

SOIL SURVEY OF CONCORDIA PARISH, LOUISIANA.

By CHARLES J. MANN, E. B. WATSON, PERCY O. WOOD.
and RILDEN T. ALLEN.

DESCRIPTION OF THE AREA.

The soil survey of Concordia Parish was conducted during the first quarter of 1910. The base map was made in the field by the soil-survey party, using the customary plane-table method.

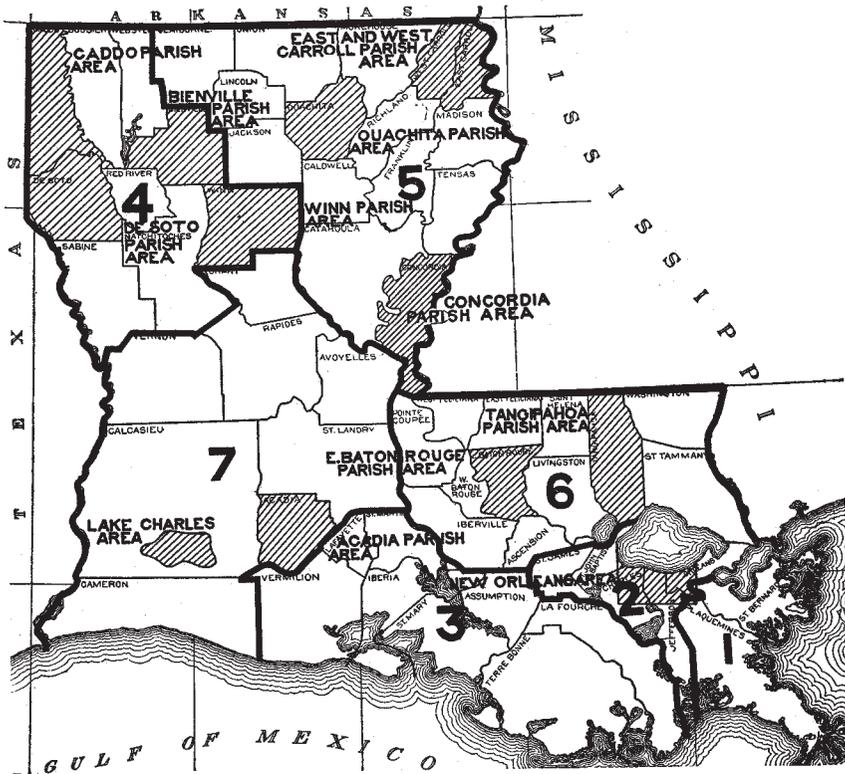


FIG. 21.—Sketch map showing location of the Concordia Parish area, Louisiana.

Concordia Parish is situated in the east-central part of Louisiana. With the exception of the boundary between Tensas Parish on the north it is practically an island, being separated from Adams and Wilkinson Counties, Miss., on the east by the Mississippi River, while on the south Red River separates it from Avoyelles and West Feliciana Parishes, and Catahoula Parish lies to the west of Black and Tensas Rivers.

The parish is of very irregular shape, varying from 2 to 25 miles in width from east to west, with a length of about 53 miles north and south. It comprises 690 square miles, or 441,600 acres. The parish has about the same latitude as Savannah, Ga., and the south line of New Mexico, and the same longitude as Jefferson City, Mo., and Duluth, Minn.

Although the entire parish is bottom land and its general relief is level, three fairly distinct physiographic divisions may be made, namely, the front lands of the Mississippi River on the east, the front lands of the Red, Black, and Tensas Rivers on the south and west, and the extensive basin of the Cocodrie Bayou through the center. Several narrow ridges or bayou fronts penetrate the basin for some distance from either front, and the two fronts are united at Shaw by the narrow ridge along Grand Cut-Off Bayou.

In detail there is considerable variation in topography in the three divisions. The Mississippi front has an elevation of from 50 to 60 feet above sea and is usually characterized by a gentle slope extending one-fourth mile to 2 miles back from the river, and merging into the Cocodrie Basin, though occasionally the basin begins abruptly with a precipitous bank. Elevations for the west front are not at hand, but the surface lies considerably lower than the Mississippi front, particularly along Black and Red Rivers, is narrower, and the slope to the basin is more pronounced. Over a considerable part of this region the topography is composed of alternate narrow though pronounced ridges and hollows. The general topography of the basin is level, though frequent low ridges and narrow bayous, sloughs, and brakes occur. The general elevation is 10 to 15 feet below the level of the Mississippi front.

The regional drainage of Concordia Parish is peculiar. Drainage into the Mississippi River is prevented by the levee throughout most of the parish, and many of the bayous and outlets into the Tensas and Black Rivers are dammed, thus severing drainage connections with the interior of the parish. Natural drainage is thus almost entirely through Cocodrie Bayou and its connecting arms and sloughs, which ramify the basin and receive water from the front lands through open ditches, and finally empty into Red River opposite Shaw. Lake St. John, a beautiful ox-bow lake in the northern part of the parish, receives drainage waters from a few square miles in its vicinity.

Settlement in Concordia Parish began under Spanish dominion in 1798 near the present site of Vidalia. In 1812, seven years after the United States had acquired possession of this territory, a commission confirmed all Spanish grants. Population steadily increased

during the first half of the last century, more than doubling between 1830 and 1840. Immediately after the Civil War a considerable number of Federal soldiers settled within the parish, but a series of poor crop years so discouraged most of them that they left. Later additions have come from the States to the east, and during recent years considerable northern capital has been invested and a few Illinois farmers have taken up their residences here. The present population is rather cosmopolitan, being composed of English, Scotch, Irish, French, German, and Italian settlers. The total population in 1900 was 13,559, of which 11,845 were negroes. In 1910 the population was 14,278. The rural districts are rather sparsely settled, the population being well distributed along the fronts of rivers and bayous. It is estimated that about 3,000 negroes have left the parish since the advent of the boll weevil, but they still make up about four-fifths of the total population.

Vidalia, a modern town of about 1,500 inhabitants, situated in the northeastern part of the parish, directly across the Mississippi River from Natchez, Miss., is the parish seat and principal town. Ferriday, in the north-central part, is the second town and principal railroad center. Clayton is a small town on the Tensas River.

Transportation and shipping facilities within the parish are good. The St. Louis, Iron Mountain & Southern operates a single track line across the parish from east to west and from Ferriday to the north end of the parish, with a branch to Clayton over which it operates three lines. The Natchez & Western connects Vidalia and Jonesville, situated on the Black River, and has Ferriday, Frogmore, and Wildsville as important shipping points. The Memphis, Helena & Louisiana line connects Natchez, Vidalia, and Ferriday with Little Rock, Ark., and St. Louis, Mo., and the New Orleans & Northwestern connects Natchez, Miss., Ferriday, and Clayton with points to the north. The Texas & Pacific operates a road south across the parish from Ferriday and reaches Baton Rouge and New Orleans. Black Hawk, Shaw, Fish Pond, and Morville are important shipping points on this road. While the tonnage carried in water transportation is not as great as it was a few years ago, boats run regularly on the Mississippi, Red, and Black Rivers and occasionally on the Tensas, giving direct transportation to all river ports. Natchez is the best local market, while New Orleans is the principal distant market, though Vicksburg, Shreveport, and Memphis are easily accessible.

The public highways along the fronts are in good condition during most of the year, but through the lowlands they are barely passable for many months. When these so-called swamps are drained good roads can be graded up with but little difficulty.

Free rural mail delivery is enjoyed by only a small territory north of Ferriday, though mail is carried regularly by boat on the Mississippi and Black Rivers. The telephone is not in as common use among the farmers as might be expected.

Vidalia has the only schoolhouse on the Mississippi front. Schools are also maintained at some of the private residences. The Tensas and Black River fronts are well supplied with good, substantial school buildings.

CLIMATE.

The climate of Concordia Parish is that of the warm temperate region of the United States, characterized by a long growing season and comparatively short, mild winters. The rainfall is abundant and frequently comes in torrential downpours. Both the climate and soils of this area are favorable to a much more diversified agriculture than has heretofore been attempted.

There is an average growing season of about 244 days, or 8 months, according to the records of the Weather Bureau at Natchez, Miss. Killing frosts seldom occur before the middle of November or later than the middle of March. The Mississippi River exerts a modifying influence upon the temperature, and areas immediately along its course are less likely to suffer from frost than farther in the interior.

