

SOIL SURVEY OF PRAIRIE COUNTY, ARKANSAS.

By WILLIAM T. CARTER, Jr., F. N. MEEKER, HOWARD C. SMITH, and
E. L. WORTHEN.

DESCRIPTION OF THE AREA.

Prairie County is situated in the east-central part of Arkansas, about 60 miles west of the Mississippi River and comprises an area of approximately 656 square miles. The county is irregular in outline and is bounded on the north by White and Woodruff counties, on the east by Woodruff and Monroe counties, on the south by Arkansas County, and on the west by Lonoke and White counties.

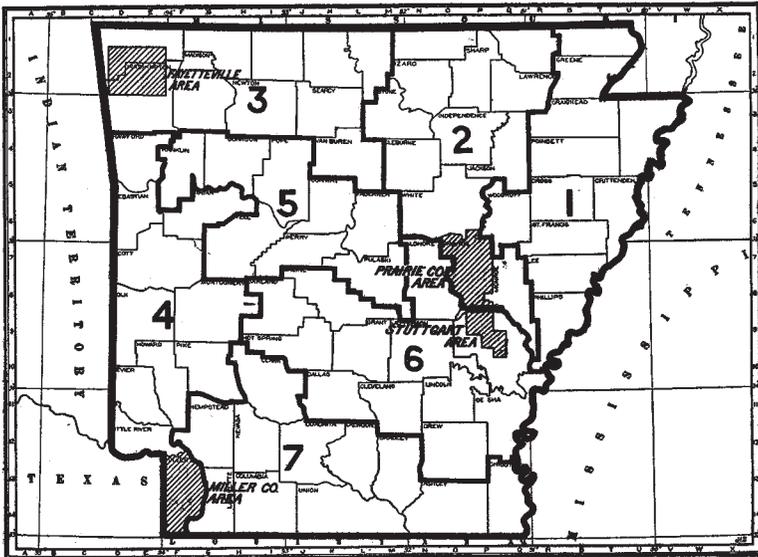


FIG. 21.—Sketch map showing location of the Prairie County area, Arkansas.

Prairie County has, on the whole, a very uniform topography, consisting of broad undulating prairies, which occupy the highest position in the county, gently rolling timbered uplands, and broad stream bottoms. The county has no very rough topography, except a few low bluffs along the White River. Some of the slopes near the mouths of the streams have been cut and gullied by rain water, but these are of small extent. The highest elevation in the county is

about 240 feet above sea level and the lowest is perhaps 200 feet. The county has a general slope from the northwest to the southeast.

The county has a number of good drainage ways, but on account of the even topography the drainage of a considerable part of the county is slow. The principal drainage way is the White River, which flows through the eastern part of the county in a general southeast direction. The next largest stream in the county is the Cache River, which forms the eastern boundary of the county for several miles. The principal tributaries of the White River in the county are: Bayou Desarc, which forms the northern boundary of the county for several miles, and which drains a considerable section in the northwestern part of the county; Big Creek, which empties into the White River near Desarc; Wattensas Bayou, which drains a large area in the northern and central part of the county; Honey Creek, which drains considerable of the eastern central part of the county; La Grue Bayou, which flows through Grand Prairie and drains large areas of it, and Bayou Two Prairies, or Meto, which forms the western boundary of the county for several miles and drains most of Grand Prairie. All these streams have numerous small tributaries.

The White River occupies a deep, broad channel and is navigable all the year. It is surrounded by broad, flat bottoms, swampy in places, and containing numerous lakes and sloughs. The flow in the river is moderate. Many of the other streams of the county have a sluggish flow, except when overflowed, and some go entirely dry in summer. The drainage of the timbered uplands is quite good. The drainage of the prairies is not so good, owing to the more nearly level topography. On the prairies drainage is accomplished principally through small, narrow, poorly defined stream beds, which lie from 1 to 10 feet below the surface of the prairie and connect with the better-defined streams in the timber lands. Small streams throughout the timbered areas are well defined and are intermittent in flow according to the season.

The population of Prairie County consists principally of whites, but there are quite a number of negroes. The negroes live in the timbered uplands, and none are located on the prairies. The population on the second bottom lands between the White and Cache rivers consists almost entirely of negroes. As the interests of the county are mainly agricultural, the population is made up almost entirely of farmers.

A large proportion of the farmers in the timbered uplands have moved here from the older Southern States, and many of them have lived here for years. The prairies, which have been settled within the last few years, have a population derived from the Central States, many of them being Bohemians, Slavs, Germans, etc., who

have lived in those States before coming here. Those coming from the Central States are from Illinois, Indiana, Iowa, and Missouri, while those coming from the Southern States are from Mississippi, Tennessee, Kentucky, Georgia, and Alabama. The population of the county in 1900 was 11,875, but there is no doubt a much larger population at present, as there has been much immigration within the last few years. The population is well distributed over the county, except in a few timbered areas, where few people live, and in the bottom-land areas, where no one lives.

The principal towns of the county are Devall Bluff, located on the White River and on the main line of the Chicago, Rock Island and Pacific Railway, Desarc, which is located in the northern part of the county on the White River, on the Searcy and Desarc branch of the Rock Island Railway, and Hazen, which is a prairie town, also on the main line of the Chicago, Rock Island and Pacific Railway, in the central part of the county. Desarc and Devall Bluff are the county seats. There are also a number of smaller towns and settlements throughout the county.

The main line of the Chicago, Rock Island and Pacific Railway extends through the central part of the county in an east and west direction. The Searcy and Desarc Railroad, a branch of the Rock Island System, extends northward from Devall Bluff to Searcy, Ark., connecting with the main line of the St. Louis, Iron Mountain and Southern Railroad at Higginson, Ark. The main line of the St. Louis and Southwestern Railroad crosses the southeast corner of the county.

The wagon roads of the county are quite good during the dry season of the year, but during the winter some of the roads in the timber areas are in very bad condition. All the roads of the county could be kept in good condition during all months of the year if graded properly. Considerable attention is being paid to the roads at present. They are being graded and worked systematically, and in a few years' time nearly all the roads in the county should be in very good condition. On the prairies the roads run on the section lines, and they are being placed on the section lines in the timber also. The roads are maintained by special tax and by some compulsory labor. The prairie roads are, as a rule, much better than the roads through the timbered sections.

The towns of the area furnish markets for small quantities of farm produce. The larger markets are Memphis, Little Rock, and Hot Springs. All the larger markets throughout the country can be easily reached by means of the railroads which enter the county.

CLIMATE.

The northern boundary of Prairie County is approximately 35° north latitude. The average temperature for December, January, and February is 43.61° F., while the three hottest months—June, July, and August—have an average temperature of 77.43°. The climate is free from the great extremes of heat and cold which are characteristic of States farther north. The mercury rarely falls to zero, and seldom rises above 98 degrees. Excessively cold weather is exceptional and of short duration. The ground rarely freezes to a depth exceeding 4 inches during the winter. Snow and ice seldom form in considerable quantities and do not remain long. The seasons gradually blend one into the other, so that there are no sudden seasonal changes.

The months of greatest rainfall are December and January. The bottom lands are flooded during a considerable portion of the winter and early spring. Unusually heavy rainfall rarely produces a flooded condition at other seasons. The periods of light rainfall are during the growing season, but, as will be seen from the appended table, the rainfall is usually ample. Droughts rarely occur, and with proper cultivation the soils of the area are especially adapted to the conservation of soil moisture.

Light hailstorms occasionally occur during the spring and early summer, but cause little damage. Thundershowers are frequent during the warmer seasons of the year, and heavy rains usually occur in March and the early part of April. There is usually, however, no excess of moisture during the planting season. Owing to the uniformly level topography and absence of large bodies of water, there is no appreciable difference in the climate of the different parts of the county.

The climate favors the production of apples and pears, and especially peaches and plums, while truck crops, fruits, and berries could be successfully grown in large quantities. Cotton is especially favored by the climate, while rice, corn, oats, peas, sorghum, and other farm crops do well with the present climatic conditions. The climate should prove favorable to the growth of alfalfa. In view of the success with which rice has been grown in Lonoke County, it would seem that there are no unfavorable climatic conditions which would prevent the successful growing of rice on a large scale throughout the prairie sections of Prairie County.

The average growing season for tender vegetation between the latest and earliest killing frosts is 214 days.

The latest killing frost in the spring at Brinkley was April 9, and earliest in the fall October 18.

On the whole it may be said that Prairie County possesses a climate favorable to the growth of nearly all the northern farm products, and in addition its southern latitude gives it an advantage that can not help but make the county one of the foremost of the State when the crop adaptations are worked out.

