U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS.

SOIL SURVEY OF LONOKE COUNTY, ARKANSAS.

BY

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[Advance Sheets—Field Operations of the Bureau of Soils, 1921.]

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1925.

[PUBLIC RESOLUTION—No. 9.]

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

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

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

Approved, March 14, 1904.

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

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DESCRIPTION OF THE AREA.

Lonoke County is situated slightly east of the geographical center of Arkansas. Its greatest length north and south is about 40 miles and its greatest width about 27 miles. It has a total area of 792 square miles, or 506,880 acres.

Topographically, Lonoke County comprises four general divisions—an area of ridges with intervening longitudinal valleys, a gently rolling upland, an area of level plains, and the alluvial belts of the Arkansas River and of other streams.

The ridge and valley belt, the smallest division, lies in the northwestern part of the county, west of the Missouri Pacific Railroad. The topography here is rolling to hilly, and a large proportion of the land is used as unimproved pasture, most of it being covered with forest.

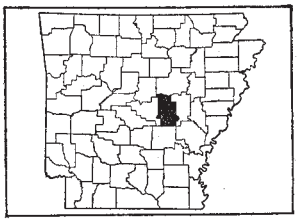

FIG. 42.—Sketch map showing location of the Lonoke County area, Arkansas.

The gently rolling coastal plain area lies southeast of the ridge and valley belt, north and east of the upper part of Bayou Two Prairie and west of Pigeon Roost Creek.

The level plains section comprises that part of the county lying north of Bayou Meto and extending up to the gently rolling coastal plain area. It is an old second bottom or terrace of the Arkansas River, standing about 10 to 30 feet above the first bottoms of that stream. The surface is level to faintly undulating or imperceptibly sloping. This is the rice-growing region.

The alluvial lands of the Arkansas and other streams is a nearly level plain bordering the Arkansas River,[1] with a slight general slope with the direction of the river. Narrow belts along or near the banks of the prominent bayous or streams are somewhat higher than the rest of the bottoms. A sandy ridge, extending from the northern part of the bottom southeasterly to a point 3 miles southeast of England, ranges from about 5 to 12 feet above the adjacent lower bottom situations. The stream-bottoms division is the largest of the four topographic divisions.

The natural drainage of the county is mainly through Bakers Bayou, Crooked Creek, Bayou Meto, Salt Bayou, and Indian Bayou into the Arkansas River. These streams drain the bottoms and terrace divisions. Bakers Bayou and Crooked Creek have long, sweeping bends, and such a slight fall that the water remains high for

[1] The Arkansas River is a few miles west of the county. Its bottoms and terraces cover more than two-thirds of the area of the county.

many days after hard rains. The northern third of the county is drained by Cypress, Pigeon Roost, Fourmile, and Wattensaw Creeks.

The county as a whole has a general slope to the southeast, except in the northernmost part, where Pigeon Roost Creek and Fourmile Creek flow almost north, and Wattensaw Creek flows in a general easterly direction.

The lowest elevation in the county is in the southeastern corner in the Catalpa Flat area; the highest elevation is in the northwestern part on the more prominent ridges. The elevation at England is 228 feet, Toltec 235 feet, Lonoke 242 feet, and Austin 259 feet above sea level.

The whole region, except the area of level plains, was originally covered with forest. The level plains area was treeless in general, with some scattering forest along the borders of the prairies. At present merchantable timber is largely confined to the Arkansas bottoms in the southeastern part of the county. (Pl. XXXIX, fig. 1.)

A large proportion of the white farmers of the county migrated from other Southern States, mainly from the Carolinas, Mississippi, Georgia, Alabama, Kentucky, and Tennessee. The present population consists mainly of descendants of these settlers. In the northwestern and western parts of the county some of the more recent settlers are of German, Bohemian, Slav, and French descent. The earliest settlers were from the Carolinas and Tennessee. These came during the period 1821 to 1842.

Lonoke County was organized April 16, 1873, from parts of Prairie and Pulaski Counties; part of the original area was reannexed to Pulaski County in 1875, and part of Prairie County was annexed to Lonoke County between 1880 and 1890.

The population of the county in 1900, 1910, and 1920 was 22,544, 27,983, and 33,400, respectively. There was an average of 41.4 persons per square mile in 1920. England, the largest town in the county, has a population of about 2,400. Lonoke, the county seat, is somewhat smaller, while Carlisle, Cabot, Ward, Austin, McCreanor, Meto, and Kerrs are smaller.

The county has several improved highways. The Pershing Highway, through Austin, Cabot, and Ward, to Little Rock, is surfaced with gravel and sandy clay. A part of the hard-surfaced road through Carlisle and Lonoke to Little Rock is surfaced with asphalt. A crushed-limestone road extends from Lonoke through England and Scott. Crushed-rock roads extend south and west from England and south from Coy. Other hard-surfaced roads extend north from Lonoke through Brownsville, south of Carlisle, and east from England through Brummitt.

The rural districts are reached by telephone lines, and practically all of the county is supplied with free rural mail delivery.

In general, the schools are good. Austin, Cabot, Carlisle, England, and Lonoke have high schools. There are a number of consolidated schools in the county.

CLIMATE.