Although the temperature rarely goes above 100° F. or below 8° F., the high humidity increases the bodily effect of both heat and cold. Hot nights, however, are very unusual, as there is generally a Gulf breeze. The cold spells of winter only last a few days, and the ground rarely becomes frozen more than an inch or two. July and August are the hottest months, with a mean temperature of 82° F. September is usually hot and dry.

Snow is rare and sleet occurs only occasionally. Hailstorms are more or less likely to occur, and sometimes do considerable damage to crops in early spring.

The heaviest rainfall usually occurs in late winter and early spring, though plenty of moisture is assured during the whole year, the average mean precipitation being over 50 inches.

The following table, compiled from records of the Weather Bureau Station at Natchez, Miss., gives the normal monthly, seasonal, and annual temperatures and precipitation. These records at Natchez, which is directly across the Mississippi River from Vidalia, are considered representative of conditions in Concordia Parish. Careful observers have stated that there is no appreciable difference in the occurrence of frosts in the two localities, though Natchez lies nearly 150 feet higher than the general level of this parish.

Normal monthly, seasonal, and annual temperature and precipitation at Natchez, Miss.

Months.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	50	80	11	3.1	9.7	3.5
January.....	49	83	17	5.4	11.0	2.8
February.....	52	82	2	5.3	2.4	7.7
Winter.....	50			13.8	23.1	14.0
March.....	61	90	23	6.4	4.2	4.0
April.....	67	92	35	4.6	1.8	19.2
May.....	74	95	43	2.7	0.0	1.5
Spring.....	67			13.7	6.0	24.7
June.....	80	99	51	4.4	4.0	5.5
July.....	82	105	61	5.4	2.5	6.9
August.....	82	101	53	5.2	1.6	1.0
Summer.....	81			15.0	8.1	13.4
September.....	77	100	46	2.3	1.2	1.8
October.....	67	96	30	2.4	1.2	2.8
November.....	58	88	23	3.3	2.6	8.2
Fall.....	67			8.0	5.0	12.8
Year.....	66	105	2	50.5	42.2	64.9

Average date of first killing frost in autumn, Nov. 14; of last in spring, Mar. 14. Date of earliest killing frost in autumn, Oct. 27; of latest in spring, Mar. 30.

AGRICULTURE.

The earliest settlers produced most of their subsistence supplies, but the main money crop from the first was cotton. The Whitney cotton gin had but recently been perfected, and this gave a great impetus to the culture of the crop. Cotton was first grown from seed brought from the island of Jamaica and from Georgia. These were black-seeded varieties, producing a fine silken fiber of good length, but they were subject to rot, which about 1811 became so severe that the crop was not remunerative. Seed was next brought from the Cumberland Valley of Tennessee. These were green-seeded, short-staple varieties, which resisted the rot, but produced coarse-fibered inferior lint. They were soon abandoned for a superior variety called Petit Gulf, which originated from seed brought from Mexico in 1806. This cotton was so superior that it superseded all others and is the parent of many of the varieties now grown. The production of this staple increased very rapidly, so that in 1840 the parish, which then included part of what is now Tensas Parish and was nearly twice as large as now, produced 48,726 bales. There were

60,000 acres in cultivation, valued at \$80 an acre. With a production of 48,726 bales where only 60,000 acres were in cultivation it is apparent that cotton was a very important crop.

The Black River front was settled later, and the development took another course. Settlers began to locate there about 1840, and most of the holdings were small and worked by the owners. Cotton was, however, the main crop there also.

Some sugar cane was grown about 1850, but the crop was abandoned at the time of the war, cotton proving a more profitable crop.

Cowpeas were also grown before the war, but were valued merely for hay, as their value for soil improvement was not appreciated at that time.

The fertility of the soil and the ease and certainty with which cotton could be produced with the labor then available made the management of the large plantation very profitable. In fact, up to the time of the war, it was solely to the production of cotton that the marked prosperity which enabled the inhabitants of this region to live in a degree of elegance rarely enjoyed by a rural community was due.

While this locality was not a seat of activity during the war, the plantation organization was dissolved, much property was destroyed, and farming operations practically ceased, so that at its close there was little semblance of the previous prosperity.

Under the extensive tenant system which was finally evolved the negro tenant was allotted from 10 to 25 acres of land, furnished with a mule, implements, and seed, and given one-half of the crop he produced. Cotton was of course the main product. The plantation manager directed the work of the tenants, and saw that the crops were cared for and gathered at the proper time. The tenants lived in the old quarters and were issued supplies from the plantation store, and a settlement was had at the end of the season. During good seasons this was a very profitable plan for both parties concerned, but during seasons of late overflow the management as well as the tenants suffered great losses owing to the destruction of the crop. But on the whole the plantations were very profitable and it was found that cotton could be grown as cheaply under the tenant system as under the old system. The profits under this arrangement perpetuated the one-crop system developed before the war, and while some corn, oats, and peas were also produced, they were put on the poorer land and were given attention only when the cotton did not need it. Consequently yields were low and not nearly enough was produced to supply home consumption. Much of the proceeds, therefore, derived from cotton was spent for supplies of corn, oats, and hay.

During the season of 1908 the boll weevil appeared in such numbers that cotton production was reduced to less than half the normal. As it was the only crop with which the labor was familiar, it was planted again in 1909. In this year there were only 3,273 bales produced, as against 30,000 three years before. Of course much money was lost and discouragement was general. The result was a second readjustment in agriculture. Some planters are still growing a decreased acreage of cotton and some other crops; others have abandoned cotton entirely and are giving exclusive attention to other crops. The industries which are being introduced and extended are the production of rice, truck, broom corn, and cattle and hogs.

While the acreage of cotton has been greatly reduced, there is some planted on nearly every plantation in the hope of making a crop. The most successful varieties are Simpkins Prolific and King, the former developed by selection from the latter. Seed is usually planted by the 1st of April on beds chopped out, barred off, and cultivated in the usual manner for this crop. The only difference in methods caused by the boll weevil is that the cotton must be planted early and be cultivated every week. In case of a frost after the middle of April the crop is generally plowed up and replaced with corn. Notwithstanding the presence of the boll weevil yields of one-half bale to the acre were obtained by some planters in 1909. While such a yield would be regarded as good in some localities, the planters here have been accustomed to harvesting a bale to the acre and the reduced yield is regarded as very low.

It really remains to be seen whether cotton will prove a profitable crop in the presence of the boll weevil. A great deal of expense is attached to cotton growing. For instance, it costs \$18.50¹ to harvest and sell a bale of cotton after it is on the stalk.

The cost of bringing the cotton to harvest of course varies and depends upon the crop, but it will be readily seen that a good crop must be produced or a high price secured if the production of cotton is to be remunerative in this region.

It is felt that the boll weevil is a much more serious pest here than in regions previously invaded. The Spanish moss on the trees makes a good hiding place for the insects, and this harbor can not be cleared away. The large growth of the cotton plant, due to the rich alluvial

A conservative estimate gives the following items of expense per bale:

Picking (50 cents per 100 pounds of seed cotton).....	\$7.50
Ginning (50 cents per 100 pounds of lint cotton).....	2.50
Bagging and ties.....	1.25
Freight to New Orleans by boat.....	1.25
Levee tax per bale.....	1.00
Commission, 2½ per cent.....	1.25
Fire and river insurance, 7 per cent.....	3.50
Weighage.....	.25
Total.....	18.50

soil and the heavy rainfall, with the relatively high humidity, makes the creation of a dust mulch in which to kill the weevils practically impossible at many times. The sandy land of the Yazoo very fine sandy loam is best suited to fighting the weevil, though the cotton louse is quite bad upon this soil, particularly during a cool spring. It never kills a crop, however, and does not attack cotton on heavy land at all. Treatment with lead arsenate to kill the weevil is being used by a few planters, and it is hoped this will prove effective. Numerous publications regarding the boll weevil and methods of farming under boll-weevil conditions can be obtained from the United States Department of Agriculture and the State experiment station at Baton Rouge.