The following tables give the normal monthly and annual temperature and precipitation and dates of first and last killing frosts at three stations. Desarc is located in the timbered area of the county; Brinkley is located about 10 miles to the east in Monroe County, and Stuttgart 4 miles south in Arkansas County.

Normal monthly and annual temperature and precipitation.

Month.	Brinkley.		Stuttgart.		Desarc. ^a	
	Temperature.	Precipitation.	Temperature.	Precipitation.	Temperature.	Precipitation.
	°F.	In.	°F.	In.	°F.	In.
January.....	41.9	4.67	42.2	5.69	42.5	3.14
February.....	42.5	3.80	43.5	3.97	47.6	2.98
March.....	52.7	5.92	53.0	6.21	57.0	7.58
April.....	58.9	4.10	62.6	4.14	58.0	3.47
May.....	69.8	3.67	70.1	4.20	68.1	2.16
June.....	77.1	3.38	77.4	3.96	76.2	6.74
July.....	79.8	3.66	80.7	4.89	78.6	5.99
August.....	79.3	2.67	79.4	3.18	78.4	2.84
September.....	78.2	2.39	73.1	3.21	76.0	1.00
October.....	61.9	2.09	61.5	2.81	62.6	.88
November.....	50.8	3.64	50.8	4.26	51.8	1.65
December.....	44.3	4.58	44.2	4.44	43.8	6.33
Year.....	61.0	44.57	61.5	50.96	61.7	44.76

^a The temperature and precipitation at Desarc are given for the year 1904, departures from the normal not being considered.

Dates of first and last killing frosts.

Year.	Brinkley.		Stuttgart.	
	Last in spring.	First in fall.	Last in spring.	First in fall.
1898.....	Apr. 7	Oct. 27	Apr. 6	Oct. 27
1899.....	Apr. 9	.....	Mar. 29	Nov. 3
1900.....	Apr. 13	Nov. 9	Apr. 12	Nov. 9
1901.....	Mar. 21	Nov. 13	Mar. 21	Nov. 4
1902.....	Mar. 19	Nov. 3	Mar. 19	Nov. 28
1903.....	Mar. 24	Oct. 18	Apr. 4	Oct. 18
1904.....	Mar. 29	Oct. 23	Apr. 10	Oct. 23
Average.....	Mar. 31	Oct. 31	Apr. 1	Nov. 3

AGRICULTURE

In 1820 what is now known as Prairie County was an unbroken wilderness. Between 1820 and 1830 hunters and trappers from

States to the south and east visited the northern part of the county. According to the old settlers some of these people cleared small patches of land for raising corn and vegetables. In 1830 a settlement was started near the mouth of Wattensas Bayou by people from Tennessee. At that time only small quantities of corn and vegetables were grown, since wild game and fish were plentiful. Within the next few years a considerable number of settlers located in this vicinity, the greater part of them coming from western Tennessee and northern Mississippi. About this time another settlement was started just north of Desarc, along the White River. In this locality the cutting of cypress timber, which was floated down the river to New Orleans, was engaged in during a part of the year, farming being subordinated to lumbering, hunting, and fishing.

In 1840 a farming settlement was started in the vicinity of Hickory Plains by people from western Tennessee, northern Mississippi, and North Carolina. Wheat and oats were grown only for home use. The growing of cotton was started about 1844. The baled cotton was hauled by wagon to the river, where it was either sold or exchanged for provisions brought by the boats which plied the river. It was subsequently taken to New Orleans or Memphis. On lower Surrounded Hill cotton was the principal product, the land in this section being well adapted to this crop.

In 1835 a settlement was started on Grand Prairie in the neighborhood of where Fairmount now stands. The adjoining timber land was, however, used mainly for farming purposes, only small quantities of corn being grown on the prairie. At that time the prairie was considered of little value for agricultural purposes and was used principally for pasturage. In 1850 stock raising was carried on to some extent in this part of the county, the open prairie being used as a range.

Before the civil war the agriculture of the county was in a prosperous condition. Cleared timber upland was worth from \$10 to \$15 an acre. Cotton was the money crop, the greater part of which was shipped to Memphis and New Orleans by boat down the White River. Slave labor was used throughout the county at this time, being used to the largest extent on the cotton lands between the White and Cache rivers. The war checked the agricultural development and land values were much lower than they had been in the earlier history of the county. On account of the freeing of the negroes much land was thrown out of cultivation, as the supply of labor was insufficient.

At the present time cotton and corn are the principal crops in the timbered upland areas of the county. Potatoes and oats are grown to some extent. Up to within the last ten years the prairie has been

considered of very little value. Within the last decade, however, many northern farmers have settled on the prairie lands and have carried on successful farm work. The growing of native prairie hay is an important industry on the prairie soils. The prairie grasses are cut and baled on the farm by machinery, after which the hay is stored in large sheds or barns and fed on the farm or hauled to the local markets and sold. The farmers receive from \$4 to \$5 a ton for this product at the local markets. The hay shipped from this county over the Chicago, Rock Island and Pacific Railway and the Desarc and Searcy Railroad amounted to over 1,000 carloads during the year 1905. Considerable hay is also shipped from Ulm over the St. Louis and Southwestern Railroad.

The oat crop is also very important on the prairie soils. Oats are in great demand in the local markets, where they bring from 40 to 45 cents per bushel. Corn is grown to a considerable extent on the prairie. For this crop it is necessary to manure the land well if a good yield is to be obtained. Little corn is sold, most of it being fed on the farm. An important industry in the prairie sections of the county which has developed within recent years is dairy farming. Many farmers have dairy herds varying in number from 6 to 40 cows. The milk is taken to creameries located at Hazen and Devall Bluff or to a skimming station at Fairmount. The amount paid to the farmers by the creamery at Hazen during the year 1905 was about \$16,000, and it is estimated that this amount will be very nearly doubled during the present year. The creameries ship the milk to Memphis, Little Rock, and Hot Springs, or skim it and ship the cream to those places. There is a considerable demand for dairy products at these places, and 15 cents a gallon is paid for the milk, and the cream is sold for from 30 to 35 cents per pound of butter fat. Dairy operations on a much larger scale would prove of great profit to the farmers of this county.

During the past few years small areas have been planted to rice in Lonoke County, several miles west of the Prairie County line. The yield per acre has been quite large and the quality superior. There is in this county a great deal of land similar to that on which the rice has been grown in Lonoke County, and it would seem that this crop should be grown quite as successfully here. There will be several thousand acres planted in rice in Prairie County this season.

Few farmers in this area practice any well-defined system of crop rotation. Some farmers on the prairie soils, however, make a practice of following peas with oats and the latter crop with corn. Practically no commercial fertilizers are used in the county.

In the prairie sections of the county the hired labor is mainly white, while in the timbered sections and in the lower lying areas

in the vicinity of the White and Cache rivers it is principally colored. The monthly wage is usually \$15 to \$20 with board. Day labor is paid 75 cents to \$1 a day. Labor is not abundant, and difficulty is often experienced in securing sufficient help to gather the crops.

According to the Twelfth Census about 56 per cent of the farms in this county are operated by tenants, the most of whom rent on a share basis. If the owner furnishes team, seed, and tools he receives half of all the crops. If he furnishes the land only he receives one-third of the corn and one-fourth of the cotton. Nearly all the farmers on the prairies own the land they cultivate.

The farms vary in size from 40 to 160 acres, the average farm, according to Census statistics, being 101 acres. Nearly all the farms in the county are operated as one-family farms, with the exception of the region between the White and Cache rivers, where the plantation system is used.

The agricultural methods practiced in the county seem fairly well adapted to the conditions. Better results would, however, be obtained if more careful attention were given to the planning of a definite system of crop rotation. Peas should be planted more largely, to be used as a hay crop or to be plowed under as a green manure. During rainy seasons large areas of the prairie soils, as well as many areas in the timbered uplands, are so wet that crops can not be planted until quite late. This condition could be largely remedied by the digging of ditches leading to the natural drainage channels.

More legumes should be grown, as the soils seem especially poor in humus and consequently in nitrogen. Clover and white clover grow wild all over the uplands. Judging from this it would seem that the clover crops should do well here. However, it is claimed by the farmers that clover will not grow unless reseeded every year, and this is also said of timothy. Whether the poor success in growing clover and timothy is due to poor cultural methods or to the climate or to the soil is not known. It would be well to try liming the soil.

The Twelfth Census gives the value of farm lands and improvements (except buildings) in Prairie County as \$1,303,890, while the value of farm buildings is \$321,160. The value of farm implements and machinery is \$104,510, and the value of farm live stock, \$450,463.