The climate of Lonoke County is humid, with long, hot summers and short winters. The mean annual temperature at England is 62.6° F. The mean temperature for the months of December, Janu-

ary, and February is 44.0° F., for the summer months 79.8° F., and for spring and fall 62.3° F. and 64.3° F., respectively. The lowest recorded temperature in winter is —13° F. The humidity being high, the summer days seem sultry, and in winter, when the thermometer is around zero, the cold is very penetrating and is felt much more than in less humid regions. The ground seldom freezes to a depth greater than 2 inches. Snowfall rarely exceeds 3 or 4 inches and usually melts in a few days. Some winters are mild, with no snow or freezing weather.

The mean annual precipitation is reported at England as 48.88 inches, with a minimum of 42.29 inches in 1917 and a maximum of 60.68 inches in 1913. At Lonoke the minimum was 39.40 inches in 1903 and the maximum 63.48 inches in 1892. The mean annual precipitation at Lonoke over a period from 1888 to 1906 was 51.84 inches. Serious droughts are rare. The danger to crops is rather from excessive rainfall in the winter and early spring, which causes the lower and heavier soils to become overflowed or saturated to such an extent that many of them can not be worked in time to get in the usual cotton crop; or, a series of rains may occur when the crop is up, thus preventing cultivation, and in such cases, if drainage has not been provided, the weeds and cold and soggy condition of the soil frequently ruin the crop. In the average year the fall months are the driest and the spring season is the wettest.

The following tables, compiled from the records of the Weather Bureau stations at England and Lonoke, give the essential climatic data in detail by months and seasons:

Normal monthly, seasonal, and annual temperature and precipitation at England and Lonoke.

	England (elevation, 229 feet).						Lonoke (elevation, 242 feet).			
	Temperature.			Precipitation.			Temperature.	Precipitation.		
Month.	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1917).	Total amount for the wettest year (1913).	Mean.	Mean.	Total amount for the driest year (1903).	Total amount for the wettest year (1892).
	°F.	°F.	°F.	Inches.	Inches.	Inches.	°F.	Inches.	Inches.	Inches.
December	42.3	78	−2	4.59	1.70	2.56	45.4	4.08	3.50	9.50
January	44.8	79	−13	4.08	3.78	9.01	43.3	5.71	3.32	3.13
February	45.0	84	4	4.07	1.30	5.12	44.2	3.57	6.73	2.68
Winter	44.0	84	−13	12.74	6.78	16.69	44.3	13.36	13.55	15.31
March	54.6	89	21	4.56	8.44	4.79	54.5	6.17	4.58	3.37
April	62.6	93	30	5.73	4.10	7.65	63.8	4.43	2.18	8.31
May	69.8	98	35	4.37	2.80	3.55	71.6	5.17	6.92	10.37
Spring	62.3	98	21	14.66	15.34	15.99	63.3	15.77	13.68	22.05
June	77.8	104	45	3.52	3.68	2.74	78.6	4.55	1.50	2.12
July	81.5	106	51	2.98	5.55	2.09	81.4	5.02	5.22	2.50
August	80.0	106	51	5.01	5.46	1.09	80.5	3.36	3.09	4.75
Summer	79.8	106	45	11.51	14.69	5.92	80.2	12.93	9.81	9.37
September	76.9	103	34	3.97	1.12	14.52	74.4	2.68	.99	6.12
October	62.3	92	21	2.45	2.90	5.26	63.1	2.11	1.32	1.81
November	53.8	85	14	3.55	1.46	2.30	52.1	4.99	.05	8.82
Fall	64.3	103	14	9.97	5.48	22.08	63.2	9.78	2.36	16.75
Year	62.6	106	−13	48.88	42.29	60.68	62.7	51.84	39.40	63.48

The average date of the last killing frost in the spring at England is April 1, and of the first in the fall, October 26. This gives an average growing season of 208 days. The earliest recorded killing frost in fall occurred October 9, and the latest in spring, April 26. Two crops are frequently grown in one season, as wheat or oats followed by cowpeas, soybeans, or potatoes. Sometimes two crops of potatoes are taken from the same field in one season.

AGRICULTURE.

The type of agriculture practiced in Lonoke County has undergone few important changes since the beginning of commercial cotton production to the present time. The introduction of rice growing is the most important change. During the days of settlement, when means of communication and transportation were limited, the agriculture consisted of the production of necessary food crops to sustain the population and livestock, and farming was subordinated to hunting, trapping, and fishing.

Cotton growing was begun in the early forties. It increased rapidly in acreage and soon became the major crop of the county. Corn ranks second in acreage and importance. Prior to 1907 the prairie land was used largely for pasturage and the production of prairie hay, but most of the desirable prairie land is now used for growing rice.

The extension of the farming industry has been rapid, especially since 1880. The number of farms increased from 1,900 in 1880 to 5,596 in 1920, and the proportion of improved land in farms from 31.8 per cent in 1880 to 68.1 per cent in 1920. The development of agriculture in the last 40 years is reflected in the figures for the acreage and production of crops given in the accompanying table, which is compiled from the reports of the Bureau of the Census:

Acreage and production of the principal crops in Lonoke County, 1879, 1889, 1899, 1909, and 1919.

Crop.	1879.		1889.		1899.		1909.		1919.	
	Area.	Production.	Area.	Production.	Area.	Production.	Area.	Production.	Area.	Production.
	Acres.	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Bushels.*
Corn	17,502	249,764	24,428	501,274	39,874	798,460	33,794	521,032	49,802	709,568
Oats	3,310	49,674	3,907	54,735	5,050	99,670	1,176	19,397	1,146	21,324
Wheat	1,131	5,563	28	198	1,747	12,100			1,043	7,418
Potatoes		8,792	207	18,497	499	42,544	351	29,471	202	16,836
Sweet potatoes	216	16,638	236	21,860	289	25,641	234	19,711	480	51,600
Peanuts			23	579	69	1,412	106	1,624	499	7,236
Rice							5,540	285,941	21,324	850,270
		Bales.		*Bales.*		*Bales.*		*Bales.*		*Bales.*
Cotton	20,910	11,704	39,451	19,401	54,383	24,436	66,106	23,034	86,380	25,958
		Tons.		*Tons.*		*Tons.*		*Tons.*		*Tons.*
Hay (all kinds)	1,472	1,283	9,180	8,478						
Tame hay [1]					2,987	3,870	1,047	936	4,839	4,911
Prairie hay					11,402	10,147	9,033	9,174	7,857	8,028
Alfalfa [2]							27	39	533	929

[1] Includes all cultivated grasses, alfalfa, grains cut green and annual legumes cut for hay.
[2] Also included with tame hay.

The acreage of cotton has steadily increased in the last 40 years. The production has not made a proportionate gain, partly because of the destructiveness of the boll weevil. The acreage in corn is also much larger than it was in 1879, but the increase has not been quite so rapid or steady as in the case of cotton. Rice has become a very important crop in recent years. Sweet potatoes show a gradual and fairly constant gain in acreage. Peanuts are gaining in popularity, mainly because of their value as field forage for hogs.

Cotton is the chief crop grown at the present time, the acreage far exceeding that of any other crop. Cotton is depended upon almost entirely as the source of income, except in the rice district. It is grown year after year, to the practical exclusion of other cash crops, because it is a sure crop, well adapted to the soils, and always has a ready market.

Ordinarily little attention is paid to the selection of seed or to the choosing of varieties best suited to the various soils. The principal varieties grown in the northern part of the county are the Texas Rowden and Triumph; in the southern part, Texas Rowden, Triumph, Express, Victor King, Acala, and Weber.

Land for cotton is usually plowed in January or February. Very little fall plowing is done, as the heavy winter rains tend to keep the soils too wet to plow or to pack them after they are plowed. Most of the land is plowed directly into beds, but some is broken flat, harrowed thoroughly, and then bedded. Various commercial fertilizers are used, usually at the rate of about 100 to 150 pounds per acre. The fertilizer is drilled into the bed, which is then smoothed or harrowed before the seed is planted. Cotton is usually planted between the first of April and the middle of May.

Corn has the largest acreage, next to cotton. The production in 1919 was about 700,000 bushels, and in 1920 and 1921, according to the Arkansas Crop Report, exceeded 1,000,000 bushels. A large part of the corn crop is fed to the work stock, but large quantities of corn, as well as hay, oats, and mixed feed, are shipped into the county.

Frequently there are two plantings of corn. The early planting is made in March and matures in late summer; the late crop ordinarily is planted from the latter part of April to July. The corn is sown in drills and thinned to leave one plant every 20 to 24 inches in the row. It is a common custom to drill cowpeas in the rows at the last cultivation. In harvesting the ears are snapped off, leaving the stalks in the field to be winter pastured. Under this practice the heavy clayey soils are likely to be impaired physically by the trampling of the stock, and to assume a hardened condition on drying. Considerable corn is cut for silage in the northern part of the county and about Carlisle, where dairying is important.

The varieties of corn most commonly grown around Cabot and in the northern part of the county are McFarland, Hickory King, and Mosby Prolific, all of which are white varieties. In the Arkansas bottoms these varieties, together with Johnson County White, Iowa Silvermine, Hastings Prolific, St. Charles White, and Mexican June are the leading white varieties, and Reid Yellow Dent, Ferguson Yellow Dent, and Iowa Goldmine are the common yellow varieties.

The average yield of corn in the last five census years has not exceeded 23 bushels per acre. Yields on the better corn soils of the Arkansas bottoms frequently range from 40 to 60 bushels per acre. In general, very little fertilizer is used, although experience indicates that some can be used profitably on many of the Lonoke County soils, if the proper kind is applied.

The oat crop has never attained any considerable acreage in Lonoke County, although it could be grown very profitably on many soils. In view of the high price of oats shipped in for feeding, it seems to be poor economy to center all the attention on the cotton crop, as is done on some of the farms. Yields of over 90 bushels of oats per acre have been obtained, and some complete failures have been reported. Poor yields are due largely to inadequate drainage or lack of proper preparation of the seed bed or fertilization. Both winter and spring oats are grown, the former being the more successful. Varieties commonly grown include Red Rustproof (Texas Red Appler, etc.) and Winter Turf.

A farmer at Kerrs used an application of 500 pounds per acre of 11–0–3[2] commercial fertilizer, and obtained a yield of 74 bushels per acre of Red Appler oats in 1921. Another farmer near Bearskin Lake fertilized one of his fields in 1920 with 8–4–4 fertilizer, using 500 pounds per acre, and produced 55 bushels of oats per acre. Another field on the same soil type, without any fertilizer, produced only 18 bushels per acre. This year (1921) oats on this farm, fertilized with 9–2–2 fertilizer, produced 91⅓ bushels per acre. These results, with those of various other experiments, all tend to show the possibilities of one of the important small-grain crops and indicate that more attention should be given to the production of oats, and possibly to other small grains.

Wheat has not succeeded well in Lonoke County, mainly, it appears, on account of its susceptibility to rust. The census reported 1,043 acres of wheat in 1919, with a yield of 7,418 bushels, or 7.1 bushels per acre. Alabama Bluestem, Red May, Fulcaster, and Fultz have been suggested as varieties suited to the local conditions. Rye is grown to only a very small extent.

Rice is one of the major crops. (Pl. XXXIX, fig. 2.) W. H. Fuller, of Lonoke, is credited with having grown the first successful rice crop of considerable size in Lonoke County, in 1905, when he produced 2,800 bushels from 40 acres, or a yield of 70 bushels per acre. Prior to this, Eli Moses (colored), from South Carolina, tried a couple of bushels on the bottom land, believing it would do as well as on the bottom land of the Santee River of his native State, where rice was successfully grown on low alluvial lands. His trial proved successful, and Mr. Fuller then produced the first commercial crop on the prairie. Before the introduction of rice, the prairies, which supported a luxuriant growth of native grasses, were used chiefly for grazing.

The economic pumping of water from wells has made it possible to grow rice profitably on the prairie soils. These soils are especially adapted to rice culture because they have an impervious subsoil which prevents too rapid loss of irrigation water by percolation, and at the same time they have sufficient surface relief to allow the

[2] Percentages, respectively, of phosphoric acid, nitrogen, and potash.

land to be cleared of water when it is desired. These wells are usually 150 to 200 feet in depth, 10 to 12 inches in diameter, and cased with iron piping. Water stands about 30 to 40 feet below the surface and pumps are usually set at a depth of 80 feet. The pumps are operated for sixty-five or seventy 24-hour days for irrigating rice, but the time may be shortened in seasons of excessive rainfall. Centrifugal pumps, driven by electricity or by steam, gasoline, or crude-oil engines, and delivering from 2,000 to 4,000 gallons per minute, are generally used.

In preparing land for rice the ground is plowed in the fall or sometimes during the winter, little attention being paid to the condition of the soil when there is reasonable time for the clods to be "slakened" by rains. Where the plowing is done shortly before seeding, it is not advisable to plow depressions or extremely wet places, because if rain does not occur, the baked clods can not be broken down. The average depth of plowing is 3 to 3½ inches; deeper plowing causes the harvesting machinery to sink too deep in the moist soil when the crop is cut. Breaking is done mainly with three-horse riding plows, or with tractors pulling three turning plows. The land is plowed right over the levees of previous years. These levees are constructed at intervals of 10 to 30 yards apart, about a foot or more in height, and 5 to 10 feet in width; they meander about the field so as to divide it into parcels having a uniform fall to allow proper distribution of the water when it is turned on. Usually an engineer is employed to locate the levees, especially those that separate the subfields. Levees built for greater durability are about 10 feet wide at the base, with sloping sides.

The common practice is to disk the land once or harrow it twice just before seeding, and to roll once after seeding with a double-cylinder corrugated steel roller. The seed rice is drilled in during April and May at the rate of 1¾ bushels of clean seed or 2 bushels of trashy seed per acre. It is advisable to use clean seed.

When the plants are 3 to 6 inches high, flooding is begun with only enough water at first to cover the ground, which is allowed to dry off gradually. Then the water is let on again a little deeper, and is turned off after about three weeks. When the ground begins to dry the fields are flooded once more and kept under water until about two weeks before harvesting time, when the water is shut off entirely.

Harvesting of rice begins in September and continues through October, but in unfavorable seasons, as was the case in 1919, the crop remains in the field sometimes until January. The grain is cut with a twine binder, usually when the kernels in the lower part of the heads are not entirely hardened, and when the main heads are well turned down. When cut later there is more or less loss of grain from shattering. Shocking is done promptly and carefully to protect the grain from sun and rain. The grain is allowed to cure in the shock from three to four weeks.

Rice is threshed with the ordinary grain separator. Some of the larger growers own outfits, while the smaller growers usually employ traveling outfits. Rough rice is greatly improved in grade by careful threshing, and careful attention should be given to the adjustment of the concaves in order to prevent hulling and cracking. Care is also taken to thresh when the straw is dry, as damp straw causes not only poor separation but endangers further loss by heat-

ing. An excellent method to prevent heating is used in a large elevator east of Lonoke, where the grain is transferred by machinery from one bin to another, thus giving it a thorough airing.

At the time the survey was made (1921) commercial fertilizers had been used in rice culture only in a few instances and in the form of light applications of acid phosphate, which had no very definite effect upon the yield. As many fields have declined very considerably in productiveness, commercial fertilizers will no doubt be used in the near future. In the Louisiana-Texas rice district fertilizers are used by many of the rice growers, applications of 100 to 200 pounds per acre of a mixture analyzing 10 to 12 per cent of phosphoric acid and 2 to 4 per cent of potash often being applied at the time of seeding with satisfactory results.

As good rice soils have rather imperfect natural surface drainage and poor aeration, the result of irrigation, it is rather difficult to find a good system of crop rotation that will include soil-improving crops, because most of these crops prefer well-drained soils. Lespedeza is a notable exception; it thrives on poorly drained soils, is a splendid soil improver, and at the same time yields excellent hay and affords fine pasturage. It appears, therefore, that lespedeza is a valuable crop to grow in rotation with rice.

The most common weed pest in rice fields is red rice. A slight infestation of this can be controlled during the first year by pulling up the individual plants and removing them from the field. It is best to plant seed free of red rice, to plow or burn off the stubble in order to prevent a second crop of the seed maturing after harvest, and to summer-fallow or plant infested fields to some other crop, such as oats or lespedeza, so that the pest may be killed out by cultivation or by frequent mowing.

The seeds of the umbrella weed or lance-leaf ragweed (*Ambrosia bidentata*) are troublesome in milled rice because they are about the same size as many of the cracked rice kernels, and it is practically impossible to separate them out. The same trouble is experienced with the "crocodile weed," "alligator head," or "rough button" weed (*Diodia tenes*). In addition to cutting down the price paid the grower for his rice, the presence of these weeds reduces the yield per acre. Clean seed, clean cultivation, and rotations are the means of eradication.

No list of rice-field weeds would be complete that did not contain the large indigo, curley indigo, bull grass, Mexican weed, smartweed, barnyard grass or barnyard millet, bull jop, black rice, and the many species of sedges. Of these several plants the Mexican weed is the most difficult to control and eradicate. A few of these weeds are present, but thus far none of them are very troublesome in Lonoke County.

The principal varieties of rice grown in Lonoke County are Early Prolific and Blue Rose. Until a few years ago the principal varieties grown in this district were of the Honduras and Japanese types. According to the Arkansas Crop Report for 1920 the principal varieties, in the order of their importance in the State, were as follows: Early Prolific 45.49 per cent, Blue Rose 39.13 per cent, Storm Proof 6.98 per cent, Honduras 5.38 per cent, Japan 1.53 per cent, Edith 0.85 per cent, and Early Pearl 0.64 per cent. Another variety, Early Prolific,

can be planted as late as June 20 and still make a good crop before frost. It is usually a little lighter yielder than Blue Rose, it is said, yet its popularity, as shown by the present rate of increase, may make it the most important variety in Lonoke County. Some Japan rice is grown; it averages practically the same as the Blue Rose, selling sometimes for a little less. The domestic trade does not call for much rice of the Japanese varieties, and according to reports the principal demand at present comes from Porto Rico and Cuba.

Rice production in Lonoke County generally has been profitable according to prominent rice growers. A farmer near Lonoke, cultivating 120 acres of rice, cleared $9,000 on his 1919 crop, which was not extraordinary in that year, it is said. In recent years, during the depression, the price of rice, like that of most other crops, has declined at times below the cost of production, or to a point where there was only a small margin of profit. This has resulted in a substantial but probably temporary decrease in acreage.[3]

Much of the rice in Lonoke County is sold through associations, which do business in the United States and in several foreign countries. The milling companies of Lonoke and Carlisle handle most of the rough rice grown in the county. Some is sold to independent buyers and elevators.

In recent years strawberries have become an important crop in the northern part of the county near Cabot, Austin, and Ward. A strawberry growers' association was formed in the spring of 1915 at Ward, and another at Cabot in the fall of 1920. The associations pool and grade the berries before shipping. Shipments are made to the northern cities, even as far as Boston. In 1919, 10 cars were shipped from Ward; in 1920, 7 cars were shipped from Ward, and 4 from Cabot. In 1921, 42 cars were shipped out of Lonoke County, representing a return of about $40,000. This new branch of agriculture is increasing very rapidly. The varieties grown are the Excelsior, Klondike, and Aroma, which begin to ripen about April 20, May 1, and May 10, respectively.

At present no commercial fertilizer is used on strawberries in this county. In the vicinity of Judsonia, a town just north of Lonoke County and in the heart of the largest strawberry center of Arkansas, an application of 400 to 600 pounds of bone meal per acre is said to be very commonly used with satisfactory results. So far most of the fields have been set on new or almost new land.

Sweet potatoes are grown quite extensively in the northern part of the county, but few are shipped. In 1919, 5 carloads were shipped from Austin. In 1921, 715 acres were in this crop, with a total production of 72,650 bushels, averaging 110 bushels per acre.[4] The crop is not grown largely for market because it matures at a time when prices have fallen and comparatively little profit can be realized by shipping from this section. Applications of about 400 pounds per acre of an 8–2½–4 mixture are made by many growers. The yields vary from 100 to 300 bushels per acre. The Nancy Hall and Yellow Porto Rico are the varieties most commonly grown.

Potatoes are not grown as extensively as sweet potatoes, and so far they are grown for local use only. The best soils yield from 100 to

[3] For further discussion of rice growing see Farmers' Bull. U. S. Dept. of Agriculture, No. 1092; Prairie Rice Culture.

[4] Arkansas Crop Report.

175 bushels per acre. The varieties grown are Red and White Triumph, Blue Victor, Irish Cobbler, and Early Ohio.

Peanuts are being grown to some extent, mainly on the more sandy soils in the northern part of the county. The acreage in 1920 was 499 acres and the production 7,236 bushels; in 1921, 450 acres were grown, with a production of 9,000 bushels. The leading varieties are White and Red Spanish, with some Texas Red and Virginia. More than three-fourths of the crop is hogged off. When the hogs are finished on corn the meat is of good quality; otherwise the meat of peanut-fed animals is said to be rather soft.

Sorghum, cowpeas, and soybeans are grown in small patches only.

Alfalfa is receiving more attention on the Arkansas bottom soils around England. In 1919, according to the census, alfalfa was grown on 533 acres, producing 853 tons of hay. In 1921, according to the Arkansas Crop Report, 600 acres of alfalfa produced 1,320 tons, averaging 2.2 tons per acre. It seems likely that alfalfa will become an important crop in the bottoms when they have been thoroughly drained. It thrives where lime is sufficiently near the surface and drainage good. The soils north of Bayou Meto or those outside of the Arkansas bottom are not so well adapted to the crop because of lack of lime in the subsoil.

Lespedeza, or Japan clover, is a valuable hay and pasture crop. It succeeds on acid as well as neutral soils, and therefore is common in all parts of the county. It may be seen in abandoned fields, along the roads, and in forest land, although it does not prefer shade. It makes a very nutritious feed, and frequently yields 2 tons of hay per acre. When sown in the spring, the best results are obtained with a nurse crop, such as oats.

Prairie hay has long been an important crop about Lonoke and Carlisle, but its production decreased considerably with the introduction of rice growing. The 1920 census gives 7,857 acres in prairie hay in 1919, yielding 8,028 tons, an average of slightly more than one ton per acre. A large part of this hay is baled and used in Lonoke County.

Orchard fruits are grown primarily for home use, but there is a small surplus sold locally. The orchards are mostly on the upland soils, where the drainage is good. The census reports 13,248 apple trees yielding 16,066 bushels in 1919, 20,760 peach trees yielding 22,250 bushels, and 11,759 pear trees, producing 3,166 bushels. The pear is subject to attack by the blight. A few plums and cherries also are produced. Pecan trees apparently do well, but there are no commercial groves in the county. Grapes and cultivated blackberries, dewberries, and raspberries are grown only to a small extent. Wild blackberries and dewberries are abundant.

Garden vegetables, such as cabbage, beans, tomatoes, and melons, do exceedingly well on many of the soils, but they are grown primarily for home use; a few small shipments are made outside the county.

In general, systematic crop rotations are not followed. In the northern part of the county, oats are frequently followed by lespedeza or cowpeas, in an attempt to maintain the yields of corn and cotton. The general practice in the southern part of the county is to grow cotton and corn year after year.

Some commercial fertilizer is used, especially about Cabot, Austin, and Ward. According to the Arkansas Fertilizer Bulletin, the quantity used in the county in 1920 and 1921 was far below the average consumption. The census reports 807 farms, or 14.4 per cent of the total number, as using fertilizers in 1919, with a total expenditure of $42,268.

The second-bottom and upland soils of Lonoke County contain but little lime within the 3-foot section. The Arkansas bottom soils, however, carry large quantities of lime concretions in the substratum and often in the subsoil and soil. In some well-drained areas lime concretions are exposed at the surface. The sandy bottom soils, except perhaps the more reddish types, are in need of lime, and lime is generally beneficial for alfalfa. However, the heavier types, except those with very sandy subsoils, will grow alfalfa successfully where the drainage is good. Crushed limestone can be obtained from near-by counties. Applications may not increase the yield of the common field crops, such as corn, cotton, and oats, to any marked degree. Burnt lime would likely give quicker results. There is no evidence at hand to show that liming would be profitable in the Arkansas bottoms.

Dairying is carried on to some extent in the western part of the county. Several creameries are located at Carlisle. Guernsey and Jersey are the common breeds, the latter being the most popular. In some parts of the county the dairy cattle are of nondescript breeding.

The livestock industry has not been specially developed in the county. The Federal census reports the numbers of domestic animals on farms of the county in January, 1920, as follows: 4,882 horses, 8,772 mules, 3,811 beef cattle, 14,336 dairy cattle, 541 sheep, 2,033 goats, 25,932 swine, and 149,554 poultry. Horses are used more as work stock in the section north of Bayou Meto than to the south. Some mules are raised in the northern half of the county, but practically all of those used in the Arkansas bottom are shipped in, principally from Missouri.

The adaptation of soils to crops is recognized in the growing of rice on flat soils with clay subsoils favoring the economic use of irrigation water. Aside from this soil adaptation receives little consideration in practice.

According to the census the value of all farm crops in 1919 in Lonoke County amounted to $9,993,743. Cereals were valued at $3,611,154; other grains and seeds $21,984; hay and forage $322,676; vegetables $374,302; fruits and nuts $127,197; all other crops (principally cotton) $5,536,430. The dairy products in 1919, excluding home use, had a value of $422,800; poultry and eggs $326,145; wool, $797; honey and wax $2,235.

Practically all of the laborers employed on the second-bottom and hill farms are whites, while on the first bottoms most of them are negroes. The farm wage ordinarily ranges from $15 to $25 a month, with board and lodging. As a rule, farm labor is plentiful. It is employed mainly on the Arkansas bottoms. The amount expended for labor in 1919 on 1,332 farms reporting was $495,169.

The proportion of farms operated by owners in 1919 was 32.1 per cent, by tenants 67.5 per cent, and by managers 0.4 per cent. In general, most of the tenants farm on the share system. Usually the

owner furnishes the farm equipment and mules. Several of the larger plantations operate small general stores, and often extend credit to the tenants until the crop is harvested. When the owner furnishes the equipment, seed, and teams, the crops are equally divided. If the tenant furnishes the equipment, the owner usually receives one-third of the corn and one-fourth of the cotton. The cost of fertilizer is borne in proportion to the share of the crop each receives. The proportion of farms operated by owners is much higher on the second bottoms and in the hills than in the Arkansas bottoms, where the larger plantations are located. The bottom lands command an annual rental of $6 to $12 per acre, and some of the best land has rented as high as $20 an acre.

The ordinary price of farm land in the uplands of the northwestern part of the county ranges from about $10 to $35 an acre, a few farms near towns being held at $50 or more an acre. The price depends on the kind of soil, the topography, the condition of the soil with respect to past usage, the buildings, distance from markets and good roads. Second-bottom rice land sells for $40 to $100 an acre. The better drained areas of bottom land along the Arkansas River sell for $60 to $150. Some of the more poorly drained land, and land subject to frequent overflow in the southeastern part of the county has been held as low as $2 an acre, it is said; but the price for such land ranged up to about $25 an acre at the time of the survey.

The average size of farms in Lonoke County in 1919 was 57.2 acres; but the average holding was actually greater, as each tenancy is reported as a "farm" by the census. Some individual farms include less than 40 acres, while several of the plantations contain from 1,000 to 3,000 acres or more.

Under the system of agriculture prevailing in Lonoke County, little attention seems to be paid to crop rotations or to the raising of enough feed for work animals. The principal needs, apparently, aside from drainage of the undrained areas, include the production of more grain, hay, and roughage, in connection with the raising of more and better livestock, and the practice of systematic crop rotations to aid in preventing decline in the productiveness of the soil. These rotations should include legumes, such as lespedeza, cowpeas, or alfalfa. Drainage operations are being actively pushed in the Arkansas bottoms. In 1920 Lonoke County, according to the census, had 172,007 acres in organized drainage districts, with a program calling for an expenditure of $730,034 or an average of about $4.24 per acre.

SOILS.

The soils of Lonoke County are all light in color. This is the color assumed generally by soils that have formed in forest-covered regions. Not all of the area included in the county is forested or was forested when first seen by white man. An important area occupying the east-central part of the county is or has been, as long as it has been known by civilized man, prairie. Soils that have formed under a cover of grass vegetation are generally dark in color, but the soils of the prairie in this county are not dark. They do not constitute, however, the only exception to the general rule

FIG. 1.—FOREST GROWTH ON BOTTOM LAND.

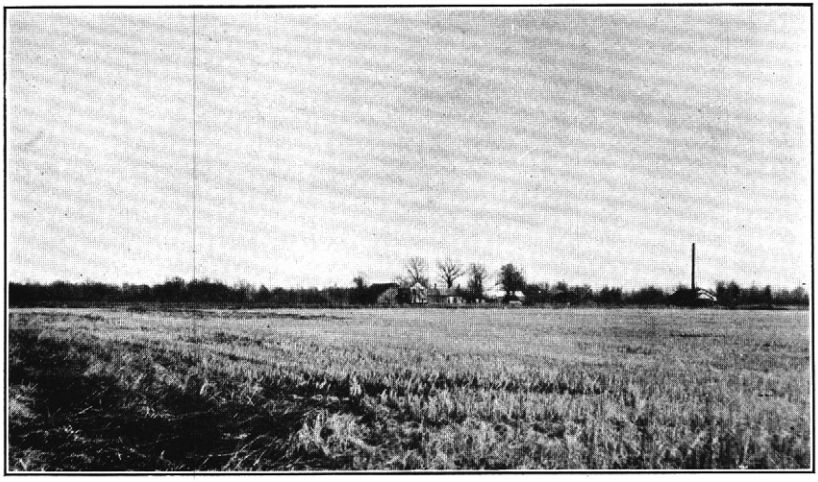

FIG. 2.—TYPICAL RICE FARM.

Rice stubble in foreground, pumping plant to the right, house and other buildings in center background.

just stated, as other prairies in which the soils are light in color are known to exist. The reason for this unusual color is not clearly known and the probable reason need not be given here.

The soils of this county and of the region in which it lies have been subjected to the influences of a high rainfall—about 50 inches annually—and a rather high mean annual temperature, about 63° F. Under such conditions the soils became rapidly leached of their more soluble mineral constituents. The soils therefore are free from salts of the alkalies or alkaline earths, including lime carbonate, in all except those soils that are very young. These latter include some of the soils of the Arkansas or large bayou flood plains, in which some of the soils were deposited so short a time ago that the lime carbonate present in the material, as it came from the dry Great Plains region along the Arkansas River, has not yet been leached out. Even in these soils the lime carbonate has been taken out of the surface and upper subsoil. Lime carbonate is found in many places in the deep subsoil, often deeper than 3 feet, of the Pulaski and some of the Portland types.

When the soils of the county are considered from the point of view of their characteristics, and when their variations are compared with the variations in the various geographic features of the region in order to determine which of these features have constituted important influences in the development of these characteristics, it is readily seen that the features of primary importance are topography, and through topography the drainage and the source and character of the parent sand and clay which have been made into soils. The climate has been the strongest factor of all in the determination of soil character working partly through the native forest vegetation, but the climate of the whole county is uniform, so that it has not produced the variations in soils that are found within the county.

In the northwestern part of the county there is a series of sandstone ridges running east and west, separated by intervening parallel lowland belts. The soils on the ridges have been mapped as Hanceville stony loam. The latter part of the name is applied because of the presence of many fragments of sandstone in the surface soil, which is, aside from the stones, normally a fine sandy loam. The first part of the name—called the series name—is given to the soils of this group because of the presence of a light-brown surface soil and a red, typically rather bright red, somewhat heavier subsoil, the material being derived from sandstone through weathering. Along the lower slopes of these ridges lies a soil free from the presence of stone fragments, with a loamy surface soil and a reddish slightly heavier subsoil to which has been given the name Hanceville loam. In a few undulating upland areas a soil like the latter, except in texture, has been called the Hanceville fine sandy loam.

On the flat or very gently undulating portions of these long intermountain valleys, both broad and narrow, lies a soil with a thin layer about 2 inches thick, of brown material stained with vegetable matter, underlain by 10 to 15 inches of yellowish material, usually silty, and this in turn by a layer of yellow silty clay, extending to a depth of about 26 inches, where the material becomes a variegated or

mottled yellow and gray silty clay. The general topography of these valleys is smooth, but in detail the surface is marked by the presence of many small mounds ranging in height to 4 feet and in diameter between 10 and 40 feet. These soils are very much like the Caddo soils to be described below and differ from them mainly in the source of the sand, silt, and clay material from which the soil has been made. The Conway soils are derived from material originating in shale with some from sandstone, while the Caddo soils are derived from sand, silt, and clay material that has always been such, never consolidated into consolidated rock, either sandstone or shale.

In the northern part of the county, east of the area of parallel valleys and ridges, lies a rolling plain somewhat lower than the general level of the intermountain valleys west of it and higher than the prairie region south and southeast of it. The predominant soils within this plain are the members of the Susquehanna series. This series consists predominantly of a grayish surface horizon of relatively light texture, ranging in texture from silt to sand and in thickness from a mere film to more than a foot. The surface horizon of the uncultivated forested soil is always stained with vegetable matter to a depth of 1 to 3 inches. Beneath the gray horizon lies a yellowish heavier horizon, ranging from brownish yellow through yellow to a pinkish shade. It is usually moderately friable at top, but becomes progressively heavier and tougher and more plastic downward, and within a depth ranging up to a maximum of 2 feet to 30 inches this passes into a mottled red and gray or yellow tough plastic clay. This material continues, as a rule, to an indefinite depth. The yellowish layer, like the grayish one, may consist of a mere film, and in such cases the heavy mottled plastic clay lies practically on the surface.

In Lonoke County the predominant soil of the series, the one that covers practically all of the area of Susquehanna soils, has a thick gray horizon and a relatively thick yellow one. It lies very nearly on the extreme limit of Susquehanna soils. The heavy plastic mottled clay is not as a rule found at a shallower depth than about 20 inches. This is the fine sandy loam type, and occupies by far the greater part of the areas of the rolling upland on which it is found. A loam type was found also, but the area is small. It occurs in a few small, scattered patches around the margin of the main area. It has a gray layer that is merely a film and can be seen only in the forested areas. The second or yellowish layer is present only in its lower part, where it has become red and heavy. The heavy, plastic mottled clay is found within 6 to 12 inches of the surface.

The Susquehanna loam is more characteristic of the soils of the Susquehanna series as they have been identified and mapped in the southern and southeastern part of the United States than is the fine sandy loam. In the greater part of the areas of their occurrence, the heavier soils of the series predominate and the clay, in which the two upper layers are thin or practically lacking and the heavy plastic clay occupies practically the whole soil section, is much more extensive than the sandy loam.

In a narrow belt surrounding the main area of Susquehanna soils lies a narrow belt of soils to which the name Caddo has been given. They lie at a lower level than the surface of the rolling plain

on which the Susquehanna soils lie and in situations where surface and subsoil drainage is not perfect. There are two types of soils in this belt, a fine sandy loam and a silt loam. The soil section consists of a surface layer of yellow material, the upper inch or so stained with organic matter in the uncultivated soil, ranging in thickness from about 6 inches to a maximum of about 15 inches. Underlying this layer is a heavier one of yellow and gray mottled color, the gray changing downward to bluish. At a depth ranging from 28 to 36 inches the material becomes stiff and compact, and contains a great number of small iron concretions. The concretions, about the size of small bird shot, are to be found in the upper layers also, but much less abundantly than in the deep subsoil. The presence of concretions and of mottling is due to the imperfect drainage of these soils. The surface is dotted with a great many small mounds essentially like those in the belts of Conway soils already described. The soil section on the mounds differs from that between them, the section just described, in the absence of the iron concretions, the lack of mottling in the heavier subsoil layer and in its friable and often reddish or reddish-yellow color, and the absence of the compact layer in the lower part of the section.

An area of country occupying the central part of the county, south of the region in which the Susquehanna soils predominate and north of the belt of country through which many winding bayous run, the region in which the county seat, Lonoke, stands, is one in which the predominant soils are those belonging to the Crowley series. The region is flat, except for narrow belts lying along the small streams which drain it. It is subject, and has long been, to alternating periods of overwetness and of overdryness.

The soil section consists of a brown to light-brown horizon, stained slightly at the top with organic matter in the uncultivated soil, about 6 to 8 inches thick, which changes gradually in the lower part into a somewhat heavier layer, lighter in color than the first layer, and containing spots of pale-yellow material. As the depth increases this layer becomes somewhat grayer and the yellow spots a little more prominent and compaction often becomes noticeable. This layer reaches to a depth ranging between 18 and 30 inches and is succeeded by a layer of heavy plastic clay mixed bright red and bluish gray in color. