruptly into a red, compact, moderately friable clay, which at 28 to 30 inches becomes more sandy or friable and somewhat lighter red in color. In places the lower subsoil has slight mottlings of brighter red, gray, or dull brown.

This type is developed in a few scattered areas, generally occurring in close association with the Orangeburg fine sandy loam. It occupies level to gently rolling or sloping ridge tops and lower slopes, and is well drained.

Practically none of this soil is in cultivation. Much of it has been cut over, and some areas still support the original timber, which is chiefly longleaf pine. The type affords good pasturage and when brought into cultivation should prove valuable for a variety of crops. It is practically all smooth enough for intensive cultivation.

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

*Mechanical analyses of Orangeburg silt loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
431951.....	Soil.....	0.2	4.2	11.0	15.4	5.0	55.4	8.9
431952.....	Subsoil.....	.1	3.0	10.2	13.8	4.0	45.8	22.9

SUSQUEHANNA FINE SANDY LOAM.

The Susquehanna fine sandy loam consists of 6 to 10 inches of grayish to light-brown fine sandy loam to loamy fine sand, which overlies mottled red, drab, or bluish-gray, sticky, plastic clay. The gray color becomes more conspicuous with depth, and predominates in the lower subsoil. Chert gravel and some quartz gravel are common in some places, while in others gray to brownish, ferruginous sandstone fragments occur. The more important gravelly areas are indicated on the map by means of symbols.

This type occupies small areas widely scattered through the upland. It occurs especially on slopes, as between Rhinehart and

Nebo. Much of the type is rather broken and unsuited for cultivation, but some areas are fairly smooth and regular. Surface drainage is well established, but the tough, nearly impervious subsoil causes poor internal drainage.

None of the type is now cultivated. The areas are either cut-over land or support a growth of pine, mostly longleaf, scrubby black-jack oak, sweet gum, and other species of trees. The better areas should give good results with a variety of crops, though the agricultural value is below that of the Ruston and Orangeburg fine sandy loams.

*Susquehanna fine sandy loam, mixed phase.*—The mixed phase of the Susquehanna fine sandy loam consists of areas of the type spotted with patches of (1) gray fine sand passing at 5 or 6 inches into yellowish fine sand to fine sandy loam, and this into yellowish-red or reddish-yellow, stiff fine sandy clay which in turn grades into mottled pale-yellow and gray, or red and yellow, or red, yellow, and gray fine sandy clay to fine sandy loam; (2) gray fine sandy loam overlying light-gray or yellowish-gray (cream-colored), stiff clay to stiff sandy clay which becomes more sandy in the lower part, where soft sandstone is frequently reached within the 3-foot section; and (3) Ruston fine sandy loam. The last is most common on the crests of the ridges, while the patches with the mottled and light-colored subsoil are most common on the slopes. Outcrops of grayish sandstone and reddish ferruginous sandstone occur in places.

Nearly all of this phase occurs in the region drained by the upper courses of Little Creek and Lacroly Creek. It also marks the bluff line of the upland facing the angle formed by the junction of Funny Louis Bayou and Little River. The phase occupies rolling country and winding ridges, with lateral spurs sloping away from the main ridge toward the drainage ways. Here the surface is much dissected, with steep slopes. Drainage for the most part is good.

Practically none of this phase is improved. Most of it is covered with longleaf pine or has been cleared in lumbering operations. A few areas are smooth enough for cultivation and should prove suited to a variety of crops.

#### SUSQUEHANNA VERY FINE SANDY LOAM.

The Susquehanna very fine sandy loam has a surface soil of grayish very fine sandy loam overlying pale-yellow very fine sandy loam. At about 10 inches this changes to a yellowish, moderately friable clay which at depths varying from 10 to 24 inches becomes a dense, plastic clay, mottled red, reddish yellow, and yellow. Below 24 to 30 inches drab mottlings are often present. In some places the upper subsoil is a red or mottled, plastic clay which becomes more mottled with increase in depth. Gravel, of chert and quartz rocks, occurs in

some places, and there are here and there outcrops and loose fragments of grayish and brownish sandstone.

This type is found principally in irregular areas occupying parts of the slopes and bordering ravines on the divide south of Funny Louis Bayou. Other areas are mapped in the northwestern part of the parish. The surface varies from gently rolling to somewhat hilly and broken, and insures reasonably good drainage.

Very little of this type is cultivated. The smoother land is very well suited for farming land, but the rougher areas are better adapted for use as pasture or forestry. Bermuda grass is fairly well suited to the soil, and if lespedeza were seeded good pastures could be built up.

#### SUSQUEHANNA SILTY CLAY LOAM.

The Susquehanna silty clay loam consists of grayish to yellowish-gray silty clay loam, underlain at depths ranging from 4 to 6 or 8 inches by mottled red and yellow or red and gray, compact, plastic clay. In some places the upper subsoil is red or only slightly mottled with gray or yellow, while in others there may be little red mottling in any part of the subsoil. The gray mottling is often bluish gray, particularly in the lower subsoil. There are some included patches of Montrose silty clay loam and here and there some small areas of Caddo soil.

The largest area of Susquehanna silty clay loam is mapped near the headwaters of Jumping Gully Creek. Other areas extend south of Cochrans Creek to a point 3 miles south of Zenoria. Smaller areas lie in the northern part of the parish. The type occupies flats, gentle slopes, and undulating to gently rolling country, and has a somewhat smoother surface than the other members of the Susquehanna series. Some of the flatter and smoother areas have a "hog-wallow" surface. Except in a few of the more nearly level areas the drainage is good.

Practically all of this land is unimproved. It is either in forest, principally made up of longleaf pine and various species of oak, or is in the partly cleared condition left by lumbermen. A few scattered areas are cultivated, and fairly good results are obtained. The type is used mostly as range for live stock, chiefly cattle and hogs. Because of the stiff, intractable nature of the soil it is difficult to work and maintain in good tilth. When cleared and seeded to Bermuda grass or lespedeza it should make good pasture.

#### SUSQUEHANNA CLAY.

The surface soil of the Susquehanna clay consists of about 6 inches of reddish, plastic clay, marked in many places with dull-red mottlings. This overlies a mottled red or reddish-yellow and gray,

plastic clay or a red, plastic clay mottled with bluish gray and yellow. The substratum often is a pale-yellowish to grayish clay or soft chalky rock. Many of the areas in the western part of the parish consist of (1) red, stiff, plastic clay mottled in the subsoil with gray or yellow or both, or (2) a mottled red and yellow or red and gray, stiff, plastic clay, in which either the gray or the yellow increases with depth until it predominates over the red, or the red disappears altogether. In many places the gray mottling is bluish gray, especially in the lower subsoil. The moist subsoil is quite sticky. In many places there is a 1 to 3 inch surface layer of grayish silt loam, very fine sandy loam, or fine sandy loam.

The largest area of this soil lies east of Tullos between Little Chickasaw and Cochrans Creeks, and other areas are developed in a belt extending southward between Little Creek and Little River. Smaller areas are mapped 1 to 2 miles northwest of Rhineharts Ferry and elsewhere.

The type varies from gently rolling to nearly level. In some of the more nearly level situations the surface is marked by hummocks and depressions, caused by the blowing down of large longleaf-pine trees and the upturning of the roots with the adhering soils. On the mounds clay is usually exposed at the surface, while in the depressions there is often a shallow covering of silty clay loam. For the most part the drainage of this soil is fairly good.

In a few places the Susquehanna clay is cultivated, but most of it remains in forest. Corn, cotton, forage crops, and vegetables are grown, with fair success. Cotton probably gives better average results than corn. The soil is well adapted to grass crops such as Bermuda grass and lespedeza, and considering the intractable nature of the soil, it will probably be found more profitable to use it for pasture land than for tilled crops. It may be possible to make the production of Bermuda-grass hay a profitable industry.

#### CADDO VERY FINE SANDY LOAM.

The Caddo very fine sandy loam consists of about 6 inches of grayish very fine sandy loam, grading at about 10 inches into yellowish or pale-yellow, heavier very fine sandy loam and below this into yellow, friable fine sandy clay, more or less mottled with brownish yellow. Between the depths of 24 and 30 inches the material becomes more compact and shows a larger proportion of gray mottling. As a rule the lower subsoil is not so dense and plastic as that of the Caddo silt loam. Soft, dark-colored concretions averaging the size of a pea are common in both soil and subsoil. In some of the flatter situations there are scattered mounds, 3 to 4 feet high and 20 to 30 feet in diameter. On these the soil is somewhat looser in structure and not so thickly mottled.

More important areas of Caddo very fine sandy loam occur along the lower course of Little Creek, extending back about 1 mile on each side of the stream. Other areas are mapped on the ridge between Trout Creek and Funny Louis Bayou, and a few smaller ones occur elsewhere. The type occupies flat ridge tops, the gentle lower slopes of ridges, and benchlike positions, and has a fairly smooth to gently rolling surface. Drainage is fairly thorough, except in some of the flatter areas and those on the lower slopes, where the land is wet and dotted with crawfish chimneys.

Practically none of the type is used except as range for live stock. Most of it has been cut over and is undeveloped. The principal deficiency, that of drainage, could be corrected by ditching or tiling. With fairly deep plowing and an increase in the content of organic matter, this soil should prove well adapted to a variety of crops, among them corn and sugar cane. It is undoubtedly well adapted to pasturage and hay production, and the raising of live stock could probably be developed to a place of considerable importance. In some sections of the South Bermuda grass is a profitable hay and pasture crop on this soil.

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

*Mechanical analyses of Caddo very fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
431906.....	Soil.....	0.4	1.4	1 5	19.2	25.6	48.4	3.3
431908.....	Subsoil.....	.8	1.0	1 0	15.2	22 4	41.8	17.8

CADDO SILT LOAM.

The Caddo silt loam consists of a brownish-gray silt loam passing at 5 or 6 inches into pale-yellow silt loam, and this at 8 to 10 inches into yellow or pale-yellow, moderately friable silty clay or fine sandy clay. At 26 to 30 inches this grades into compact silty clay or fine sandy clay, mottled with yellowish and gray or bluish-gray colors. In many places the lower subsoil is a mottled bluish-gray and yellowish, plastic clay, and the substratum a bluish-gray, stiff, impervious clay. The areas with this heavier lower subsoil are most common on flats and in close proximity to the Susquehanna soils. They represent an approach toward the Montrose soils, but differ in having a more friable and less sticky upper subsoil. In the more poorly drained situations small rusty-brown or black concretions are of common occurrence on the surface and throughout the 3-foot

section. Mounds are of rare occurrence in this type, except on some of the terracelike flats near streams.

The largest and most typical development of Caddo silt loam occurs in the vicinity of Trout and Good Pine. Smaller areas are scattered throughout the upland. The type occurs characteristically on the lower slopes of ridges and on the more nearly level areas, associated with the Ruston and Orangeburg soils. Its surface generally ranges from undulating or gently sloping to level, and the drainage is imperfect, though sufficient over much of the type to allow cultivation.

Very little of this soil is devoted to crop production. It is avoided because of its imperfect drainage and low productiveness as compared with the better drained Ruston and other soils. Most of the type has been cut over or is still forested, mainly with longleaf pine. Its principal use is as range for cattle and hogs. A burned-over area of this soil near Good Pine is shown in Plate II, figure 1.

This soil could well be devoted more extensively to the raising of live stock, especially beef cattle, the better drained areas or the more desirable adjoining soils being selected for cultivation. With the growing of forage crops and the storing of silage for winter feeding, large numbers of cattle could be raised. Bermuda grass could probably be made a profitable crop for hay and pasturage, and lespedeza also should give good results.

#### MONTROSE SILT LOAM.

The Montrose silt loam consists of a light-brown to yellowish-brown silt loam changing at 2 or 3 inches into a yellowish-brown silt loam which passes at 6 to 8 inches into yellow silty clay, plastic and sticky when wet. At 18 to 24 inches a heavy clay is reached, which is mottled yellow, bluish gray, and in places red. Here and there grayish and yellowish-brown mottlings occur nearer the surface. A lighter textured variation, approximating a very fine sandy loam, is included in the few areas lying between Zenoria and Funny Louis Bayou.

The Montrose silt loam occurs in scattered areas, largely in the northern part of the parish. One of the most extensive lies between Tarvers and Little Chickasaw Creeks, and another about 6 miles east of Standard. The type also is developed east from Rogers, bordering Catahoula Lake. It occurs in close association with the Montrose silty clay loam, and in some cases the difference between the two soils is slight.

The surface varies from nearly level to gently rolling, becoming more or less sloping near the streams. The surface is somewhat more irregular than that of the Montrose silty clay loam, and on the whole the drainage is good.

While this soil is less extensive than the Montrose silty clay loam, a larger percentage of it is in cultivation. The unimproved areas either are forested with pine, sweet gum, and various species of oak, or are cut-over land. The type is used in the production of cotton, corn, oats, and a variety of other crops, which give about the same yields as on the silty clay loam. It is farmed in practically the same way as the latter soil, but is somewhat easier to maintain in good tilth, and is considered somewhat more productive.

Bermuda grass and lespedeza for hay and pasturage are promising crops on this soil, and it is possible that wheat would succeed in years of moderate rainfall. Rice could probably be made a successful crop on the more nearly level areas if irrigation water could be supplied from shallow wells or streams at moderate expense, as the soil is somewhat similar to types which are used profitably for rice in southwestern Louisiana.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Montrose silt loam:

*Mechanical analyses of Montrose silt loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
431959.....	Soil.....	0.2	1.2	0.9	8.4	31.2	51.2	7.2
431960.....	Subsoil.....	.8	.8	.6	5.2	23.8	50.0	18.9

MONTROSE SILTY CLAY LOAM.

The Montrose silty clay loam consists of pale-yellow silty clay loam passing at 5 to 7 inches into yellow clay which is plastic and sticky when wet. At 15 to 20 inches heavy, plastic, yellow clay, mottled in varying degrees with bluish gray, is reached. When dry the lower subsoil is dense and tough. In some of the low places, where the drainage is not complete, gray mottlings are found nearer the surface and in the surface soil. Concretions are of rare occurrence.

This soil differs from the members of the Caddo series in its denser clay subsoil, and in the practical absence of concretions. On some of the gentler slopes there is enough red mottling in the subsoil to place the soil properly in the Susquehanna series, but as a rule this color is not developed, and it is in this respect that the type differs from the Susquehanna.

The Montrose silty clay loam is an extensive soil in the flat-woods country in the northwestern part of the parish. It predominates in the upland between Summerville and Olla, and in the region extending thence to the northeastern corner of the parish. It is also developed south and southeast of Rogers.

The surface is essentially level or gently sloping, but there are slight depressions along drainage ways. Some areas are somewhat undulating and others sloping, but the slopes are rarely uneven. Between Rogers and Walkers Ferry the type occupies a terrace only 20 to 30 feet above the Little River flood plain. In places the soil has a faint "hog-wallow" surface, shallow depressions alternating with low hummocks. In the depressions gray mottling is more conspicuous. Fair or even adequate drainage prevails over most of the type, except in the flatter depressed areas.

The greater part of this type is forested or exists as cut-over land, which is used as range for live stock. Only a small proportion is in cultivation. The forest growth typically consists of shortleaf yellow pine, post oak, and red oak, with some white oak near streams. There is very little longleaf pine, which is the predominant growth in the forest on the Caddo, Ruston, and Orangeburg soils.

Cotton yields one-half to two-thirds bale per acre, and corn 25 to 30 bushels. Minor crops such as sweet potatoes, Irish potatoes, sugar cane, oats, cowpeas, and peanuts are grown to some extent, mostly for use on the farm.

In preparing the seed bed light turning plows are generally used, the soil being thrown into ridges  $3\frac{1}{2}$  to 4 feet apart, on which the crop is planted. Occasionally the land is flat broken. In addition to the small quantities of barnyard manure available some commercial fertilizer is used, consisting largely of acid phosphate, often mixed with some carrier of nitrogen. From 200 to 300 pounds is applied per acre. Fertilizer is used principally on cotton land, and is distributed in the furrow before planting. Many farmers consider the use of commercial fertilizer essential. No definite crop rotations are followed, but cotton is often alternated with corn, and cowpeas may be sown between the corn rows.

Improved land of this type sells at \$25 to \$30 an acre. Unimproved or cut-over land is held at \$10 to \$15 an acre.

With deeper plowing, thorough preparation of the seed bed, and the adoption of a rotation including some green-manuring crop, the productiveness of this soil should be materially increased. Considerable areas might well be used as pasture land. Bermuda grass, lespedeza, possibly white clover, and various other grasses would furnish excellent grazing where the land has been sufficiently cleared. Hay probably could be made a profitable crop. If water could be had from shallow wells it is probable that this soil could be successfully used for rice, at least in the more nearly level areas. Its properties are much like those of the good rice lands of southwestern Louisiana.

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

*Mechanical analyses of Montrose silty clay loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
431957.....	Soil.....	1.1	1.7	0.7	2.0	18.0	58.5	18.3
431958.....	Subsoil.....	.4	.6	.2	.9	14.2	42.4	41.4

SUMTER CLAY.

As mapped in this parish the Sumter clay predominantly consists of brown or yellowish clay passing at 3 to 5 inches into yellow, plastic clay, which with depth takes on a greenish cast. The lower subsoil contains lime concretions and white lime carbonate. In some of the more nearly level situations there are patches of very dark brown to black clay overlying ash-colored clay, this passing into yellow calcareous clay like the lower subsoil of the typical areas. This variation represents the Houston clay, but it occurs in areas too small and irregular to map separately.

The Sumter clay has a total area of approximately 1,000 acres. It occurs mainly in two localities, immediately west of Tullos and northeast of that place on the south side of Chickasaw Creek. The surface is sloping and somewhat irregular owing to eroded, shallow gullies and ditches, many of which have developed in cultivated fields. The type has prevailingly good drainage.

Longleaf and shortleaf pine are the principal trees in virgin areas of this soil. A few small areas are cultivated, but some fields that were at one time farmed have, through neglect, become gullied and undesirable. Some cotton is grown and this crop, as well as corn and various minor crops, gives satisfactory returns. Alfalfa, in at least one instance, has given encouraging results, and there is no doubt that the inoculated soil, in a productive condition, would grow this crop satisfactorily. Areas not well suited for cultivation could well be used as permanent pasture land. Bermuda grass, lespedeza, and melilotus (sweet clover) are among the crops that are very successfully grown on this soil in other parts of the South.

MYATT VERY FINE SANDY LOAM.

The Myatt very fine sandy loam consists of 3 to 5 inches of grayish very fine sandy loam, mottled to some extent with pale yellow, overlying gray or bluish-gray very fine sandy loam, in many places showing some yellow or pale-yellow mottling. The lower subsoil is

a stiff or compact, fine sandy clay, mottled grayish and yellowish and containing dark-colored and rusty-brown concretionary material. In a few places there is an abundance of this concretionary material, and here the lower subsoil is very compact, of a hardpan nature, and impervious. Concretions and crawfish chimneys are common in the areas of this soil. Some mounds occur which are occupied by the *Kalmia* very fine sandy loam.

The Myatt very fine sandy loam occurs chiefly west and southwest of Searcy along Funny Louis Bayou, where the generally level surface rises abruptly to the hilly country to the southeast.

This soil is wet and soggy in rainy periods and hard and baked in dry weather. It is used only as range for cattle and hogs, and pasture is probably the best use to which it can be put in its present poorly drained condition. With improvement of the drainage Bermuda grass could be grown for hay. Lespedeza should succeed even under present conditions. If water can be supplied cheaply, rice could be made a profitable crop, as similar soil is used for rice production in southwestern Arkansas.

#### MYATT SILT LOAM.

The surface soil of the Myatt silt loam consists of a mottled gray and brown to mottled light-gray and yellow silt loam. At 6 to 8 inches this grades into a subsoil of bluish-gray, compact silty clay loam to silty clay mottled with yellow, yellowish brown, or rusty brown, which changes at 24 to 30 inches into a dense, impervious, plastic clay, mottled with bluish-gray and yellowish colors. Concretions are common throughout the surface soil and subsoil. Low mounds occur in places, especially on the more nearly level areas. Here the soil approximates a very fine sandy loam to fine sandy loam in texture. It also shows less mottling and is better drained.

The principal areas of Myatt silt loam are mapped on the broad, high terraces west and south of White Sulphur Springs, between the several branches of Chickasaw Creek near Urania and Olla and in the extreme northwestern part of the parish along Castor Creek. A few scattered areas occur elsewhere.

The surface in most places varies from nearly level to gently sloping, but there are some eroded areas. On account of the nearly level surface and the compact subsoil the drainage is poor, and little of the type is cultivated. It is used principally as a range for cattle and hogs, and this is perhaps the best use that can be made of much of it. Lespedeza and native grasses thrive, and are capable of supporting a considerable live-stock industry. The better drained areas could be used for many of the general farm crops. Bermuda grass does well and would make a valuable hay crop and pasturage. Rice is

successfully grown on this kind of soil in southwestern Arkansas, and if water were available at shallow depths it could be made a profitable crop in this region.

#### KALMIA SILT LOAM.

The Kalmia silt loam consists of about 8 inches of moderately compact, yellowish-brown to brownish-gray silt loam overlying yellow, moderately friable silty clay loam to silty clay, mottled in most areas with yellowish brown, gray, or bluish gray. In the better drained areas there is little gray mottling even in the subsoil, while the more poorly drained areas show some gray mottling at the immediate surface. Such areas approach in character the Myatt silt loam, and in places the separation between these two types is rather arbitrary.

The Kalmia silt loam occurs on the second bottoms along some of the larger streams, especially the several branches of Chickasaw Creek, Funny Louis Bayou, and Little River. The surface is generally level or sloping, and dissected by a few drainage ways. The more typical areas are fairly well drained, but in places drainage is deficient, and here the soil resembles the Myatt silt loam.

Some of the better drained areas of the Kalmia silt loam are cultivated with fair success, but the greater part remains unimproved, being either cut-over or forested with pine, water oak, overcup or blackjack oak, sweet gum, and other trees. Most of the staple crops are grown, but the yields are low. Cotton, corn, and sugar cane are the principal crops. The type makes good pasture land.

*Kalmia silt loam, light phase.*—The light phase of the Kalmia silt loam consists of grayish to grayish-brown very fine sandy loam, about 6 inches deep, overlying pale-yellow very fine sandy loam which at 10 to 12 inches grades into pale-yellow or yellow friable fine sandy clay. This is mottled with gray and light brown in the lower part of the 3-foot section. There are included a few wet spots of Myatt silt loam and very fine sandy loam and some mounds of Cahaba sandy loam.

This phase is confined to a few areas lying on the terrace of Little River above and immediately below the mouth of Funny Louis Bayou. A few areas also occur along the latter stream just above Searcy. The surface for the most part is level, though somewhat billowy in places. All of the phase lies above overflow and is fairly well drained.

A large percentage of this soil is in cultivation, all the common crops being successfully grown. Yields are somewhat below those obtained on the Cahaba very fine sandy loam, and owing to the somewhat poorer underdrainage returns in wet seasons are some-

what more uncertain. Cotton and corn are the principal crops on this soil. Some sugar cane is grown.

CAHABA VERY FINE SANDY LOAM.

The Cahaba very fine sandy loam has a surface soil of brown to light-brown, friable very fine sandy loam, about 8 inches deep. This grades into light reddish brown, heavy very fine sandy loam and at 10 to 12 inches into dull-red, moderately friable sandy clay. Below 30 inches the material usually becomes pale red or yellowish red, and more friable and sandy. Grayish mottlings are sometimes present in the lower subsoil. In many cases the subsoil is looser or more friable than in the corresponding Ruston type. Included with this soil as mapped are occasional patches of Cahaba silt loam, as well as some patches of Kalmia very fine sandy loam and silt loam, the last two in the less well drained situations.

The Cahaba very fine sandy loam occurs mainly in small areas, seldom exceeding 80 to 100 acres. They are mostly found on terrace fronts along Funny Louis Bayou and Little River. The surface generally is nearly level, though in some places somewhat billowy. Drainage is for the most part adequate. A few of the low-lying areas are subject to inundation during exceptionally high floods.

This is recognized as a good farming soil, and a considerable proportion of it is cultivated. Some areas formerly cropped have been abandoned and now support a second-growth forest. Farmsteads are located on this soil near areas of the better bottom-land soils, such as the Ochlockonee. All the common crops are grown, chief among which are corn and cotton. Oats, cowpeas, peanuts, sugar cane, and sweet potatoes are of minor importance. Corn yields 15 to 40 bushels per acre, averaging 20 to 25 bushels, and cotton from one-half to three-fourths bale. One bale or more may be obtained in seasons when the boll weevil is not very destructive.

Improved land of this type is valued at \$20 to \$30 an acre.

Some fields on this soil have decreased in yields with depletion of organic matter. The supply can be increased by including such crops as cowpeas, velvet beans, and peanuts in the rotation. Deeper plowing and more thorough pulverizing of the soil are desirable. Alfalfa possibly could be made a successful crop, especially if the soil were given liberal applications of lime.

In a few scattered areas on the Little River terrace above Funny Louis Bayou, included with the Cahaba very fine sandy loam on the map, the soil is coarser in texture than typical, and is in reality the Cahaba fine sandy loam. The soil consists of 10 to 12 inches of brown or slightly grayish brown loamy fine sand to fine sandy loam,

passing into a lighter brown to reddish-yellow fine sandy loam. The subsoil, beginning at depths ranging from 15 to 30 inches, consists of dull-red, friable sandy clay, which may continue with about the same color and texture to a depth of 36 inches, or may become lighter red and more sandy in the lower subsoil. In surface features, drainage, and agricultural use and adaptation this soil is similar to the typical Cahaba very fine sandy loam.

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

*Mechanical analyses of Cahaba very fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
431903.....	Soil.....	0.0	0.2	0.2	25.4	41.2	27.4	5.7
431904.....	Subsoil.....	.0	.1	.1	19.8	35.8	25.0	19.2

OCHLOCKONEE FINE SANDY LOAM.

The Ochlockonee fine sandy loam is a brown or light-brown fine sandy loam, 10 or 12 inches deep underlain by a lighter brown to yellowish-brown fine sandy loam subsoil, which changes in the lower part to mottled yellowish and grayish fine sandy loam. Strata of silt loam and silty clay loam are encountered in the subsoil of some areas. Patches of Ochlockonee silt loam and loam, containing gravel in places, as well as patches of Bibb soil are included with the fine sandy loam as mapped. One of the coarser textured areas lies along Trout Creek about 1 mile northwest of White Sulphur Springs.

The Ochlockonee fine sandy loam occurs in small scattered areas, usually associated with the Ochlockonee silt loam. It is developed principally adjacent to the stream channels in the bottoms of some of the swifter flowing streams. Drainage is generally good between periods of overflow.

A considerable proportion of the type is cultivated, being devoted to the usual farm crops. It is much easier tilled than the heavier textured Ochlockonee silt loam. Corn probably gives better average yields than cotton, at least in years when the boll weevil is active. Sugar cane and various forage crops do well, and Bermuda grass is a successful hay and grazing crop.

OCHLOCKONEE SILT LOAM.

The soil of the Ochlockonee silt loam consists of a brown, mellow silt loam 8 to 14 inches deep. The subsoil is a lighter brown, heavy silt loam to silty clay loam, the color becoming lighter with depth and being mottled slightly in the lower part with gray and yellowish

brown. Dark-colored iron concretions are present in the lower-subsoil of many areas.

Included in this type are some patches of Ochlockonee fine sandy loam and very fine sandy loam, which generally occupy narrow strips bordering the stream channels, as well as some small areas of Bibb silt loam and silty clay loam and an intermediate soil between the Bibb and Ochlockonee, these occupying depressions and areas along the outer margins of some of the bottoms. The principal variation in the type consists of less well drained areas in which the subsoil is mottled with gray or bluish-gray mottlings and dark concretions and concretionary material. In some places the lower subsoil is more sandy than typical, and yellowish in color. On some of the numerous hummocks and low ridges and on swells in the wider bottoms some Ochlockonee fine sandy loam and very fine sandy loam is included. Here the subsoil is often yellowish brown, the soil being in fact the Thompson fine sandy loam or very fine sandy loam. In some places there are included with the first bottoms low second bottoms which, because they are subject to overflow, can not be included with the higher second bottoms, on which the soils are derived solely from old alluvium.

The Ochlockonee silt loam predominates along many of the upland streams, the largest areas occurring along Funny Louis Bayou and Hemphill, Chickasaw, and Castor Creeks. The areas range from strips too small to map to developments a mile wide, as along Funny Louis Bayou. The surface is relieved by slight swells and depressions marking abandoned channels. All of the type is subject to overflow, but destructive floods seldom occur and are of short duration. Except in the areas grading toward the Bibb soils the type has fair to good drainage.

A moderately large acreage of this type is under cultivation, and many farmers residing on near-by terrace or upland areas use it for cultivated crops almost to the exclusion of other soils. It is in most cases more productive and easier to cultivate than the adjoining uplands. The greater part of the type is forested with such trees as sweet gum, beech, red haw, holly, magnolia, ironwood, and sycamore, with cypress in wet places, and an abundance of grapevines and other undergrowth. In some places, especially along Castor and Chickasaw Creeks and Funny Louis Bayou and their immediate tributaries, there is a considerable growth of wild cane.

Corn and cotton are the principal crops on this soil. Sugar cane, cowpeas, and oats are grown to some extent. Hay, consisting of native grasses and lespedeza, is produced on many farms, and the forested and unimproved tracts furnish range for cattle and hogs. Yields vary considerably with the efficiency of the farm management. Corn yields 15 to 50 bushels per acre, averaging 25 to 30

bushels. Before the advent of the boll weevil cotton frequently yielded 1 to 1 $\frac{1}{4}$  bales per acre, but at present only from one-half to three-fourths bale is obtained. The yield of hay ranges from 1 to 1 $\frac{1}{4}$  tons per acre. Sugar cane, oats, peanuts, and cowpeas are grown in small fields and give satisfactory yields.

Most of this type is prepared for crops by throwing the soil into beds, though a few farmers flat-break the land 4 to 5 inches deep and practice more thorough preparation of the seedbed. Small quantities of manure are sometimes used, and occasionally commercial fertilizer, generally acid phosphate, is applied at the rate of about 200 pounds per acre. Not much attention is paid to crop rotations, though corn and cotton are usually alternated and oats are grown to some extent on the cotton and corn lands.

Land values on the Ochlockonee silt loam vary from \$10 to \$30 an acre, depending upon the location and improvements.

To improve this soil more attention should be given to increasing and maintaining the supply of organic matter. Rotations should be adopted which include crops such as oats, cowpeas, or velvet beans, and green vegetation should occasionally be turned under. By clearing the land of brush and trees valuable areas could be made available for pasture and hay production, regardless of the overflows. Bermuda grass, white clover, and lespedeza do well, and could be extensively grown for live-stock maintenance. The drainage could be improved by opening ditches and straightening some of the stream channels.

#### BIBB SILTY CLAY LOAM.

The Bibb silty clay loam consists of a grayish silty clay loam to silt loam mottled with brown, rusty brown, and yellowish brown, and underlain at 6 to 10 inches by grayish silty clay loam to silty clay, thickly mottled with bluish gray and yellowish brown. The lower subsoil in most areas is a compact silty clay mottled drab and rusty brown. It is compact, impervious and of a hardpanlike nature. Concretions are common throughout the 3-foot section.

This soil occurs in small isolated areas in the first bottoms of the upland streams. It is associated with the Ochlockonee silt loam, and usually occupies positions along the outer margin of the bottoms. The low, nearly level surface and compact soil structure cause poor drainage, and the type is considered of low agricultural value. None of it is cultivated. It is practically all forested with water oak, overcup oak, sweet gum, pecan, and ironwood, with scattering pines. Cleared areas are well suited to various pasture grasses, and in its present condition the type can best be used as hay and pasture land. Bermuda grass and lespedeza would give good results. With artificial drainage fair success could be expected with such crops as sugar

cane and corn. Rice can be grown where irrigation water can be supplied at reasonable cost. This soil is very closely related to types used for commercial rice production in other southern States.

CHASTAIN VERY FINE SANDY LOAM.

The surface soil of the Chastain very fine sandy loam is a grayish or grayish-brown, light very fine sandy loam or loamy very fine sand, 6 to 10 inches deep, overlying grayish or light-drab very fine sandy loam, slightly mottled with brown. This material extends to depths of 18 to 28 inches, where a mottled red, yellow, and grayish, plastic clay is reached. In many areas the surface is billowy, owing to the presence of dome-shaped mounds. The flats between the mounds are poorly drained in places and are occupied by a mottled soil resembling the Bibb very fine sandy loam.

The Chastain very fine sandy loam is confined to three or four small areas along Little River above Thompsons Ferry and south of Cochrans Creek on the western county boundary. Part of the type has been cultivated, but it is used mostly for pasture or is still forested.

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

*Mechanical analyses of Chastain very fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
431901.....	Soil.....	0.0	0.2	0.1	25.4	36.8	29.0	8.7
431902.....	Subsoil.....	.0	.2	.1	14.9	32.7	33.0	19.2

WAVERLY SILTY CLAY LOAM.

The Waverly silty clay loam consists of a mottled grayish and brownish (generally bluish-gray and rusty-brown) silty clay loam passing at 18 to 20 inches into compact, bluish-gray silty clay mottled with rusty brown and containing an abundance of concretions and concretionary material. This lower stratum in many places is essentially a hardpan. The surface soil is browner than the sub-surface layer and there are generally more bluish-gray mottlings a few inches beneath the surface. In some respects this soil resembles the Sharkey, but the latter typically contains less concretions and lacks the hardpan.

South of Catahoula Lake bordering Saline Bayou and along some of the minor drainage channels there are included areas of lighter textured soil, approximating a silt loam, and often containing ap-

preciable amounts of very fine sand. The soil here has about the same color and other physical characteristics except texture as the typical Waverly silty clay loam and therefore has been included in mapping.

The Waverly silty clay loam occurs in the southern part of the parish, the principal area lying between Saline and Muddy Bayous. Other areas lie northeast and west of Rhineharts Ferry, bordering the upland. The surface in most places is nearly level, and drainage is deficient. There are some slightly undulating or sloping areas, especially in the vicinity of streams, and these are better drained than the rest of the type.

Little use is made of this type, owing to overflows from backwater of the Mississippi River. Most of it is forested with a growth similar to that on the Sharkey soil, including water oak, pin oak, gum, and several kinds of haw. Cattle and hogs range in the forests. Northeast of Rhineharts Ferry there are a few cultivated fields on this type, which give fairly good results. About 2 miles north of Saline Lake along Muddy Bayou a small area is in cultivation. The common farm crops are grown, and in the better situations practically the same yields are obtained as on the Sharkey silty clay loam. Cotton, oats, and forage crops seem to do fairly well, but corn gives poor results except where the drainage is above the average.

Improved land of the Waverly silty clay loam is valued at \$15 to \$30 an acre.

This soil apparently could be profitably used for growing Bermuda grass and lespedeza as hay and grazing crops. It is probable that rice growing could be made a profitable industry if irrigation water could be supplied cheaply. The rather impervious subsoil makes moisture conditions well suited for rice culture.

#### SHARKEY SANDY LOAM.

The Sharkey sandy loam consists of 8 to 12 inches of brown to yellowish-brown or grayish-brown sand to sandy loam, underlain at variable depths by bluish-gray, plastic, sticky silty clay or sandy clay, containing yellow and yellowish-brown mottlings. Strata of sandy material are common in the subsoil, and small cherty gravel and chips are of frequent occurrence. The sandy surface covering ranges from a thin layer to a mantle more than 3 feet deep. Where it is deep the material has a lighter color and is loose and incoherent, resembling Riverwash. Part of the type has a surface soil of coarse sandy loam or gravelly sandy loam.

The Sharkey sandy loam is confined to strips bordering the north shore of Catahoula Lake and small areas along the highway south of the lake. A small area lies about  $1\frac{1}{4}$  miles southeast of Walkers Ferry.

The type occupies narrow ridges whose borders are usually well defined and which rise 4 to 6 feet higher than the surrounding bottoms. The surface is generally smooth, but is marked here and there by low hummocks.

Practically no agricultural use is made of this soil, only one area, south of the lake, having ever been cultivated. It has good drainage, but is subject to overflow during exceptionally high floods, and owing to its small extent and to the loose structure of the material the type is unimportant.

#### SHARKEY SILTY CLAY LOAM.

The Sharkey silty clay loam consists of a brown to light-brown silty clay loam, faintly mottled with bluish-gray and dull yellow, changing at 5 to 8 inches into a mottled bluish-gray and yellow or yellowish-brown, plastic, sticky silty clay. Near stream courses or abandoned channels the lower subsoil is often somewhat sandy.

Nearly all of this type lies south of Catahoula Lake, extending from the vicinity of the French Fork of Little River southward along the eastern parish line and westward a little beyond Muddy Bayou. A strip farther north borders Old River. The type occupies relatively high situations in the bottoms, being nearly always elevated above the Sharkey clay. Its surface is nearly level, as shown in Plate II, fig. 2, or in places slightly sloping or undulating. In some places ridges rise 4 to 5 feet above the general level. Except in the lower situations where water collects in wet seasons and where the soil become hard and intractable in dry weather, the drainage is fairly good. In occasional years the Mississippi River flood waters at the time of the spring freshets inundate the whole region occupied by this soil, and usually cause considerable damage to crops and losses among live stock. Some of the farmers live in houses built upon piers rising above the normal level of overflows.

The soil is naturally productive and easily cultivated, but the frequency of overflow has discouraged any extensive agricultural development. The farmed areas are confined to rather narrow strips along Old River and French Fork. The remainder of the type is still forested with deciduous trees, principally striped oak, white oak, water oak, and sweet and bitter pecan, with willow and cypress in the swales. Swamp palmetto and two species of haw are abundant.

Various general farm crops are grown, with cotton and corn leading in importance. Cowpeas, oats, sweet potatoes, and sugar cane are important minor crops. Under the prevailing methods of farming cotton yields 1 to 1½ bales per acre in favorable years, corn 20 to 30 bushels, and oats 25 to 30 bushels. Sweet potatoes are grown principally for home use.

The seed bed is prepared with small turning plows, which work the soil into bed rows. Thorough, deep breaking and pulverizing are seldom done. Animal manures are the principal fertilizers used.

Improved land of this type is valued at \$30 to \$35 an acre. Forested areas have an estimated value of about \$12 an acre.

#### SHARKEY CLAY.

The Sharkey clay is a mottled rusty-brown and dull-yellow or dark bluish gray silty clay, passing at 6 to 8 inches into mottled bluish-gray and rusty-brown or yellowish-brown, sticky, plastic silty clay. The soil is quite sticky and intractable when wet, but when in proper condition it is easily pulverized. It is often known as "buckshot land," owing to the tendency to break down into small soil aggregates.

This type has an extensive development around the northeastern part of Catahoula Lake, extending to the Catahoula Parish line. Smaller areas occur along the southern lake border and farther south. The bed of the lake, which is nearly all exposed at low-water stages, is composed of Sharkey clay material. The type also predominates on the Little River bottoms along the western parish line to a point about 2 miles north of the Louisiana & Arkansas Railway crossing.

The surface is low and nearly level, except for faint swells and depressions and abandoned stream channels. Backwater from the Mississippi River covers these areas nearly every spring, often remaining over the land for several weeks, and drainage waters from the upland occasionally spread over the surface. Otherwise the drainage is fairly good. In some shallow depressions water often stands for considerable periods.

The tree growth on this soil includes white oak, striped oak, pin oak, water oak, pecan, locust, ash, sweet gum, swamp maple, ironwood, hackberry, and haw. Swamp palmetto is abundant in places, as well as wild cane and grapevines. In the swales and areas more frequently inundated cypress and tupelo are common.

This type is used as range for cattle and hogs. It is naturally productive, and if drained and protected from overflow would be well suited to the production of cotton, corn, cane, and probably rice.

#### SUMMARY.

La Salle Parish is situated in north-central Louisiana. In general it comprises a gently rolling to rolling region in the central part, a relatively low, undulating flatwoods region in the northwestern part, and low, alluvial belts, subject to inundation, in the southern part. The drainage has a southwesterly to southerly trend and eventually reaches the Mississippi River. The parish has an area of 617 square miles, or 394,880 acres.

In 1910 the population of the parish was 9,402. Jena, the parish seat, with a population of 689, is the principal town. Railroad facilities are fairly adequate for the needs of the farmers, and the principal highways are in moderately good condition.

The climate is mild, with a mean annual temperature of 66.3° F. and an absolute range from 3° to 109°. There is a normal growing season of 242 days. The mean annual rainfall is over 57 inches.

Farming has never been extensively developed in this parish. Probably as much as 85 per cent of its area has never been in cultivation, but lumbering operations are rapidly removing the original stand of longleaf and shortleaf pine. Cotton and corn are the principal cultivated crops. Other crops, grown mainly for local use, are potatoes, oats, sugar cane, cowpeas, peanuts, and velvet beans. Live stock, chiefly cattle and hogs, are raised on the open range. Improved areas in the upland sell for \$15 to \$25 an acre, and the better alluvial lands for \$25 to \$35.

The average size of farms in this parish is nearly 90 acres, of which 24 acres is improved. Eighty-one per cent of the farms are operated by owners.

La Salle Parish lies within the Gulf Coastal Plain, and the upland soils are of sedimentary origin. Twenty-six soil types are mapped. The upland soils are classed in the Ruston, Orangeburg, Susquehanna, Caddo, Montrose, and Sumter series; the first-bottom soils in the Ochlockonee, Bibb, Chastain, Waverly, and Sharkey series; and the terrace soils in the Myatt, Cahaba, and Kalmia series.

The Ruston series, represented by a fine sandy loam, very fine sandy loam, and silt loam, has grayish surface soils and yellowish-red to pale-red, friable sandy clay subsoils. These types are well drained and are used for general farming.

The Orangeburg series, represented by the fine sandy loam and silt loam, has grayish surface soils and a red, friable sandy clay subsoil. Only a small area of these soils is cultivated, although probably they are inherently the best of the upland soils.

The Susquehanna series, represented by the fine sandy loam, with a mixed phase, very fine sandy loam, silty clay loam, and clay, has grayish to light-brownish or reddish surface soils and mottled red, yellow, and gray or bluish-gray, heavy, plastic clay subsoils. These types are used mainly for pasture.

The Caddo very fine sandy loam and silt loam have grayish to yellowish-gray surface soils and mottled subsoils, showing compact structure in the lower part. The principal use of these soils is for pasture.

The Montrose silt loam and silty clay loam have light-brown to yellow surface soils overlying a subsoil of heavy, plastic clay, mot-

tled with bluish gray and in some places with red. Parts of these areas are in cultivation, being devoted to the general farm crops.

The Sumter clay has a surface soil of brown or yellowish clay overlying plastic clay which contains lime concretions and lime carbonate. Part of this type is farmed. Alfalfa is a successful crop.

The Cahaba very fine sandy loam has a brown surface soil resting on dull-red, friable fine sandy clay. It is a good, productive soil.

The Kalmia silt loam and its light phase are distinguished by gray to grayish-yellow surface soils and yellow to mottled yellow and gray, moderately friable subsoils. They are fairly productive, and selected areas here and there are farmed.

The Myatt very fine sandy loam and silt loam have gray to mottled grayish and brownish soils and mottled gray, bluish-gray, and rusty-brown fine sandy clay to silty clay subsoils. The lower subsoil is dense and nearly impervious. The Myatt soils have poor drainage and are used entirely for pasturage.

The Ochlockonee fine sandy loam and silt loam are characterized by brown to dark-gray soils and light-brown subsoils. They have fairly good drainage and are cultivated to a considerable extent. These are among the best of the stream-bottom soils.

The Bibb silty clay loam is a mottled grayish and brownish soil overlying bluish-gray and yellowish-brown silty clay. It has poor drainage and is mostly forested.

The Chastain very fine sandy loam has a grayish soil overlying mottled red, yellow, and grayish, plastic clay. It is of small extent and mostly unimproved.

The Sharkey soils, the sandy loam, silty clay loam, and clay have yellowish-brown to drab soils and mottled rusty-brown, bluish, drab, and yellowish, plastic subsoils. Drainage in the first bottoms occupied by these types is fairly adequate between the periods of inundation, and the silty clay loam is cultivated in a few places. It produces corn, cotton, and various minor crops.

The Waverly silty clay loam is mottled grayish and brownish in the surface portion. The subsoil is a compact, bluish-gray silty clay mottled with rusty brown, and containing a relatively large number of iron concretions. A small part of the type is cultivated.

[PUBLIC RESOLUTION—No. 9.]

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

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

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

Approved, March 14, 1904.

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



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