These figures, while representing conditions five years ago, do not represent the condition of the county at present, as within the last few years there has been a steady inflow of settlers, with a consequent rapid growth of farm values, much improvement in building and fencing, and a steady increase in the production of all farm products. Alfalfa has not yet been successfully grown on the uplands, but there

seems to be no reason why it should not do well with the addition of lime on the rolling timbered uplands and creek or river bottoms.

On the flat upland prairies it is not likely ever to succeed on account of the poorly drained condition of the soil and the impervious nature of the lower subsoil which prevents deep rooting.

SOILS.

Prairie County lies entirely within that region known geologically as the Mississippi Embayment.^a The Mississippi Embayment occupies a large region which extends southward from the mouth of the Ohio River and includes southern Georgia and Alabama, nearly all of Mississippi, western Tennessee, southwestern Missouri, the southeastern half of Arkansas, all of Louisiana, and southeast Texas.

At one time this entire region was covered by an extension of the Gulf of Mexico, a subsidence of the area in late Cretaceous times causing an extension of the Gulf northward. Streams flowing into the Gulf carried material from the adjacent land areas into the Embayment, forming deposits of late Cretaceous age. Following this there came an increased subsidence of the Embayment, and the material then washed in from the surrounding lands spread over the Cretaceous deposits and formed the deposits of the Tertiary age. Then there came an elevation of the Embayment area which caused the Gulf to retreat southward. The Mississippi and Ohio rivers then spread over the Tertiary deposits. After a period of erosion, during which these rivers wore away a considerable proportion of the Tertiary deposits, the valley was again partly refilled by river deposits, so that a large part of the material at and near the surface of the lowlands of this region now consists of deposits of recent age. According to the section of a well drilled at Newport, Ark., it appears that the deposits of recent age in this region consist of sand and clay and are about 100 feet thick.

The prairies occupy a higher position than any other section of the county. It would seem from this that at one time the region consisted almost entirely of large very nearly level prairies, from which the surface material has been largely removed by erosion. Erosion having worked out a system of drainage, a forest growth has sprung up which has followed the erosion and the consequent destruction of the prairies. The silty surface soil of the prairies is very uniform

^aThe matter pertaining to the geology of the Embayment is taken largely from the report on the Water Resources of the Contact Region between the Paleozoic and the Mississippi Embayment Deposits in Northern Arkansas, by A. H. Purdue, published in Water Supply and Irrigation paper No. 145, U. S. Geological Survey, entitled "Contributions to the Hydrology of eastern United States."

in texture and differs greatly from the underlying subsoils. This may be due to the deposition of a more silty layer over the underlying clays or to a washing out of the finer particles from the surface soil. It is evident that the underlying clays were deposited from very quiet waters, and it would seem from this that the region was covered with sluggish streams or lakes. Reworked glacial or other material, brought from regions farther north by streams which spread over large areas, constitutes the basis of the soil formations of the area.

The prairie lands consist almost entirely of the Crowley silt loam, and erosion and drainage have formed the most of the other soils of the county from this type, either directly or indirectly. These processes have been in progress for a long time, and the formation and changing of all the types is still going on, the principal factors in the rearrangement being erosion, weathering, and deposition.

The first type of soil evolved from the material constituting the prairies was the Acadia silt loam, which represents a well-drained condition with a well-defined system of streams. Wherever the Acadia silt loam has been formed the county is covered with a timber growth.

The lower and more poorly drained areas throughout the prairies and timber land—some of which are covered with water for a considerable part of the year, while others act as incipient stream channels through which surplus surface water passes slowly—gave rise to the type known as the Waverly silt loam. These wet areas are probably due to depressions in the underlying clay material into which is being washed and deposited the soil particles gathered by flowing surface waters. In the timbered region this type is covered with a growth of water-loving trees and plants which are gradually encroaching onto the Waverly silt loam of the prairies, which phase at present is covered with a rank growth of coarse grass.

The next step in the process of erosion was the formation of larger streams with more swiftly flowing water, and a consequent deeper cutting and the formation of stream beds with steeper slopes. The greater part of the surface soil and the intermediate yellow silty subsoil of the Acadia silt loam has been removed, and the underlying heavy red and yellow clay material exposed, thus giving rise to the type called Morse clay. This red clay is calcareous and contains lime concretions.

Simultaneously with the formation of the Morse clay was the formation of the type called Collins silt loam. This was formed simply by the deposition of eroded material at the bottoms of the larger streams, where an alluvial soil was built up by the wash from the other soils.

The heavy bottom lands of the largest streams were during all this time being formed by the deposition of the soil particles from

the overflow and backset waters, which had transported the most of the material from distant areas.

The soils of the area may be classed, according to origin, as sedimentary and alluvial. The formation of all the types is still in progress, with the exception of the Crowley silt loam, which is being gradually eroded and displaced by the other types of the area. The soils may be broadly grouped according to position and agricultural value into prairie, timbered uplands, and bottom or overflow lands. The prairie lands, which consist almost entirely of the Crowley silt loam, occupy the highest position in the county, are only moderately well drained, and are used for general farm crops. The natural product is prairie hay. The timbered uplands are on the whole the best drained soils of the county. These uplands consist principally of the Acadia silt loam with smaller areas of the Waverly silt loam and the Morse clay. The principal type cultivated is the Acadia silt loam. The Waverly silt loam is largely uncultivated, owing to its poorly drained condition, while the Morse clay has but a slight extent.

The principal crops grown on the upland soils are cotton, corn, and oats, but cotton is not produced on the prairies. The principal timber growth is post oak, white oak, red oak, black-jack oak, and hickory. The natural product of this section is timber, from which railroad ties, lumber, piling, etc., are manufactured.

The bottom lands are alluvial in origin and are heavily timbered with cypress, elm, gum, hickory, cottonwood, hackberry, cow oak, overcup oak, willow oak, pin oak, sycamore, pecan, ash, and other water-loving trees, and canebrakes. These are the most poorly drained soils in the county, some parts of the bottoms being swampy during the greater part of the year. During the winter and spring months the bottoms, the largest of which are along the White and Cache rivers, are covered with overflow water. The land in these bottoms is cultivated very little, and about the only crop grown is a small acreage of cotton and corn, which is planted in June after the overflow waters have receded. Good yields are made, and a great deal more of the land could be cultivated than at present. The bottom lands are valued chiefly for the timber and for grazing purposes. Cattle do well grazing on the cane in the bottoms and hogs thrive on the mast which the timber produces. The natural product of the bottom lands is timber. Barrel hoops are manufactured from the elm, oars from the ash, and the other timber is utilized largely for various purposes.

The soils of the Prairie County area are similar to the soils extending over a considerable part of the Mississippi Embayment. The soils of the prairies and timbered uplands are very similar to those of Acadia Parish, La., where the rice industry has been extensively

developed. The soils of the bottom lands are similar in texture and topography to some soils of the Yazoo delta, but they are lighter colored, and a smaller proportion of the bottom-land areas have drainage sufficient for profitable cultivation.

The following table gives the name and extent of each of the several soil types shown on the accompanying map:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Acadia silt loam	186,512	32.5	Calhoun clay	12,672	3.0
Crowley silt loam	100,160	23.9	Collins silt loam	8,576	2.1
Waverly clay	98,688	23.4	Morse clay	5,760	1.4
Waverly silt loam	44,672	10.6	Total	420,032	.....
Biscoe silt loam	12,992	3.1			

CROWLEY SILT LOAM.

The soil of the Crowley silt loam consists of about 10 inches of a mottled light-brown to ashy-gray silt loam. When wet this soil is dark brown in color, but when dry it becomes quite gray. The subsoil from 10 inches to about 24 inches is a gray or a mottled gray and yellow silt loam. Beneath this the subsoil to a depth of 36 inches is a heavy gray or mottled gray and yellow, or a red or mottled red and gray heavy silty clay. On the rolling and better drained areas of this type the subsoil from 10 to 24 inches is usually quite yellow in color, with only slight mottling. In these rolling areas the subsoil from 24 to 36 inches is usually mottled red and gray, while in the lower areas it is usually gray. In other words, where drainage is poor the gray color is predominant, while in the gently rolling areas the red and yellow colors are more often found.

The soil is friable and of excellent tilth. On some of the lower areas of the type where drainage is poor the soil dries out and bakes on the surface, and if not cultivated before drying it becomes so hard that cultivation is difficult. The lower subsoil is compact and very nearly impervious to water. Often a thin, compact layer of dry silt light in color is encountered just overlying this impervious subsoil. The lower silty clay subsoil is locally termed "hardpan," but it is not a true hardpan, as there is no true cementation of the soil particles. This peculiar impervious condition of the lower subsoil is probably due to the large quantity of silt in the clay and the peculiar arrangement of the clay and silt particles. In flat or poorly drained areas there are numerous small rounded iron concretions throughout the soil and subsoil.

Throughout certain areas of this type are small mounds from

1 to 3 feet high and from 10 to 100 feet in diameter. The soil of these mounds to a depth of from 24 to 36 inches consists of the same material as the surface soil of the Crowley silt loam, with, perhaps, more very fine sand. Local areas where these small mounds are numerous are comparatively sandy, the sand ranging from fine to very fine in texture.

The Crowley silt loam is the prairie type of the area, and this occupies the greater part of Grand Prairie. Grand Prairie extends from Lonoke County on the west into Prairie County eastward to within a few miles of the White River and reaches southward to the Arkansas County line. Two smaller prairies, several square miles in extent, lying a few miles west and southwest of Desarc in the northern part of the county, consist largely of this type. A few small prairies in the northern part of the county, a few miles northeast of Hickory Plains, also consist principally of the Crowley silt loam.

The topography of this type ranges from very nearly level to undulating and gently rolling. In the southern part of the county, in the vicinity of Fairmount, some areas are quite rolling.

The origin of this soil is not as yet well understood, but it is evident that it is the oldest type in the area. From what could be learned of the geology of the county it seems probable that this soil is derived, in part at least, from the older deposits of Recent age or from the Port Hudson stage of the Pleistocene. It may be that the silt in the prairie soils is the reworked loess material of regions farther north, which have been transported and deposited by gently flowing waters. The exact origin of these mounds is not understood, but they may be wind-blown material. The Crowley silt loam, owing to its nearly level surface, has rather poor natural surface drainage, while the impervious lower subsoil makes the downward flow of soil water almost impossible. Consequently, on some of the more nearly level areas of the type, the water remains until removed by evaporation. There are, however, numerous shallow drainage ways extending throughout the areas of the Crowley silt loam from a few hundred feet to several hundred yards wide, which act as drainage ways for large quantities of the surface water. These are locally termed "slashes," and while the slashes may hold considerable standing water for a long time during wet seasons, most of them have a sluggish flow and carry off considerable surplus surface water. These slashes form the heads of small streams, which find their way to larger streams in the timbered country. There are few streams throughout the areas of the Crowley silt loam, although there are large streams near by, which act as the

drainage ways for the prairie slashes. These slashes are mapped as the Waverly silt loam.

Although much of it is poorly drained in its natural state, the Crowley silt loam is so situated that it can be easily drained artificially. This is successfully done to some extent by ditching, thus rendering it susceptible to profitable cultivation, except during extended and extremely wet seasons, which, however, seldom occur. It could be underdrained by means of tile laid beneath the surface just over the impervious silt clay subsoil. While the land is successfully cultivated without it, a system of artificial drainage would prove of great benefit, the value of the land for general farm crops being at present proportional to the drainage conditions.

The Crowley silt loam is covered with a natural growth of prairie grasses. In the lower and more poorly drained areas of this type the grass is somewhat coarse, but on the whole it makes excellent hay and pasturage. Japanese clover and white clover are indigenous. Occasionally small persimmon trees may be seen growing on the more poorly drained areas, and sumac bushes usually cover the small mounds of the prairie, but in general this type has the appearance of a treeless plain. This soil seems especially adapted to the growth of grasses and grains.

The crops grown on this type are oats, corn, cowpeas, potatoes, small quantities of all kinds of vegetables, and small quantities of peaches, pears, apples, small fruits, and berries. Large areas of the natural prairie grass are pastured and large quantities are cut and baled on the farm for feeding and for shipment. This soil yields from 1 to 2 tons per acre of native prairie hay. Oats yield in ordinary seasons from 30 to 50 bushels per acre, and under especially favorable conditions they sometimes yield as high as 60 or 70 bushels. Corn yields from 15 to 40 bushels per acre. The average yield, however, is about 20 bushels per acre under good conditions. Cotton is not grown on this type, but could be grown on the better drained areas. Cowpeas are largely grown on this type of soil. Some thrash the peas, which yield from 15 to 25 bushels per acre, but they are grown principally for peavine hay, of which this soil produces from 2 to 3 tons per acre. This hay is an excellent feed, and is largely fed to the farm stock. Irish potatoes yield from 100 to 150 bushels per acre, and sweet potatoes from 200 to 300 bushels. Potatoes are grown mainly for home use; not many are sold. A few farmers have made a practice of growing and shipping early Irish potatoes, with fairly good success. It is claimed by the farmers that fair yields of wheat can be secured on this soil, and that this has been done in the past to a small extent. At present little or no wheat is grown, as oats prove more profitable. All kinds of vegetables, such as cabbage, turnips,

peas, beans, radishes, lettuce, onions, melons, and cantaloupes do well. It should be understood that these yields apply to the better drained areas of the type. While the more poorly drained areas are as productive as the rolling areas, the former can not be depended on to give good yields during wet seasons. From small crops of rice which have been grown on this type in the adjoining county of Lonoke, it has been demonstrated that yields ranging from 50 to 80 bushels per acre may be produced. Of course it is upon the more nearly level areas of the type that rice could best be grown on account of the ease with which it could be irrigated. An important industry on this type, which has been started within the past few years, is dairy farming. A great many farmers keep from 5 to 40 cows each. The farmers find that dairy farming is quite profitable, as much of the food for the dairy stock can be produced on the farm.

The cultural methods employed on this type are fairly good. Many of the farmers are from the north and are practicing to a considerable extent the methods to which they have been accustomed. The land is broken early in the spring to a depth of 3 to 5 inches with plows ranging in size from 10 inches to 16 inches using from 2 to 4 horses. The land is put in good condition by harrowing two or three times, and the seed bed is thoroughly prepared. Spike-toothed and disk harrows are used. As soon as the soil is dry and warm enough for the seed to germinate the crops are planted. Corn is planted usually from the 1st to the 15th of April. Corn may be planted as late as the latter part of July and fair yields obtained. The corn rows are laid off 3 or 3½ feet apart, and the corn is planted with planters, leaving the hills about from 12 to 18 inches apart in the row and leaving one stalk to the hill. The corn is cultivated several times with improved 2-horse cultivators, and, if it was planted early, is cultivated for the last time during June. Early corn is matured by the 1st of September.

Spring oats are sown in February and fall oats are sown in September and are harvested late in May or early in June.

Prairie hay may be cut and baled from May until October. The early hay is of better quality, but does not yield so heavily as the late hay. The hay is baled by machinery on the farm, stored in large sheds or barns, and fed on the farm or sold in the towns to buyers, who ship it from the county.

Peas are broadcasted in May, June, or July. The early peas make more hay, but the late peas make more seed. The peas are harvested in September, some gathering the seed, and all making hay of the vines. Often the land on which the peas have grown is disked and fall oats drilled in.

The manure is nearly all saved and utilized on the farm. Nearly

all the corn grown is manured as much as possible, according to the supply, while less quantities are used for oats. The soil seems to demand large quantities of organic matter or humus, and the practice of manuring the land can not be too highly recommended.

Little or no commercial fertilizers are used.^a The practice of growing peas on the land is also very beneficial, and the value of the crop, both for feed and for its fertilizing action, is thoroughly appreciated by the farmers. It is probable that liming would prove beneficial to this soil in counteracting the acid condition of the more poorly drained areas.

The agricultural conditions on this type are doubtless better than on any soil in the county. The farms are, as a rule, well kept, the fences are good, being constructed chiefly of wire, and many good residences and farm buildings indicate the generally prosperous conditions. Up to within a few years ago this prairie land was quite low in value, but within recent years northern and western farmers have been moving on to this land and have been fairly successful. Consequently, during the last few years it has steadily advanced in value, and with the prospect of the introduction of successful rice growing these lands are now, on the whole, valued higher than most other lands in the county, with the exception of the second bottom lands between the White and Cache rivers.

Improved land on this type is valued at from \$20 to \$35 an acre. In the southern part of the county, where the land is quite rolling, some improved land is valued as high as \$50 an acre. Unimproved land is rated at from \$20 to \$25 an acre, depending on location.

^a Four large samples of the Crowley silt loam were collected at different points in the area for the purpose of studying the manurial requirements of the type by the wire-basket method. The fields represented have all been under cultivation for many years, corn and oats being the chief products, though some potatoes have been grown on one of the fields. No fertilizers have ever been used upon either of the fields, but manure in small quantities has been applied to three of them. No regular system of rotation has been followed. The yields are about 15 to 20 bushels of corn and 25 to 30 bushels of oats to the acre.

The results obtained indicate that the soil may be readily improved by the application of lime, used alone or in combination with other substances. The largest increase was obtained when it was used in combination with a complete fertilizer; the next, when applied with cowpea vines.

Stable manure also gave a good increase. The benefits derived from nitrate of soda, sulphate of potash, and acid phosphate, used singly or in combination, were scarcely appreciable in the absence of lime, but when lime was present the combination of all three gave a fair increase in growth over that produced by lime alone.

These results, while held to be strictly applicable to the fields from which the samples were taken, undoubtedly indicate in some degree the treatment of the flat, poorly drained areas of this type throughout this section.

The following table gives the average results of mechanical analyses of typical samples of the Crowley silt loam :

Mechanical analyses of Crowley silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	Per ct.	Per ct.	Per ct.	Per ct.
14378, 14435, 14733...	Soil	0.5	0.7	0.2	1.3	15.2	65.4	16.1
14379, 14436, 14734...	Subsoil.....	.3	.9	.3	1.0	11.9	65.5	19.5
14380, 14437, 14735...	Lower subsoil.....	.2	.6	.3	1.3	12.4	59.3	25.4

ACADIA SILT LOAM.

The soil of the Acadia silt loam consists of from 2 to 6 inches of a light-brown silt loam, which becomes quite gray in color upon drying. The subsoil to a depth of from 15 to 24 inches consists of a yellow heavy silt loam or silt clay. In the poorer drained locations this subsoil may have a slight mottling of gray. The subsoil between 15 and 24 inches changes to a mottled gray and red or gray and yellow clay or silty clay, heavy and brittle and always containing a large amount of silt. In this lower subsoil the gray color usually increases with depth. A phase of this type exists as badly eroded spots on the slopes of stream valleys, where the surface soil has been removed by erosion and the yellow subsoil exposed. These spots are of small extent, but in the aggregate they comprise a considerable area. The soil of the Acadia silt loam is of good tilth and is easily cultivated.

A phase of the Acadia silt loam that is largely developed in the more rolling areas differs from the typical soil mainly in the larger content of sand of the fine and very fine grades found in both the soil and subsoil. The surface appearance of the phase is the same as that of the typical soil, the topography being somewhat more rolling and slopes slightly steeper in the phase.

This soil is one of the most extensive types of the area, being found over a large proportion of the timbered uplands of the county. It is strictly a timbered type and is found in all parts of the county except on the prairies and in the bottoms.

The Acadia silt loam has a gently rolling surface and little of it approaches a level position. All of the type has an elevation somewhat lower than the prairies of the county. It is probably the best drained type in the county. Some areas of it, however, could be greatly improved by artificial drainage, either by covered drains or by ditching.

It seems from the general topography and position of this type that it is formed by the erosion of the prairies, with a consequent removal of the greater part of the surface material, a weathering of the

exposed underlying prairie material being followed by a better drainage and a heavy timber growth.

The Acadia silt loam where uncultivated is covered with a heavy growth of hardwood—post oak, red oak, black-jack oak, hickory, etc. Considerable grass also grows in the timber and Japan clover and white clover are characteristic plants.

The Acadia silt loam is adapted to a large variety of farm crops. It is the most extensively cultivated soil type in the timbered uplands of the county. On account of its loose texture the soil is easily cultivated and partly for this reason and partly because it is a comparatively well drained soil it is cultivated by a large number of farmers. The crops grown are cotton, corn, peas, some oats, and small quantities of garden truck and fruit. During good seasons the average yield of cotton is one-half of a bale, corn from 20 to 40 bushels, and oats from 25 to 40 bushels per acre. Peas are grown for hay and yield from 1 to 3 tons per acre. Vegetables and apples, pears, peaches, plums, small fruits, and berries are grown on a small scale for home use and could be grown more extensively. Yields for the eroded and slightly sandy phases are not quite so high as for the typical soil.

The methods of culture on the Acadia silt loam are largely those used throughout the cotton-growing sections of the older Southern States. The land is plowed to a depth of from 3 to 5 inches as soon as it is dried out somewhat. The plows are smaller than those used on the Crowley silt loam, being from 6 inches to 12 inches in size. Two horses are used for the larger plows, while but one horse is used for the smaller plows. The land is either flat broken or in many cases is thrown up in narrow shallow beds. When these beds are dried out the surface is broken with a small spike-toothed harrow which destroys the young grass, the land is smoothed off with a drag, and when the soil is warm enough for the seed to germinate these beds are planted. This method is largely employed for preparing the seed bed for cotton and corn. Corn is planted during the latter part of March or the first part of April. Corn may be planted as late as June with good results. Some use two-horse cultivators, but many still use the double shovel plows for cultivating the corn. The corn is cultivated three or four times and is laid by about the last of June if early corn, and about the last of August if late corn. The corn matures from about the middle of September to the middle of October. Cotton is planted from late in April until the third week in May. It is "chopped" (hoed and thinned) when a few inches high, is cultivated several times with double shovels and a sweep, and is hoed at least twice. The cotton is laid by about July 20 and picking may be commenced the latter part of September.

Little or no commercial fertilizers are used on the farms and few of the farmers on the Acadia silt loam save or apply manure to the soil.^a They understand, however, the value of growing cowpeas on the land and great many grow them. However, the pea vines are all cut for hay and little green manuring is done. If the pea vines were turned under it would aid greatly in maintaining the productiveness of the soil. When first cleared this soil is fairly productive, but under the system of exhaustive cotton farming, so largely practiced, much of the type is deteriorating in productiveness. Some sorghum is grown on this soil, some being used for feed and some being made into sirup.

Agricultural conditions on the Acadia silt loam are not so good as on the Crowley silt loam. The farmers on this type are, on the whole, only moderately prosperous, and many of the farms are in poor condition. By careful cultivation and practicing rotation in which cowpeas have an important place, it seems probable that the productiveness of this soil can be easily maintained. By raising more stock and utilizing the manure on this soil its productiveness would be greatly increased.

^aThree large samples of this soil were collected near Hazen and Devall Bluff, for the purpose of studying its manurial requirements. The fields from which the samples were drawn have been cultivated for more than twenty-five years. Upon one of them cotton and corn have been grown alternately for twenty-two years without the application of commercial fertilizer or barnyard manure or the cultivation of a single leguminous crop. The yields under this system have averaged one-half bale of cotton and 20 bushels of corn to the acre. The other two fields have been subjected to much the same tillage, though each at times has received slight applications of barnyard manure, and have maintained an average of one-third to three-fourths bale of cotton and about 25 bushels of corn to the acre.

Small samples of this soil were placed in wire baskets and given applications of nitrate of soda, sulphate of potash, and acid phosphate, singly and in combination, as well as lime, manure, and cowpeas and lime. The results noted are based upon the figures obtained from all three samples. Of the single elements, nitrate of soda proved most beneficial, sulphate of potash and acid phosphate following in the order named. Combinations of two or more of these salts gave good increases over the untreated soil, the largest being obtained when all three were used with the addition of lime. The use of lime alone also proved beneficial.

The use of stable manure, of cowpea vines with lime, and of complete fertilizer were followed by good increases, the increase from each source being about equal, thus emphasizing the advantages to be expected from following a systematic rotation including a green manuring crop, or from application of humus forming material in the form of stable manure.

These results, while held to be strictly applicable only to the fields from which the samples were taken, no doubt indicate the best method of handling this type in this area, where by continuous planting of cultivated crops the soil has been deprived of much of its organic matter.

The Acadia silt loam is valued at from \$5 to \$10 an acre for the unimproved land and from \$10 to \$20 for improved land.

The following table gives the average results of mechanical analyses of typical samples of the Acadia silt loam:

Mechanical analyses of Acadia silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14386, 14744	Soil	0.8	2.7	0.8	2.0	11.6	67.1	14.1
14387, 14745	Subsoil .....	.3	1.5	.5	1.4	9.0	59.6	27.4
14388, 14746	Lower subsoil .....	.2	.5	.2	1.4	11.8	47.5	37.9

WAVERLY SILT LOAM.

The soil of the Waverly silt loam consists of a gray or mottled gray and yellow silt loam from 15 to 20 inches deep. When dry the soil looks nearly white. The subsoil to a depth of 36 inches consists of a gray or mottled gray and yellow silty clay. The surface 2 or 3 inches of soil contain numerous small rounded iron concretions. The subsoil is very nearly impervious to water, and often at from 30 to 36 inches is quite dry, even when the surface is covered with several inches of water. When moist this soil is friable, but on drying out it bakes hard.

The Waverly silt loam is found in all sections of the county, and is usually found surrounded by the Acadia silt loam in the timbered areas and by the Crowley silt loam on the prairies. Some areas are quite large, having an extent of several square miles, but it often occurs in areas of a few acres each.

The Waverly silt loam always occupies nearly level or basin-shaped areas. It consists largely of narrow, incipient stream beds having no well-defined stream channel for some distance, although having a slight flow during rainy seasons. In these poorly developed stream bottoms the impervious subsoil may not be found within 36 inches of the surface, the soil section consisting entirely of a gray silt loam which is somewhat heavier at the lower depths.

Owing to its low position and its occurrence in basinlike areas, the Waverly silt loam has very poor surface drainage. As the impervious silt clay subsoil will not allow a downward flow of soil water, in many instances the water stands on the surface after rains for long periods, usually until it is removed by evaporation. Nearly every large area of the type, however, forms the headwater of one or more small streams by which much of the water is removed from the surface, even though the soil stays wet during a considerable part of the year. This soil could be easily drained by means of

small ditches having their outlets in these small streams. Because of the wet condition of this soil it is locally called "slash land."

This soil seems to be largely alluvial in origin and is still in process of formation, being composed largely of wash from the surrounding soil types. The small incipient stream bottoms are being built up more rapidly than the large flat areas, and in this way the soil formed is practically alluvial.

Owing to its poorly drained condition this soil is not cultivated. The land around and adjacent to the Waverly silt loam may be cultivated to the borders of this type, but the Waverly silt loam is nearly always left uncultivated. The soil supports a heavy growth of post oak, pin oak, gum, haw, etc.

On the prairies the type is covered with a growth of very coarse native grass and small persimmon trees. The growth of the timber phase is gradually encroaching on the prairie phase. If this land were drained it would in a short time become a productive soil. It would seem to be best adapted to general farm crops, such as corn, oats, and peas. It is quite probable that rice would do especially well on this type. The Waverly silt loam is valued at from \$5 to \$10 an acre where sold in areas by itself. It is usually sold in connection with other types adjoining and tends to lower the value of the surrounding types. It is highly probable that this soil would be greatly benefited by applications of lime, which would counteract its present acid condition.^a

The following table gives the average results of mechanical analyses of typical samples of this soil:

Mechanical analyses of Waverly silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14383, 14424, 14741...	Soil	0.3	0.7	0.3	2.2	10.5	67.2	18.8
14384, 14425, 14742...	Subsoil.....	.2	.7	.3	1.5	8.8	65.9	22.1
14385, 14743.....	Lower subsoil.....	.5	.9	.3	1.6	6.4	58.4	31.3

^a From a study, by the wire-basket method, of the manurial requirements of some of this soil taken from uncultivated fields it would appear that the application of lime, either alone or in combination with a complete fertilizer or with cowpea vines, very greatly increases the productiveness of the soil. Nitrate of soda, sulphate of potash, and acid phosphate, used singly, were but slightly beneficial, and while the results were somewhat better where combinations of these salts were used, they were still greatly inferior to those obtained from the use of the complete fertilizer to which lime was added. Stable manure also gave good increase.

These results, while held to be strictly applicable to the fields from which the samples were taken, are doubtless indicative in some degree of the needs of this soil throughout the area.

WAVERLY CLAY.

The soil of the Waverly clay consists of a light-brown or gray silt clay, or silt loam, having a depth ranging from zero to 6 or 8 inches. The subsoil consists of a mottled gray and yellow clay, or silt clay. The river bottom phase of the type consists of 0 to 36 inches of mottled gray and yellow silt clay or clay. Small rounded iron concretions are often found throughout the soil and subsoil.

The type is, on the whole, quite uniform in texture. Exceptions to this are found along the river banks, bayous, and lakes, where there are narrow strips of this soil, 200 or 300 feet in width, often lying higher than areas farther back from the streams, and here there is more silt and sand in the soil than is found elsewhere. These small narrow areas are often heavy silt or sandy loams, but are not of sufficient extent to be shown as a separate type on a map of the scale used in this survey.

The Waverly clay is found in large areas constituting the White and Cache river bottoms, in the eastern part of the county, and as narrower bottoms along the La Grue Bayou, Wattensas Bayou, Bayou Desarc, Cypress Creek, and Bayou Meto, or Bayou Two-Prairies.

A phase of the type exists on the uplands, the largest area of which is located near the headwaters of La Grue Bayou, $5\frac{1}{2}$ miles southwest of Hazen. The texture of this upland phase is about the same as that along the bayous, the chief difference being one of position. The surface soil of the Waverly clay along the bayous usually is of a paler yellow color than the surface of the type in the river bottoms.

Occupying as it does the low bottom lands along the rivers and creeks the Waverly clay has a nearly level or basin-shaped surface configuration, the immediate banks of the stream being somewhat higher than the land farther back toward the uplands. This depressed surface, together with the low-lying position and rather close texture, gives the type, as a whole, rather poor drainage. It is subject to overflow during a considerable portion of the year, though floods are least frequent during the late spring, summer, and fall months. Many bayous, sloughs, and lakes exist throughout the river bottoms—the lakes marking the old river bed. During the summer months these bottoms are fairly dry and the bayous and creeks may be almost or entirely dry.

Many streams drain the type, and by ditching the drainage conditions could be made fairly good, except during inundations. However, these overflows would still render cultivation impossible during a considerable part of the year. The highland phase, while not overflowed, has water standing on the surface during a considerable part of the year.

The Waverly clay is formed by the deposition of suspended material from the overflow and back-set waters of the streams along which it occurs. The soil in the bottoms is thus purely alluvial and contains a small percentage of organic matter in various stages of decomposition.

Near the stream channels, where the waters move swiftest, the heavier particles of soil (i. e., sand and silt) are deposited, producing the lighter textured phase, while out in the low basinlike areas, where the movement of water is very slow or there is practically no movement, the finest particles are deposited, giving rise to the heavier texture in these areas.

The upland phase, while not entirely alluvial, doubtless has been formed largely by the wash from the surrounding higher soils. This phase may have been at one time a lake bed. Only very small areas of the Waverly clay are ever cultivated, owing to danger of overflow and poor drainage conditions generally. A few small areas of the higher lying and lighter textured phase, usually near stream banks, are under the plow. The principal crop in these small fields is cotton, with sometimes a little corn. These crops are planted in May or June, after the overflow waters have receded. If the season is fairly favorable, not too wet, the cotton yields three-fourths to 1 bale, and the corn from 40 to 60 bushels per acre.

The type is naturally very productive and is especially adapted to growing cotton and corn. At present the land is valued principally for the timber, which consists of a heavy growth of pin, white, black, willow, and overcup oak, hickory, pecan, ash, elm, persimmon, gum, cypress, and other hardwood species. The upland phase has a very heavy growth of oak, post oak being found to a considerable extent. On the better-drained bottom areas and lighter phase of the type there exists, besides the timber, a heavy growth of cane. In the wetter areas largely the cypress and tupelo gum are found.

The land is valued at from \$5 to \$10 an acre, depending on the character of the timber growth. The land is valuable for grazing, as cattle thrive on the wild cane and hogs fatten on the pecans and other mast. Large numbers of cattle and hogs are kept on these bottoms, with little or no other feed during the greater part of the year.

If this land could be reclaimed it would be a very valuable farming land and would add much to the agricultural output of the county. It would seem that a levee several feet high could be extended from the uplands just north of the Prairie County line southward just east of the White River and connecting the Surrounded Hills, thereby confining the White River overflow waters to the White River bottoms. Cache River overflows only to an inconsiderable extent and

if the waters from White River were excluded the bottoms along the former and for several miles west would be reclaimed to agricultural use. This method of leveeing would render cultivable several thousand acres of the Waverly clay in Prairie County alone.

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

Mechanical analyses of Waverly clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14422, 14426, 15900, 15904.....	Soil.....	0.2	1.9	1.5	4.9	3.2	44.5	43.0
14423, 14427, 15901, 15905.....	Subsoil....	.3	2.0	1.5	4.1	3.7	45.6	42.6

CALHOUN CLAY.

The soil of the Calhoun clay consists of a gray heavy clay to a depth of from 2 to 6 inches. The subsoil consists of a very heavy, tenacious, waxy clay of a gray or drab color. Numerous small rounded iron concretions are found throughout the soil and subsoil. Sometimes the soil to a depth of 12 inches is a gray silty clay. At from 4 to 8 feet alternate layers of this clay and light-colored silt occur. At a depth of 8 to 10 feet a pure-gray sand underlies the material.

The soil is located in the northern part of the county adjacent to the bottom soils along Desarc Bayou, Wattensas Bayou, and White River, and between the White and Cache rivers. It occupies the low-lying uplands and its intermediate position between uplands and bottoms would seem to indicate that it is a second bottom. Its surface is very nearly level. It has very poor drainage and the water stands on it for a long time during wet seasons, though it is never overflowed.

The origin of the Calhoun clay is not well understood, but it is evident from its position and from the underlying material that it is alluvial in origin. It was probably built up by the deposition of fine soil particles from quiet overflow or backset waters. As the soil is not now overflowed it would seem that the soil was built up to a considerable height and that the stream beds have since been cut deeper, until now the process of formation is no longer in operation. The type lies from 2 to 15 feet higher than high water in the river and bayous, and is but a few feet lower than the surrounding uplands.

From what could be learned of the agricultural value of the soil, it seems that if drained and cultivated properly it would be a very good cotton soil, and would perhaps yield three-fourths of a bale or more per acre.

The Calhoun clay is very little cultivated, owing to its poorly drained condition. It supports a heavy growth of white oak, black oak, etc. The surface is covered with small depressions and elevations, which are probably caused by the baking and cracking of the soil in dry weather, and areas of this type are locally termed "holey woods," for this reason. The land is considered of low value except for the timber growth and probably never brings more than \$10 an acre.^a

The following table gives the results of mechanical analyses of a typical sample of the Calhoun clay:

Mechanical analyses of Calhoun clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14876.....	Soil.....	0.3	1.8	1.0	2.3	1.7	50.7	42.1
14377.....	Subsoil....	.1	.7	.7	1.2	.8	40.7	55.6

COLLINS SILT LOAM.

The soil of the Collins silt loam consists of about 24 inches of a brown silt loam and the subsoil to a depth of 36 inches of a gray silt loam. This type exists as narrow stream bottoms along the smaller streams throughout the timbered sections of the county.

The Collins silt loam is very nearly level in topography. It has fairly good drainage, but in many places it produces better crops when drained. Although this soil is liable to overflow, it is cultivated to a considerable extent, as it is very productive and is profitably cultivated, even though a crop is lost occasionally by overflow.

This type is alluvial in origin, being formed by the deposition of mineral and vegetable material from the overflow waters of the small streams and by wash from the adjacent slopes.

The principal crops grown are cotton, which yields from three-fourths of a bale to 1 bale per acre; corn, which yields 30 or 40 bush-

^a A test of a sample of this soil, taken from a field that has lain idle for seven years, was made, using the wire-basket method. Its manurial requirements seem to be best met by applications of complete fertilizer, both with and without the addition of lime. Lime alone proved quite beneficial, and nitrate of soda, sulphate of potash, and acid phosphate, used singly, or combinations of any two of these substances, proved of slight benefit, as was the case with cowpea vines and lime as well as stable manure.

These results are doubtless reliable indications of the manurial needs of this soil throughout the area wherever the soil is capable of being sufficiently well drained to make the prospect of its cultivation at all encouraging. They are, of course, strictly applicable only to the field from which the sample was taken.

els, and Irish potatoes, giving from 50 to 100 bushels per acre. Where not cultivated the type supports a growth of elm, white oak, pin oak, etc.

This soil does not exist in large enough areas to have a separate money value, but is sold with adjacent types. It occurs as narrow bottoms throughout areas of the Acadia silt loam and tends to enhance the value of that type.

The following table gives the results of mechanical analyses of a typical sample of the Collins silt loam:

Mechanical analyses of Collins silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14481.....	Soil.....	0.1	0.8	0.3	2.0	13.8	63.0	19.8
14482.....	Subsoil....	.1	.6	.4	6.9	27.5	53.8	10.3

MORSE CLAY.

The soil of the Morse clay consists of a gray silt loam from 0 to 4 inches deep. The subsoil to a depth of 36 inches is a heavy red or yellow clay, sometimes slightly mottled with gray. The color of the subsoil usually depends on the depth to which erosion has exposed the clays. The clay near the top of the slope is usually somewhat yellow in color, while the clay lower down and nearer the bottom of the slope is of a red color. The red phase contains a large quantity of lime concretions, some of which are several inches in diameter. In many instances the soil has been entirely removed by erosion, and the red clay subsoil is exposed. Where the clay is exposed cultivation is very difficult.

The Morse clay is unimportant in extent. It occurs in small areas in the form of narrow strips along the slopes of the streams—strips in many cases too small to be shown on the map. In the timbered uplands the type always occurs in close proximity to the Acadia silt loam.

This type has a very broken and rolling topography, for it forms the slopes of streams throughout the areas of the Acadia silt loam. As it occupies comparatively steep slopes it is well drained, and, in fact, the surface frequently is so steep that in many places the soil covering has been removed by erosion.

The soil owes its origin to the removal of the surface material and the exposing and weathering of the underlying clays, which form the lower subsoils of the Crowley and Acadia silt loams.

The Morse clay is covered with a heavy growth of post oak, red oak, and hickory. It is sometimes cultivated in conjunction with

other types of more importance. The red phase of this clay is fairly productive, according to some farmers,⁷ but the yellow phase is not considered very desirable. In wet weather the clay is sticky and can not be worked, and in dry weather it becomes very hard and bakes, so that it can not be cultivated. In good seasons this soil will produce about 20 bushels of corn, and from one-third to one-half of a bale of cotton per acre. By growing and turning under crops of cowpeas and by otherwise adding organic matter to the soil it could be kept in a state of fair productiveness, but cultivated carelessly it will continue to be an unprofitable soil.^a On account of its small extent, it is a very unimportant soil type in the county. It is nearly always found contiguous to the Acadia silt loam and it deteriorates the value of adjoining land wherever found.

The following table gives the results of mechanical analyses of a typical sample of this type:

Mechanical analyses of Morse clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14881.....	Soil	0.3	1.2	0.5	1.3	13.0	66.6	17.0
14882.....	Subsoil.....	.0	.0	.1	.3	2.8	32.1	64.4

BISCOE SILT LOAM.

The Biscoe silt loam consists of 8 to 12 inches of a chocolate-brown silt loam, underlain to a depth of 36 inches by a yellowish or brownish-yellow silt loam. The soil is very loose and has excellent tilth. The subsoil is quite light to a depth of 24 inches, and often at from 24 to 36 inches is a heavy silt loam, sometimes slightly mottled with gray. The surface soil in many places is rather sandy, the sand being fine to medium in texture. These sandy areas occur on

^aThe results of tests by the wire-basket method, to determine the manurial needs of this type, using nitrate of soda, sulphate of potash, and acid phosphate (singly and in combinations), lime, stable manure, and cowpea vines, gave no increases of marked character. The average of the three treatments showing best results on all three samples was less than 10 per cent above the untreated soil, and many of the treatments failed to give any increase whatever. It should be stated, however, that the plants produced upon the untreated soil were exceptionally large and fine.

These results, while held to be strictly applicable to the fields from which the samples were taken, apply in some degree to this and similar types of tenacious and plastic clay soils in general, the indications being that with the maintenance of good physical condition there would be great improvement in the productive capacity of such soils, irrespective of the use of fertilizing materials of any kind.

the small ridges and near the boundary between this type and the Waverly clay. The soil of the more nearly level areas, while containing an appreciable quantity of fine and very fine sand, would be classed as a silt loam. Owing to the looseness of the soil and to the rather light texture of the subsoil, the soil dries out quickly after rains and allows of cultivation at almost any time.

The Biscoe silt loam occupies a large area in the eastern part of the county, between the White and the Cache rivers, and is surrounded by the bottoms of those rivers; hence the local name "Upper" and "Lower Surrounded Hill." Several smaller "hills" composed of this type are located near this large area of the type.

The type has a gently rolling topography, and is fairly well drained. The hills, which are composed principally of this type, lie from 12 to 20 feet above the bottom lands and are never overflowed.

The position and surface topography, as well as the structure of this soil, indicate that it is of sedimentary origin. At some time all the area between the two rivers was undoubtedly subject to overflow. This may have been due to the larger quantities of water carried by the rivers at that time, or it may have been that this area was lower at some time and has since been elevated, the rivers consequently cutting deeper and narrower channels. Jackson Bayou at the present time cuts across the area of this type a few miles north of Biscoe and forms a connection between the White and Cache rivers during high water. The area occupied by the Biscoe silt loam could be considered a second bottom. The whole of it is never overflowed, but when the rivers are very high the water backs up in the bayous and "slashes," and occasional small areas are inundated.

The growth peculiar to this type consists of several varieties of oak. A large proportion of this soil is in cultivation. It is well adapted to cotton, although yields are not so high on it as on the typical cotton soils. Owing to the loose texture of the soil it can be prepared for planting early in the spring, and the subsequent cultivation is performed with ease. This soil, and especially the sandy phase, is undoubtedly adapted to truck crops, but as yet little truck is grown except for home use. Considering the nearness of the Memphis market, it is probable that growing late truck would prove a profitable industry. Small areas of white clover and a great deal of Japan clover are commonly seen growing wild. Cowpeas do well and are often planted in the cornfields after the last cultivation of the corn. One field of alfalfa was seen growing on this type, and this legume should do well where the land is properly prepared. A drought coming before the plants were well rooted in the subsoil might be destructive to this plant. Red clover has been produced on this soil with marked success, and a little wheat has also been grown.

Cotton is the principal crop grown on this soil. It yields from

one-half of a bale to 1 bale per acre, the average lying between one-half and three-fourths of a bale. Some corn is grown on this type. The yields are variable, depending largely on the season. In ordinary seasons the yield varies from 15 to 40 bushels per acre, with an average of perhaps 25 bushels per acre. Generally speaking the corn does better on the sandier phases of the type. Corn would yield much better on this type in general if the preparation of the seed bed and care of the crop were more thorough.

Much of this type is in plantations of from 200 to 1,000 acres, which are devoted almost entirely to the production of cotton. The plantations are farmed almost exclusively by negroes, there being very few white people living on "Lower Surrounded Hill." On the "Upper Surrounded Hill" and in Calhoun Township some of this land is owned by small farmers, both white and colored, and in the northern part the plantation system is not used so generally as elsewhere.

The greater part of this type, however, is owned by several wealthy landowners and is rented to the negroes. Few rent for cash, but where this is done the price is from \$3 to \$5 an acre. The most of the landowners prefer to rent the land to tenants on the share system and keep close supervision of the planting and cultivation of the crop. The usual method of renting is to furnish the negroes with land, houses, work stock, tools, and seed and take as payment one-half of all the cotton produced. The landowner also furnishes the renter with provisions on credit, waiting for payment until the crop is sold. Where the renter is under the direct supervision of the owner or his overseer, better culture is usually given the crop and better yields are obtained than where small tracts are rented to the negro without supervision.

Practically no commercial fertilizers are used on this type. Some of the farmers maintain that this soil does not need any special treatment to maintain its productivity, but the majority of the landowners realize that continuous cotton growing will gradually lower the yield of this crop. Cowpeas are used to some extent in rotation with cotton, but this is about the only means employed to prevent the soil from becoming less productive.

The type has been in cultivation for a long time, some of it for sixty or seventy years, and, although cropped continuously during all this time, it has maintained its productiveness to a remarkable degree. It is considered one of the most valuable soils in the county. Where improved its price ranges from \$25 to \$50 an acre.

The table following gives the average results of mechanical analyses of typical samples of the Biscoe silt loam:

Mechanical analyses of Biscoe silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per ct.	Per ct.	Per ct.	Per ct.	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
15896, 15898.....	Soil	0.0	0.6	0.7	18.4	10.3	56.1	13.3
15897, 15899.....	Subsoil....	.1	.5	.7	14.4	8.6	50.9	23.7

IRRIGATION.

In Lonoke County, which joins Prairie County on the west, several areas have been planted in rice during the last few years, and during 1906 several hundred acres of rice was planted in Prairie and Lonoke counties. The yields have been large and the rice is of superior quality. Owing to the success which has been attained so far in growing rice on the prairie soils, considerable interest in this industry has been manifested in the prairie sections of the State.

A study of the prairie lands of Arkansas was made in Lonoke County by the United States Department of Agriculture in cooperation with the Arkansas Agricultural Experiment Station. The results of these investigations are published in the Annual Report of the Irrigation and Drainage Investigations for 1904, United States Department of Agriculture, in a paper entitled "Rice Irrigation on the Prairie Land of Arkansas."

The water supply for irrigation on the prairies is obtained from wells at a depth of from 140 to 250 feet, the water rising to within about 26 feet of the surface. Those which are being bored at present are all intended to reach to a depth of 140 feet, well into the water-bearing sands and gravels, which underlie the whole region. The water is drawn from these wells by means of pumps, either compressed air, centrifugal, or the ordinary type. The water is of excellent quality, and it is estimated that one well will furnish enough water to irrigate more than 130 acres of rice, and it is probable that it will furnish enough water for a much larger area.

The land is prepared for irrigation by throwing up levees along the contour lines at proper intervals. The levees should be well puddled at the base to prevent seepage. Owing to the impervious subsoil the water does not seep downward and is removed only by evaporation.

The land is broken any time from January to March or April, or as soon as it has dried out sufficiently. Fourteen or 18 inch plows are used to break the land, two to four horses being used. The land is plowed from 3 to 5 inches deep, or deep enough for all stubble to be turned under. It is then harrowed until in good condition, and the rice is planted any time from April 1 to the last of May, depending on the weather conditions. The rice is drilled in with a wheat drill,

or it may be broadcasted and harrowed in. When it is several inches high the land is flooded to a depth of several inches, not covering the tips of the rice plants. Water is kept on the surface for a month or longer until the grain fills, and the water is then drained off. In a week or so the grain has hardened, and when the land is dry enough to support a binder the rice is harvested. Although, owing to accidents to pumping machinery, some crop failures have occurred, as a whole the venture has been successful, and many other planters are opening up rice plantations for the ensuing season. There are large areas of the Crowley silt loam and Waverly silt loam that can be irrigated in Prairie County which are adapted to the production of rice.

DRAINAGE.

In Prairie County the question of drainage is a very important one. The prairie lands of the county are cultivated largely without artificial drainage. Some areas of the Crowley silt loam are rolling and do not require much artificial drainage. The greater part of this type, however, would be greatly improved by a system of tile drains leading into large ditches. These should extend throughout the "slashes" and connect with the small branches which flow into the larger streams of the area. By ditching, the Waverly silt loam could also be placed in cultivation. The Acadia silt loam is generally comparatively well drained, there being only occasional areas where the conditions make artificial drainage necessary.

The large areas of bottom land in the county are very poorly drained, and are overflowed to a considerable extent. There are areas of land within these bottoms which can be cultivated late in the season, but some are swampy and can not be cultivated until artificially drained. By a system of levees nearly all the poorly drained but rich bottom lands could be placed in cultivation and large quantities of corn and cotton produced.

SUMMARY.

Prairie County is situated in the east-central part of Arkansas, about 60 miles west of the Mississippi River. It is very uniform in topography, consisting of undulating prairie and gently rolling timber lands and broad stream bottoms. It has an elevation of about 240 feet above sea level. The regional drainage is fairly good, though locally, owing to the level character of some parts of the county, it is rather slow.

The climate is temperate and equable; the temperature rarely falls below zero and seldom rises above 90° F. The annual precipitation is about 45 inches. It is usually well distributed throughout the year.

The money crop of the timbered uplands is cotton. Corn is also an important product. The prairie lands are devoted chiefly to small grain and hay. Dairy farming and the production of rice are lines to which the soils here are well adapted.

The soils of the area are derived from unconsolidated materials which were laid down in quiet water. There were eight types mapped. The Acadia silt loam is the most extensive, covering about one-third of the area of the county. It occupies the timbered uplands area, and much of it is under cultivation. It gives good yields of cotton, corn, and oats.

The Crowley silt loam is next in point of extent, covering about 24 per cent of the area of the county. It is a friable and easily tilled soil and especially adapted to the production of grain.

The Waverly clay nearly equals in extent the type last mentioned. It is a river bottom soil and subject to overflow. In favorable seasons good yields of cotton and corn are secured.

The Waverly silt loam is a poorly drained type found in depressions occupying intermittent stream valleys. The type is little cultivated, but could be made productive by proper drainage.

About 1,300 acres only of the Biscoe silt loam occur in Prairie County. It is found in the eastern part of the county between Cache and White rivers. It is adapted to cotton, which gives moderate yields. Corn is a secondary crop. A sandy phase could be used for trucking.

The Calhoun clay, a low-lying upland soil, has about the same extent as the Biscoe loam. The surface is level and the drainage is poor, and at present the type is but little cultivated, though it would be a very good cotton soil if reclaimed.

The Collins silt loam, a type of minor importance, occupies about 2 per cent of the entire county. It occurs along small streams. The principal money crop is cotton, of which small yields are secured. Corn and potatoes are also important products.

The Morse clay is an unimportant type occurring along the slopes of streams. It is difficult to cultivate and gives only moderate yields of corn and cotton.

The soils in the prairie section are well adapted to the production of rice, where irrigation is practicable. The rice industry has made considerable progress in other counties of Arkansas and there appears to be an excellent opportunity for rice growing in this section. The water for irrigation will have to be pumped from wells.

The greater part of the Crowley silt loam would be greatly improved by underdrainage. The bottom-land types are overflowed, but possibly could be protected by levees and would be valuable land for corn and cotton if reclaimed.

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.