Interest in corn production has greatly increased since the advent of the weevil. Each farmer is trying to produce at least enough to feed his stock and, if possible, increase the amount of stock on hand. More varieties are grown than are commonly met in one locality. This is due to the fact that the farmers are in many cases trying to find a variety well adapted to their conditions and also to the probability that a single variety may be known by two or more names. The New Madrid, Silver Mine, Mosby, Mexican June, and Shoepeg are the most commonly grown varieties. The New Madrid is a popular variety and a good corn for this locality. Silver Mine is a small white corn which is claimed by some not to make stalk enough and to be very susceptible to drought. Mexican June corn is a prolific small corn and, as the name signifies, can be planted in June and make a crop. Shoepeg is a native corn having a short stubby ear with shoepeg-shaped kernel. The Mosby corn is claimed to be more subject to the weevil than most of the others.

Corn of the different varieties can be planted from the middle of March to the middle of June and matures from June 20 to late fall. Silver Mine is one of the earliest kinds, being a little earlier in maturing than the New Madrid. Imported seed of New Madrid will mature about 10 days ahead of home-grown seed as a rule, so that much seed corn is annually brought in from the North. Corn is always planted thick in the row and then hoed out to the proper stand. It is claimed this is necessary in order to allow for destruction of plants by worms, though these are reported not to be bad on sandy land.

Much difference of opinion exists over the parish with regard to the preparation of the seed bed. At present the ground is bedded as for cotton and the seed planted on the bed. Some maintain that seed should be placed in the water furrow and others that the ground should be broken flat. Much, of course, depends upon local conditions, but it is certain that the land should be broken to a depth of 6 or 8 inches, about twice as deep as at present, and on a well-drained

field fall breaking will be preferable. Many factors must be taken into consideration in taking up the production of corn. It will be found that the corn which will prove best on the lighter soil will not be so desirable for the heavier soils. Farmers should realize this and set about at once to select corn from their own fields with reference to the soil. Several years will probably be needed to attain the desired strains, but in the end the corn yields will be greatly increased.

Weevils work a great deal of destruction to corn, and this must be taken into consideration in selecting seed. It is said that an ear which is well covered with husks is well protected and a hard, flinty kernel is too hard for the weevil to penetrate. Corn is always pulled with the shucks on and husked as used from the crib. Corn fodder is seldom made use of, though the entire plant could be cut in the dwarf stage and cured, making a valuable food. Yields of corn run from 15 to 65 bushels per acre, but considering the relatively poor culture the crop has heretofore received there is every reason to believe that as much as 75 or 80 bushels can be secured when the proper varieties are grown under improved methods.

Rice is rapidly becoming an important crop, particularly in the northern part of the parish. About 2,000 acres were grown in 1909 and the yields were so satisfactory that in 1910 something like 10,000 acres were being devoted to its culture. In preparing for rice the fields are cleared of scattering trees and brush and then low levees are made to hold the water at the different levels. Water is obtained principally from the Mississippi River by siphons over the levee into canals which penetrate the fields. Lake St. John, Tensas River, and some bayous are also sources of water supply. Because it is warmer lake and bayou water is deemed better than river water.

The installation of the pumping plant and construction of canals and cross levees make a heavy outlay for rice culture imperative, estimates of the cost of putting in the first crop varying from \$25 to \$35 an acre. The land is usually plowed with gang plows during the winter and early spring. In March or April, when ready to plant, the ground is fined with disks and the grain planted with drills. Water is turned on when the plants are from 4 to 6 inches high, and kept on until within two weeks of harvest time, when it is taken off to allow the soil to dry and settle sufficiently to permit the use of a binder. Both Honduras and Japanese rice are grown. The former is the earlier, requiring five months in which to mature. The Japanese rice can be planted from April 1 to May 20 and is harvested in September or October. This variety yields more heavily, but a better price is usually secured for the Honduras variety. It is general for the planter to use both varieties in order to extend the harvest period.

Much of the land now planted to rice is being rented. It is said that rice can only be grown continuously for about four years and that it is better for the tenants to rent than to buy. Rent is about \$4 an acre, cash. The rice growers have an opportunity in beginning its culture here to keep out weeds, particularly red rice. These have as yet not become established, and if the farmer will begin now to keep these weeds out the profits from rice growing will be increased very appreciably. Rice yields from 15 to 20 sacks per acre.

One of the disadvantages of rice culture which may develop is the labor problem. Many hands are required to put in a crop, but after that one man can take care of 100 acres, whereas one man has formerly taken care of about 15 acres of cotton. The result will be that many negroes, finding no employment for a considerable part of the year, will leave the country, as many have already done. Another result will be the entire abandonment of the tenant system. It is suggested that other crops, such as broom corn, be included on the plantation, if for no other purpose than to hold labor for use when wanted in the rice fields. The area which can be planted to rice is, however, limited. The present total acreage could possibly be trebled, but this would about exhaust the lands at present suitable for rice. If effective drainage of the Sharkey clay is secured, the acreage can be greatly increased, though much of that type is too much broken by ridges and bayous for successful rice culture.

The vast area of natural range in the timbered interior of the parish has induced many of the larger plantation owners and nearly all of the smaller farmers either to take up stock raising or to increase their stock holdings. Some even expect to depend upon stock entirely for income from their farms. In preparation for this, miles of hog-tight fence have been constructed and fields arranged conveniently. Formerly, and more or less at present, hogs and cattle were branded or marked and turned loose in the swamps, not to be seen again until driven up and sold. The native hog is of the razor-back type and well suited to such a life. Recently, however, a considerable number of purebred Poland-China, Berkshire, and Duroc-Jersey hogs have been brought in. They are, of course, not at home on the range and rarely do well, but where crossed with the native hog the result is much more satisfactory. While no experience in the parish can be cited to sustain the opinion, it is believed that a first cross of Poland-China with Duroc-Jersey will be a very desirable hog. It can be depended on to do well on pasture, and when taken up and fed will make rapid gains in weight. The Tamworth breed is handled by some and highly prized.

The native cattle do not compare with feeders in the corn belt, but are well adapted to the requirements of the region. They are nearly

always of Jersey blood. Some fine herds of Angus and Polled Durham have been introduced and are doing well. Some sheep are raised and this industry can be profitably extended.

While the range of the swamps is not equal to a good Bermuda grass or clover pasture, it produces an abundance of feed consisting of undergrowth, cane, a wild pea vine, Spanish moss, and a scant growth of grass.

Considerable trouble is frequently experienced with hog cholera and other diseases. In this connection attention is called to the water supply in these regions. The stock depends entirely upon bayous or sloughs for water. These usually become low and stagnant in the early fall, making the water unfit for drinking. Under such conditions if cholera breaks out it is easily communicated, and if hog raising is to be successful a sufficient supply of pure water should be supplied.

Truck crops of cabbage, onions, and potatoes have been or are being grown on a commercial scale, although local markets consume most of the products. Irish potatoes and Bermuda onions have been produced for shipment during the last two or three years, but the returns have been so discouraging that trucking is not looked on with favor at present. Tales of dishonesty on the part of commission merchants are common, but much of the failure was probably due to ignorance in regard to the requirements of the market. There is no question that good crops of these products can be produced and it remains for the farmers to study the market and meet its demands. Two crops of potatoes can be produced the same year and \$500 an acre has been realized from 5 acres of cabbage. Marketable potatoes can be dug about May 1, and should bring \$1 a bushel. It would seem that much more could be realized from growing truck crops throughout the parish if the demands of the markets be satisfied. Watermelons are grown only for home consumption; strawberries also, but not in sufficient quantity to supply the local demand. The production of small fruits could be greatly increased. A few patches of rape were seen in the parish, and considering the increase in stock raising the acreage should be greatly extended. When used practically this is a most profitable pasture for hogs and sheep.

Cowpeas are almost universally grown as a catch crop in the corn, being planted at the last cultivation. They are frequently planted after oats are harvested and are highly valued for hay. They are sometimes given the entire use of the ground and a crop of hay and peas both secured. The Whippoorwill variety is not so common as the Clay and New Era. Cowpeas, through their ability to gather nitrogen from the air, are valuable soil improvers. They constitute the only fertilizing practiced at the present time. For this they are highly valued and universally grown, particularly upon the sandier

soils. Some are endeavoring to grow red clover and lespedeza. There is no apparent reason why these crops can not be successfully grown, and lespedeza is especially desirable. Alsike clover will probably stand the wet conditions generally found here better than red clover. Bur clover, while abounding in the hills across the river, was not seen in the parish. It is safe to say, however, that none of the clovers can meet the requirements of the planters and soil as well as cowpeas.

Dwarf broom corn has been grown in a small way for a number of years, a small factory in Vidalia consuming the product. Seed is usually secured from the broom-corn district of Illinois and planted at any time between April 20 and July 1. Harvesting usually begins about 60 days after planting. The Yazoo very fine sandy loam is probably best adapted to the culture of broom corn, as it makes a fairly fine and tough straw, yielding 1,500 pounds of valuable straw to the acre, which is a very high yield. If properly cut to a stubble a second crop of finer quality straw can be obtained the same year. One thousand pounds has been obtained from the second cutting. This makes a total of 2,500 pounds of baled straw to the acre. Even with a yield of 2,000 pounds this is a highly profitable crop. The cost of production ranges from \$25 to \$35 an acre. The heavier types of soil will produce a heavier yield than the lighter types, but the quality is not so good. However, thick planting will improve the quality appreciably and the returns would probably be as great from heavy as from sandy land. Inasmuch as this crop does well, it seems especially desirable to urge the extension of its culture in connection with rice. The rice crop demands considerable labor at planting and harvesting time only. Broom corn planted on the sandy lands, with rice on the heavier types, would solve the difficulty of keeping labor on the rice plantations, as the crop demands considerable labor at the time when rice needs none. Though no one in the parish is combining these crops, it seems well to urge at least a trial of this plan.

Several attempts have been made by various planters to secure a permanent field of alfalfa. They have invariably been successful in getting a good stand both with spring and autumn sowing, but weeds come in about the second year and soon take possession of the fields. Crab grass is the principal offender. Only one small patch was seen growing, and the impression is general that alfalfa will not do well here. The necessity of sowing the seed upon thoroughly clean ground seems to have been overlooked. Inasmuch as this crop is so desirable, it is suggested that a well-drained piece of ground—Yazoo silty clay loam, Yazoo clay, Yazoo very fine sandy loam, or Sarpy silty clay loam—preferably where it is not very sandy—be planted to oats. As soon as they can be taken off, the land, if possible, should be given a top dressing of manure and plowed im-

mediately and disked to a perfect seed bed. Every possible effort should be taken to germinate all weed seeds and have the land disked thoroughly at least once a week, or oftener if necessary, to kill weeds. The object at this time is to make conditions as favorable as possible for seed germination and then to kill the weeds. This process should be continued until fall, and then alfalfa seed should be sown at the rate of about 25 pounds to the acre. Seed can probably be sown as late as November and make sufficient growth to live over winter. Northern-grown seed would be best, but under no circumstances should seed grown under irrigation be used in this climate. It is urged against fall sowing that the soil is too dry to germinate the seed, but under this method a dust mulch has been maintained all summer and the soil should be in excellent condition as regards moisture and tilth. If it is seen that the ground is by no means clean of weeds by fall, it is suggested that the alfalfa be planted in rows and given several cultivations. Additional seed may be sown in the spring. After a stand is secured, care must be taken not to cut the crop until growth has started from the crowns. A disking with straight-set knives after each cutting will also be found beneficial. Five and sometimes six cuttings can be obtained, and a total yield of 5 tons per acre should be secured. While a strictly alfalfa farm would probably not be advisable, every planter can and should have a small acreage. It is thought that no inoculation will be necessary on any of these soils.

Oats are grown more extensively than formerly and the acreage should be still further increased. A good quality of oats is produced, and yields are estimated to run from 25 to 45 bushels to the acre, though the crop is never thrashed, being fed with the straw. The Red Rustproof oat is almost universally used, and for best results should be planted not later than November. The young growth furnishes a most excellent pasture for stock, particularly dairy cattle, throughout the winter and until March. The crop is cut the last of May or first of June. Large shipments of oats are annually brought into the parish for feed. This should be produced at home, as the yield is satisfactory and the expense of production as low as elsewhere.

Sugar cane has been grown in a limited way for sirup for many years. A very good quality of sirup is produced from the Louisiana Ribbon cane. Yields of 200 gallons and upwards have been obtained from the Yazoo very fine sandy loam and Yazoo silty clay loam. No attempt has been made to put sirup on the market in bottles or cans suitable for the trade, and it appears that such an industry would be highly profitable. Whether sugar can be manufactured profitably or not must be determined by trial. It will undoubtedly be

found that the lighter soils will make the best quality of sirup for fancy trade, although the heavy soils will produce a heavier yield.

Many pecan trees are found in the woods, and when the nuts are ripe they are gathered and shipped in large quantities. Seventy-five cents a peck is the ordinary price paid at the small stores for the wild pecans. They are sent thence to the New Orleans market. A few trees have been set out around the old plantations, and among them are some that are of very superior quality. The pecans from these trees find a ready sale at \$6 to \$8 a bushel, and as they yield regularly from 5 to 10 bushels a year the crop is quite valuable. One important orchard of improved varieties has been set out near Ferriday, but this is the only case where an attempt is being made to grow this nut on a large scale for market.

The entire parish was originally covered with a dense growth of deciduous trees, and much of this virgin timber is still standing. The species most abundant are oak, cypress, ash, pecan, gum, tupelo, cottonwood, persimmon, and sycamore. Some of the uncleared land has the most valuable part of the timber removed, but there are very large tracts which are as yet untouched. Even the cut-over land is very soon reforested, for the trees grow rapidly in this region.

From the foregoing it will be seen that a great variety of crops can be grown in the parish. Small acreages of cotton can probably still be produced under proper culture. Rice is the most important substitute for cotton. The quality and yield of corn can be greatly improved by proper seed selection and culture. Oats, cane, and broom corn offer encouraging possibilities. Cowpeas are a necessity. Stock raising will undoubtedly prove a success. Trucking is profitable if properly conducted. But in adapting any of these industries the local conditions should be carefully studied. Seed grown upon bottom land should be secured whenever possible, and it is thought much greater permanent success will be obtained by selection and breeding to secure varieties of corn, oats, cotton, cowpeas, and stock peculiarly suited to local conditions.

It will probably be some time before a crop rotation is firmly established. It is thought that the following plan or some slight modification of it will be advisable in most cases where rice is not grown. Let corn occupy half the ground, oats one-fourth, and the other fourth be given to cotton, cane, broom corn, and potatoes. Cowpeas should be planted in the corn at last cultivation and should also follow oats. It is assumed that much of the corn will be fed to stock and the manure distributed properly. A permanent pasture of Bermuda grass and white clover should also be maintained. The variety of crops is so great that almost any rotation can be adopted, but it is thought that one covering three years is preferable to a longer one.

As everything is inclined to grow very rapidly, weeds become unusually troublesome. Crab grass is probably the worst, though indigo, "cocoa," and a few others are common. An area over which weeds could be controlled better than in Concordia Parish would be difficult to find. The Mississippi on the east greatly lessens seed dissemination from that direction. The timber land protects cultivated land on the west, so that there remains the strip of from one-fourth to 1 mile wide in which to eradicate the weeds. It could be done. Farmers could with concerted and determined effort destroy every weed growing on their lands. It would be expensive at first, but after a few years weeds would be very easily kept out and the result in the long run would certainly be worth the trouble.

The average size of the farms of the parish, according to the census of 1900, was 93.7 acres, and the percentage of farms operated by the owners was 6.9. These figures were arrived at by considering each individual tenancy on the large plantations as a separate farm. If each plantation, comprising from 10 to 150 of these small farms, but all under one management and run as a unit, be considered a farm, the average size of the farm in the parish would be very much larger. The plantations on the Mississippi front are all large, running from 500 to 8,000 acres in size, and the plantations on the Tensas River and the upper part of the Black River and on Lakes Concordia and St. John in the northern part of the parish are nearly as large. Only on the lower part of Black River are the individual holdings small, and here they average probably 120 acres. These smaller farms are owned by white men and operated almost entirely by the owners. The large plantations are usually under the charge of managers and the work on them is done by negro tenants. This parish will never support its full quota of inhabitants nor reach its highest prosperity until the large plantations are subdivided. The boll weevil has started agitation of this question.

The labor on the plantations is performed entirely by negroes, and as they have been employed entirely in growing cotton they are qualified for little else at the present time. For the most part it has been the custom to supervise the work on the plantations very closely. The cotton has been grown almost entirely under the tenant system and but comparatively little wage labor employed. Now, however, the wage system is being introduced quite generally. The usual wage is 75 cents a day for the time actually employed. In addition the laborer has his house rent and fuel free. In the New Era neighborhood, in the southwest part of the parish, there are no negroes. The farms are small and operated almost entirely by the owners.

The census of 1900 gave the average value of the farm land as \$11 an acre; but a little less than half of this was classified as improved farm land. As the unimproved farm land has little value, it is prob-

able that the average value of the improved farm land at that time was from \$20 to \$25 an acre. This is very close to its value at the present time. That in the northern part is the most valuable because it is well protected from overflow, which is not true of that in the southern part. The better plantations in the northern part of the parish are worth from \$30 to \$35 an acre. Such a plantation would include a small proportion of uncleared land having little marketable timber on it and therefore of little value, and this would make the actual improved land somewhat higher in value. Improved farms and plantations in the southern part of the parish are worth from \$10 to \$15 an acre. The unimproved land is worth from \$1 to \$10 an acre, according to the amount of marketable timber on it. These lands are steadily increasing in value. Some of the cypress brakes are worth a great deal more than these figures. Although a great deal of discouragement has been felt since the advent of the boll weevil, farm values have not dropped a great deal. Recent sales have taken place at nearly if not quite the figures that have heretofore prevailed.

SOILS.

The soil of Concordia Parish is wholly alluvium, or what is frequently locally termed "made land." It represents the accumulations of particles of sand, silt, and clay which have been continuously deposited from the overburdened waters of the Mississippi, Tensas, Black, and Red Rivers at times of inundations during thousands of years. There thus occurs in this soil particles from the remotest lands of the drainage basins of these streams—from the Rocky Mountains and from the Alleghenies, from Minnesota and from the hills of Louisiana and Mississippi, and from the Permian Red beds of northwest Texas. Needless to say it is characteristic of such material to be productive. The method of deposition of this material is in a general way easily explained. As the size of a soil particle which may be carried by water depends upon the velocity of the current, the sudden decrease in the current when a stream leaves its channels and the water flows over the bank forces the deposition first of the sands, then of the silt, and finally of the clay. And such, with some modifications, is the order in which the soil occurs in this area. The sand has largely been deposited nearest the source of overflow and formed the immediate front, giving rise to two types of soil, which, having similar characteristics in all things except texture, are called Yazoo fine sand and Yazoo very fine sandy loam. Immediately back of these soils and at a slightly lower elevation silt loam or clay loam material has been deposited over a former front or sandy bar and given rise to the Yazoo silty clay loam, Yazoo clay, and Sarpy silty clay loam. Still farther back occur extensive de-

posits of clay loam material and clay, which form the Sharkey clay. In some places a deposit of fine sandy material has been made over this clay and given rise to Yazoo fine sandy loam. This relationship in occurrence of these types is more theoretical than actual, for only two or three of them may be encountered in passing from the front to the Sharkey clay. In the western part of the parish some of the soil is highly mottled with yellow, and because of this coloration is separated as Yazoo silty clay loam, Sarpy silty clay loam, and the Sharkey clay (erosion phase). Reddish deposits from Red River are also separated largely because of the wide variation in coloration and called Miller very fine sandy loam and Buxin silt loam. Meadow (Yazoo material) and Riverwash are terms applied to unclassified material occurring between the levee and the river.

From an agricultural standpoint there are two important soil divisions in Concordia Parish, namely, the sandy and loamy, better drained, and easier cultivated soils along and near the river fronts, and the heavy clayey lands occupying the low, flat, poorly drained back country. Under present conditions these might be classed as agricultural and nonagricultural lands. The unused low-lying clay land, as the Sharkey clay, although extremely fertile land, stands now as a nonproductive soil on account of the swampy conditions and liability to frequent overflow. Reclaimed from such unfavorable conditions by levees, dikes, and ditches, all of this would prove immensely productive land.

The following table shows the names and extent of the various soil types of the area:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Sharkey clay.....	278,408	} 74.6	Yazoo fine sandy loam.....	2,624	0.6
Better drained phase.....	17,152		Buxin silt loam.....	2,560	.6
Erosion phase.....	38,976		Yazoo clay.....	2,432	.6
Yazoo very fine sandy loam..	39,424	8.9	Miller very fine sandy loam..	1,472	.3
Meadow (Yazoo material)....	24,960	5.7	Riverwash.....	1,408	.3
Yazoo silty clay loam.....	21,248	4.8	Wabash very fine sandy loam..	704	.1
Yazoo fine sand.....	10,432	2.4			
Sarpy silty clay loam.....	4,800	1.1	Total.....	441,600	.....

SHARKEY CLAY.

There is very little difference between the soil and subsoil of the Sharkey clay. More organic matter has been incorporated with the top 2 or 3 inches, making it a dark-gray silty clay speckled with rusty brown. At lower depths the material becomes lighter colored, so that the subsoil is a steel-gray silty clay with a decided bluish tinge. It is also spotted with brown, which is somewhat lighter

than the specks in the surface soil. Sandy material usually underlies the type at from 3 to 10 feet.

While the type is fairly uniform some variations occur. The above-described surface is frequently lacking and the steel-gray or bluish heavy silt clay begins at the immediate surface. If the entire body of Sharkey clay, as shown on the map, is ever brought into cultivation it is very likely that considerable areas of Sharkey clay loam or silty clay loam will be discovered, which, because of inaccessibility, could not be located during the survey. In some localities considerable yellow is developed in the subsoil.

While the soil of the Sharkey clay is heavy, tenacious, and plastic, and becomes exceedingly hard when dried from a puddled condition, if properly handled in the field it mellows down and assumes the tilth of a heavy silt loam. Upon drying, the particles flocculate and tend to form small cubes, hence the popular name of "buckshot" land, which is universally applied to soil of this type. The terms "black buckshot" and "blue buckshot," so common in other localities, are not used here. The term "gumbo" is not applied to the Sharkey clay, and the tendency to the cubical structure is not nearly so pronounced in this soil as in many other heavy bottom-land soils to which that term is applied.

The soil should always be fall plowed and should either be very dry or very wet. When dry its buckshot structure makes it somewhat friable, and when wet it tends to soften and run, so that in either condition it may be readily turned, but if only in a fairly damp condition, plowing is very difficult and good work impossible. If plowed when wet it becomes very hard and intractable to implements, yet it will mellow down with the frosts of winter and alternate drying and wetting in the early spring, so that no trouble will ordinarily be had in securing good tilth.

Except for a few areas of other types, the Sharkey clay occupies the entire interior portion or about five-sixths of the parish. Its boundary between the front types usually nearly coincides with the timber line which marks the back of the cultivated land, for only occasionally have small spots been brought under cultivation. This is because of the poor condition of drainage. Occupying the comparatively level basin, it is subject to deep and prolonged overflows. These do not come every year, but the rain water alone causes very wet conditions during the winter and spring months. Hence the term "swamp" which is generally applied to areas of this type. Water marks on the trees can frequently be seen 8 and 10 feet above the ground. The chapter on drainage describes conditions over this type and the subject need not be treated here.

The Sharkey clay owes its origin to the accumulations of clay and silt particles which were brought in at times of overflow and de-

posited in comparatively still water. The lack of sand is due to the fact that these heavier particles were deposited nearer the streams, while the finer particles could be held in suspension by the water until carried farther back into the so-called swamps, there to be slowly deposited in nearly stagnant water.

At present most of this type is forested to ash, pecan, sweet, red, and tupelo gum, water willow, and overcup oaks, cypress, and persimmon. Much of the cypress has been cut, but there is a wealth of timber of the other varieties, which is increasing in value rapidly. Tree growth is very rapid and in large bodies the holding of the land for its timber growth alone would be highly remunerative. Only a few sawmills are at present in operation. Cane abounds in localities near the boundaries of the swamp and on some slight ridges within them. Spanish moss covers the trees, and scattered palmettoes are also typical of the soil. The undergrowth of young trees, briars, and shrubs is frequently so dense that penetration even on foot is difficult. At present areas of this type are used to supply fuel and pasture. Great numbers of cattle and hogs are turned out to range on the mast, moss, canes, and leaves and obtain all their sustenance in this manner. Enough of the soil has been cleared and cultivated to determine that it is a strong soil where drainage conditions favor the growth of plants. Corn and rice do particularly well, but the nature of the soil and its position with relation to the woods are against the production of cotton during the presence of the boll weevil. When drainage is provided, as it must be some time, this will be the best corn soil in the parish, provided of course that the proper variety of corn is secured. Rice will also do well, except that the land may be cut up too badly with bayous and sloughs for the most profitable results. It will never be as well adapted to alfalfa as the Yazoo silty clay loam or soils having a light-textured subsoil, but there are probably ridges upon which alfalfa will do well. Broom corn will give a heavy yield, but the straw will be too coarse to bring the highest market price. Land of this type has advanced from almost nothing to \$10 to \$25 an acre, depending upon the value of the timber.

Better drained phase.—On both sides of the parish, occupying the inner margins of the cleared fronts and in a few other positions, is to be found a phase of the Sharkey clay better drained than the main areas before described and lying at a somewhat higher elevation. Only the general overflows ever cover this phase of the type, and a crop can be usually depended upon. The greater part of it is in cultivation, and more of it could be cleared, ditched, and cropped successfully. This year (1910) it is planted mainly to rice. Yields of 20 sacks per acre were obtained in 1909. Under present methods the yields of corn are from 35 to 60 bushels per acre. Alfalfa was

seen growing on a small area where there was good drainage. Sugar cane would unquestionably give heavy yields.

Farms composed principally of this phase of the Sharkey clay can be purchased for \$25 to \$35 an acre.

Erosion phase.—In the western part of the parish and mainly along Tensas and Black Rivers is a light-colored erosion phase of the type. The surface is formed typically of ridges and hollows, the ridges varying from 2 to 10 rods wide and the tops being from 8 to 15 feet above the bottom of the hollows. Occasionally there may be areas with flat surface. The soil in the hollows is the typical Sharkey clay, but that covering the ridges consists of a yellowish-brown plastic and tenacious clay mottled with reddish brown and bluish gray. The subsoil, beginning at about 20 inches, is mostly a steel-gray, unctuous, plastic clay, with but little yellow mottling. The ridges have fairly good natural drainage, the water escaping to hollows on each side. They are, nevertheless, subject to prolonged overflows during general inundations and during floods in the Tensas and Black Rivers. The soil is very deficient in organic matter, and its physical condition could be much improved by plowing under some vegetable matter, cowpeas probably being the best for this purpose. Only the ridges can be successfully tilled. It is recognized as a very productive soil. Fifteen bales of cotton were produced on 33 acres in 1909. Corn and oats yield well also.

The results of mechanical analyses of the Sharkey clay and of its two phases are given in the following table:

Mechanical analyses of Sharkey clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Typical:								
23295	Soil.....	0.0	0.2	.2	1.0	2.6	35.2	60.9
23296	Subsoil.....	.0	.2	.2	.7	1.1	40.0	57.7
Better drained phase:								
23288, 23290..	Soil.....	.0	.1	.5	3.6	7.1	47.4	41.4
23289, 23291..	Subsoil.....	.0	.1	.3	2.8	1.1	48.2	47.6
Erosion phase:								
23286	Soil.....	.0	.2	.3	1.2	3.3	44.1	50.9
23287	Subsoil.....	.0	.3	.5	1.6	1.5	56.4	39.9

YAZOO VERY FINE SANDY LOAM.

The Yazoo very fine sandy loam consists of from 8 to 20 inches of light-textured gray to light-brown fine sandy loam, underlain by brown or light-brown very fine sandy loam or fine sandy loam more or less mottled with rusty brown, extending to a depth of 36 inches or more. This type is rather variable, particularly so in the subsoil. Lenses of silt loam and also of fine sand may occur in the subsoil, and

in some cases the entire substratum may be nearly as light textured as the surface soil. The soil when dry is very light colored and incoherent.

This type occurs along the fronts of the Mississippi, Tensas, and Black Rivers. The main development is in the northern part of the parish along the first two rivers. The Tensas areas contain perceptibly more fine sand and less very fine sand than the Mississippi River areas.

Occupying the immediate river fronts, the Yazoo very fine sandy loam lies above the heavier types and has good surface and under drainage. In fact so completely does the water drain away that crops are sometimes injured by drought. The type has been formed by sandy deposits from overflow waters of the rivers and owes its position of proximity to the streams to the fact that the sand, being coarser and heavier than the silt and clay particles, is the first to be deposited upon a slackening of the river currents.

It is practically all cleared, though considerable of that along the Tensas River and a small proportion of that along the Mississippi is at present lying idle. Some of it has been in cultivation over 100 years. The general farm crops of the area are grown. This type would lend itself very well to the cultural methods required for combating the boll weevil. It is not so well adapted to rice culture, but is a natural truck soil, and that industry is strongly urged for these areas. Cabbage, Irish potatoes, sweet potatoes, lettuce, garden peas, beets, peppers, okra, melons, cucumbers, radishes, early tomatoes, and a number of other vegetables would give good results. Some of these crops have already assumed some little importance. Sugar cane makes an excellent quality of sirup. Cowpeas should be grown on it in order to increase the supply of organic matter and to supply nitrogen for subsequent crops. Applications of phosphate and potash would probably prove remunerative, but the amounts to be used must be determined by experiment.

The Yazoo very fine sandy loam is one of the highly prized types of the area, and the improved farms can not be bought for less than \$50 an acre.

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

Mechanical analyses of Yazoo very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23304, 23306.....	Soil.....	0.0	0.1	0.2	3.4	53.1	36.0	6.9
23305, 23307.....	Subsoil.....	.0	.0	.1	1.1	45.4	43.2	10.0

YAZOO FINE SANDY LOAM.

The soil of the Yazoo fine sandy loam is a gray to light-brown fine-textured loam or heavy fine sandy loam, with a depth of 8 to 15 inches, and very similar to that of the Yazoo very fine sandy loam. The subsoil, beginning with a sharp line of demarcation from the soil, varies from a rather plastic grayish silty clay loam or silty clay to brown silty clay. It is slightly mottled with rusty to dark-brown iron-oxide colors. Very frequently this gives way to lighter-textured material at about 30 inches. The subsoil represents material which without the sandy overlying soil would have formed soil probably belonging to the Sharkey series.

The type is developed in isolated areas on both the Mississippi and Tensas fronts, though it occurs more extensively along the Mississippi. It is land of relatively high elevation, and drainage is usually fairly good. It has been formed by the deposition of sandy material over heavy soil during deep inundations or breaks in the levees. Much of it is under cultivation and is highly prized agriculturally.

All the general farm crops are grown, and trucking is engaged in to some extent. It is a good rice soil because of the heavy subsoil, which prevents seepage of irrigating water. It will not, however, grow rice continuously as well as some of the heavy soils. Areas of the type are small, and land values and yields were not obtainable.

YAZOO FINE SAND.

The Yazoo fine sand is a gray to light-brown loose and incoherent fine sand containing but a very small proportion of medium or coarse grades. This usually extends to a depth of at least 36 inches, but occasionally heavier material is encountered in the lower part of the profile. The largest area occurs in the vicinity of Bougere in what is known as Bougere Swamp, though another important area lies to the north of Fish Pond. Both of these areas have been formed by sand-laden water rushing through crevasses in the levee. Other areas have been formed below the end of the levee at times of overflow. The material composing this type is the same as that found in much of the Riverwash and some areas adjacent to the river and outside of the levee have been included with Meadow (Yazoo material) for the reason that the Yazoo fine sand as mapped will sometime be an agricultural soil, while Riverwash and Meadow (Yazoo material) as such will never be.

None of the type is at present under cultivation, but is covered with forest. Many of the trees in this forest have been killed, supposedly by the deep sand deposit forming this type having been piled around them. Its rather bumpy and ridgy topography is a hindrance to agricultural use, but if cleared of forest and thick

undergrowth and properly managed it will make a most excellent truck soil.

Below are given the results of a mechanical analysis of the Yazoo fine sand:

Mechanical analysis of Yazoo fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
23303	Soil.....	0.0	0.5	1.1	47.7	37.4	9.8	3.2

YAZOO SILTY CLAY LOAM.

The soil of the Yazoo silty clay loam is a silty clay loam varying from a light to heavy texture and having a distinctly brown color, though when dry the surface is grayish and somewhat resembles the Yazoo very fine sandy loam. This material has a depth of 10 to 24 inches, with an average of about 18 inches. Very frequently the subsurface, from 8 to 18 inches, is considerably heavier than the immediate surface material, which is very mellow and is easily brought into good tilth. The subsoil from 18 to 36 inches is a light-brown very fine sandy loam or coarse-textured silty loam faintly mottled with rusty brown and brownish or yellowish gray. This is a fairly uniform type, remarkably so for bottom land, and no very prominent phases occur, the only variations being slight differences in color and in texture of surface soil in some areas.

The Yazoo silty clay loam is developed along the Mississippi and Black Rivers. It occupies a position slightly below the level of the Yazoo very fine sandy loam, but somewhat higher than the Sharkey clay, sometimes giving way abruptly to the Sharkey clay. Owing to the light texture of the subsoil the type has fairly good natural drainage. However, open ditches are usually deemed necessary for thorough removal of the rain water.

The type owes its origin to the deposition of silt and clay over sandy bars, flats, and fronts. Most of the type is exempt from overflow, except at times of very high floods and general inundations.

The greater part of this type is in cultivation, and it is a very popular and valuable soil. It works easily, is susceptible of good drainage, and is a strong productive soil. All the general farm crops are grown. Because of the sandy nature of its subsoil, rice requires more irrigating than would otherwise be necessary. Corn yields well if properly cared for, the average yield being about 35 bushels per acre. It is believed that this yield can be greatly increased. Oats average probably 30 bushels to the acre. This is an admirable type for alfalfa, provided sufficient drainage is insured. Sugar cane would do well. The true value of this soil is not yet appreciated in the parish. It

will in time come to be known as one of the very best types in the parish. Cotton does well when not attacked by the boll weevil.

In the table below are given the average results of mechanical analyses of the Yazoo silty clay loam:

Mechanical analyses of Yazoo silty clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23284, 23297	Soil.....	0.0	0.1	0.2	3.7	25.8	42.2	28.0
23285, 23298	Subsoil .....	.0	.0	.2	7.6	48.7	27.8	15.7

YAZOO CLAY.

The Yazoo clay consists of brownish clay faintly mottled with grayish and reddish brown. It has a depth of about 20 inches and is underlain by a subsoil of very fine sandy loam to silty clay loam. The color of the subsoil is dark drab or gray mottled with brown. It extends to 36 inches or more. The type is somewhat more difficult to farm than the Yazoo silty clay loam, as it becomes quite hard and tends to clod unless properly handled. It is not, however, so difficult to get in good tilth as the Sharkey clay.

It occurs in rather isolated areas along the Mississippi front and usually displaces the Yazoo silty clay loam in its position immediately back of the Yazoo very fine sandy loam. The surface is usually level or has only a gentle slope back toward the swamps. Drainage is secured by shallow open ditches, but the light subsoil aids materially in the rapid removal of rain water, which passes through it into the subdrainage. Its drainage is hardly so good as that of the Yazoo silty clay loam. It is subject to inundation only at times of general floods.

It is nearly all in cultivation and is well adapted to all general crops of the area. For rice culture, owing to its light subsoil, it would require the use of considerably more water than would the Sharkey clay. Corn yields well and alfalfa should do excellently upon it, provided the required drainage is secured. Sugar cane would do well. Cotton would give profitable returns if the crop were not too seriously attacked by the boll weevil.

The results of mechanical analyses of the Yazoo clay are given in the following table:

Mechanical analyses of Yazoo clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23299	Soil.....	0.0	0.1	0.2	0.3	2.8	43.7	52.9
23300	Subsoil .....	.0	.0	.2	1.5	47.1	34.6	16.6

SARPY SILTY CLAY LOAM.

The Sarpy silty clay loam is closely allied with the Yazoo silty clay loam in general characteristics, but is much darker in color, somewhat heavier in texture, and less adequately drained. It consists of about 20 inches of dark-gray heavy silty clay loam somewhat tenacious and tending to a granular structure, underlain after a few inches of gradation by a yellowish-gray loam, in which fine sand grains are conspicuous. When wet this subsoil has a decidedly mushy feel. The type is developed to some extent on the Mississippi River front. It occurs more commonly along Black River, though usually in small areas and not of wide distribution. It occupies a position somewhat higher than the Sharkey clay, with which it is generally in contact. But for its light-textured subsoil this type would suffer severely from lack of drainage. Narrow open ditches are needed to assist in the removal of rain water. It is subject to overflow only in times of general inundation.

The Sarpy silty clay loam has been formed by the settling of silt and clay over sand bars, sandy flats, and fronts.

Probably a little more than one-half the type is in cultivation at the present time, while some of it has in times past been cultivated, but is now grown up to second-growth timber. Where quick and efficient drainage can be secured for this soil it is an exceedingly valuable general farming type. Alfalfa should do very well upon it. The soil is highly prized and there seems to be no reason why all of it should not be drained and cultivated.

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

Mechanical analyses of Sarpy silty clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23292	Soil	0.0	0.3	0.7	4.5	27.8	36.7	30.2
23293	Subsoil .....	.0	.0	.0	6.2	47.1	29.1	17.2

WABASH VERY FINE SANDY LOAM.

The Wabash very fine sandy loam consists of about 20 inches of nearly black very fine sandy loam, underlain to a depth of 36 inches by a subsoil lighter in color but heavier in texture, being a dark yellowish-gray heavy loam or light silt loam. There is very little material in this soil coarser than fine sand, but it mellows up readily with almost no tendency to clod and is easily managed.

From the standpoint of extent this type is of little importance in this area, as only a few small areas occur. It is developed only in the western part of the parish, back of the front lands, and is there confined to comparatively narrow ridges. The area of greatest extent lies about 5 miles west of Clayton, on Lake Marke plantation.

The type is, of course, alluvial in origin, and the material must have been deposited in rather slowly moving water, but the processes of its formation must have been somewhat different from those under which the other types of the parish were formed. It probably represents the front land of bayous which have now been largely filled, and must have been subject to swampy conditions for some time in order that the large amount of organic matter might be incorporated with the surface soil. It has good drainage so far as rain water is concerned and is flooded only at times of high general overflow.

The Wabash very fine sandy loam is a highly prized type of soil because of its productiveness and the ease with which it can be handled. The general products of the county are commonly grown upon it and rice is being planted on the largest area. This is an admirable soil for onions, tomatoes, cabbages, kale, sweet corn, and potatoes, and would yield greater returns if planted to these crops than to the general crops. The type would probably command a price of about \$40 an acre.

Below are given the results of mechanical analyses of the Wabash very fine sandy loam:

Mechanical analyses of Wabash very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23301	Soil.....	0.0	0.0	0.2	2.8	58.9	22.1	16.0
23302	Subsoil .....	.0	.0	.0	5.4	65.1	17.8	11.8

BUXIN SILT LOAM.

Lying immediately back of the Miller very fine sandy loam there has been deposited at times of overflow from the Red River a reddish silt loam material to a depth varying from 2 to 10 inches. It invariably overlies what was at one time Sharkey clay material and which now forms the subsoil. The immediate surface of the land for a considerable distance back from Red River appears decidedly reddish, but this material is merely a superficial covering. In case this region should be next submerged by water from the Mississippi River the present red surface would be obliterated. None of the Buxin silt loam is under cultivation.

MILLER VERY FINE SANDY LOAM.

The Miller very fine sandy loam consists of a chocolate-red friable very fine sandy loam throughout the entire 36 inches of its profile. It forms a narrow strip immediately along the front of Red River. It has good surface drainage, but is subject to overflow both from the Red River and from water backing up from the Mississippi River through Cocodrie Bayou.

While some of this soil has in times past been in cultivation, very little of it is farmed at present, and no crop yields are obtainable. Cotton, corn, and alfalfa should do well.

The following table gives the results of a mechanical analysis of the soil of the Miller very fine sandy loam :

Mechanical analysis of Miller very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
23294	Soil.....	0.0	0.0	0.0	0.3	64.2	28.1	7.2

RIVERWASH.

Sand bars have been thrown up in the acute angles of bends in the Mississippi River, and these have been designated as Riverwash. These bars are at present valueless for agriculture. They represent the first step in the formation of river-bottom soil, and at some time probably existed over nearly every part of the Mississippi bottoms. The sandy subsoil, which is characteristic of the Yazoo silty clay loam, Yazoo clay, and Sarpy silty clay loam, is no doubt the remnants of old sand bars which have passed through the meadow stage and been converted into true agricultural soils by the deposition of their present soil covering.

MEADOW (YAZOO MATERIAL).

On the outside of the levee, or between the river and the levee, the land is subject to annual inundation and accession of new soil material. Much of it is badly cut up by sloughs and valued only for pasture. It is frequently timbered with cottonwood or willows and is usually of heavy texture, though some areas of sandy texture are included. These areas have accordingly been shown on the map as Meadow (Yazoo material). They represent soil types in the process of making or of destruction and much of the entire parish has at some time been in this same condition. This land is of little value for agriculture, is not taxed, and seldom changes hands.

DRAINAGE.

While a detailed study of drainage requirements and methods is not within the province of the soil survey, a few of the essential facts can properly be considered in this report upon the soils and agricultural possibilities of the parish. The Mississippi River is constantly changing its course, cutting at one place and building sand bars in another or cutting across at the narrow point in a bend. For instance, Lake St. John, in the northern part of the parish, is an old channel of the river left where a cut across the narrow neck of a bend was made at no very ancient date. The same process occurred in the formation of Lake Concordia, and would no doubt have occurred directly north of Vidalia had not efforts been made to prevent it. This was done in order to keep the river from washing the bluff at Natchez, and caused the channel to push westward, where it is now eating into Lake Concordia again.

Two overflow periods are likely to occur each year—one in February or March, due to the melting of snow, and one in May or June, due to excessive rains. The greatest overflow year was in 1882, when a steamboat made the trip from bluff to bluff straight across the bottoms and landed at Natchez, and yet the water drained away that year in time to produce good crops. Other years of serious overflow were 1874, 1876, 1884, 1890, 1892, 1893, and 1897. The driest year on record was 1872, which mark is taken as zero on the water gauge at present. With the exception of the last 8 miles of its course along this parish overflows from the Mississippi are provided against by high levees erected under Federal and State supervision. The Tensas and Black Rivers also were at one time leveed, but the levees were low and have been broken so frequently that they are practically worthless. All of the important bayous connecting with these rivers are dammed up, thus preventing any drainage connection. Red River is not leveed, which leaves the south end of the parish entirely unprotected. Most of the front land is traversed by a network of small artificial ditches, which carry all rain water into the interior swamps, to be carried south by Cocodrie Bayou, which empties into Red River opposite Shaw.

Considerable change has taken place in stream channels at the south end of the parish during the last 100 years. At one time the Mississippi formed the south parish line, making a bend around what is now Turnbull Island. After the cut-off was made at the east end of the island, Red River appropriated the old channel for itself, but now it has largely forsaken it and finds its outlet through Atchafalaya River. When the Mississippi River is swollen it backs up through this old channel in Red, Black, and Tensas Rivers, and especially into Cocodrie Bayou, so that there is a strong current

northward. When all the bayous, lakes, and brakes become filled the water spreads over nearly the entire area of Sharkey clay to a depth in places of 8 or 10 feet. The effect upon any attempt at agriculture will be readily appreciated. There is a movement under way to complete the levee across this parish closing the old mouth of Red River, thus making a solid levee from New Orleans to some point in Missouri. This will prevent the Mississippi River water from backing up the Cocodrie Bayou and will probably prevent the actual damage done at present by water from this source, but will not prevent back water from the Red River, which also overflows its banks. Unless this is provided against it would seem that the cultivated land could be extended but little.

Inasmuch as the Sharkey clay is known to be a rich soil and easily worked when having the proper moisture conditions, it is entirely improbable that the 329,536 acres of that soil in this parish will be left practically idle for many more years, merely because it lacks sufficient drainage. The method of perfecting this drainage is, however, an engineering problem. It would seem that the ideal condition would be brought about by leveeing Tensas, Black, and Red Rivers as protection in emergencies, by clearing out and straightening the bayous to meet all demands made upon them by rain water, and by providing both locks and pumps at the mouth of Cocodrie and Grand Cut-off Bayous, the locks to be closed and pumps started in case Red River becomes dangerously high. Then the front lands can be thoroughly ditched and tiled to perfect their drainage. While such plans would be very costly, it would throw open to cultivation practically all land which is at present not farmed and improve most of that which is tilled.

When the Mississippi is very high seepage water causes considerable damage for one-fourth to one-half mile from the levee. This seems to be unavoidable at present, but when drainage improvements are made ditches can probably be arranged which will prevent damage even from seepage. It is said that when a lake or bayou occurs between the levee and a field seepage water is caught and causes no injury.

SUMMARY.

Concordia Parish lies in the east-central part of Louisiana between the Mississippi River on the east and the Red, Black, and Tensas Rivers on the south and west, with Tensas Parish to the north. It contains 690 square miles, or 441,600 acres.

In relief it is comparatively level, though the front lands along the rivers lie 10 to 15 feet above the interior. With the exception of Red River, drainage into the boundary rivers is cut off by levees and

dams, so that all rain water must find its exit through Cocodrie Bayou, which penetrates the parish and empties into Red River.

Settlement began under Spanish dominion in 1798 and has been more or less gradual and along the lines of the large plantation system, based upon the culture of the one crop, cotton. The population in 1910 was 14,278, of which the greater part was colored.

Vidalia, in the northeastern part, is the largest town and the parish seat. It has a population of 1345. Ferriday is the other important town and the principal railroad center.

The parish has good shipping facilities. Direct railroad connection can be had over the Texas & Pacific to New Orleans and over the St. Louis, Iron Mountain & Southern lines to the north. Boats run regularly on the rivers to New Orleans and markets to the north.

The climate is typical of the warm temperate region. There are 244 growing days. The average annual rainfall is about 50 inches.

Agriculture up to 1908 was based entirely upon cotton production. But since then the boll weevil has made that crop nearly unprofitable, and rice, corn, oats, broom corn, and truck crops are being raised as substitutes. It is probable that no continued depression in agriculture will result from the reduction of the cotton acreage and the adoption of a more diversified farming.

Stock raising is being entered into enthusiastically and will be a most valuable industry to the parish.

Most of the parish is held in large plantations, which are worked by managers and negroes. These holdings must ultimately be broken up, if this parish is to support its full quota of inhabitants.

Land is held at from \$10 to \$60 an acre, depending upon improvements or timber and drainage. While it is generally supposed that the boll weevil has forced a decline in land prices, this seems to be the case only in a few small farms.

The soils are all alluvium, representing accumulation of sediments from the rivers at times of overflow. Twelve types have been recognized. With reference to their physical characteristics these have been grouped into the Yazoo, Sarpy, and Sharkey series, with a few miscellaneous types.

The Yazoo series is characterized by light-gray soils and sandy subsoils. The Yazoo fine sand consists of fine sand throughout the profile, has rather uneven topography, and is little used for agriculture. If cleared it would make a good truck soil.

The Yazoo very fine sandy loam is a good truck soil and cotton can be grown upon it still because of its natural advantages in fighting the boll weevil. It is well adapted to all the general crops of the area. It is better suited to corn, cotton, and broom corn than to rice.

The Yazoo fine sandy loam is a good rice soil, but not so strong as the Sharkey clay. It is also a good truck soil and cotton does fairly well on it.

The Yazoo silty clay loam is a most valuable soil and is admirably adapted to corn, oats, and alfalfa. It will probably be the best alfalfa soil of the area. Cotton production is not so successful as on lighter types.

The Yazoo clay is not so important a type in extent as the Yazoo silty clay loam, but it is well adapted to corn, alfalfa, and rice.

The Sharkey series is characterized by heavy subsoils. The Sharkey clay is the swamp type of the area, is little cultivated, and deficient in drainage. It is a strong soil, however, and some day will be noted for its corn and rice production. The better-drained phase is the typical rice soil of the area, while the erosion phase, where cultivated, is highly prized for cotton and corn.

The Sarpy silty clay loam has a dark-gray soil and sandy subsoil and in some respects resembles the Yazoo silty clay loam. Its drainage is not quite so good, but in adaptation the soils are very similar.

The Wabash very fine sandy loam, Buxin silt loam, and Miller very fine sandy loam, owing to their small extent, are unimportant types in this parish.

The term Riverwash is applied to the sand bars bordering the river and Meadow (Yazoo material) includes the land, small areas of which only are cultivated, lying between the river and the main levee.

Drainage is an exceedingly important question in the ultimate agricultural development of this parish. In fact, more depends upon the rapid removal of rain water and the prevention of overflow than upon anything else. Immediate efforts should accordingly be made to bring about the reclamation of the vast undrained swamps in the parish and to provide for the thorough drainage of the cultivated land.

NRCS Accessibility Statement

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

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotope, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.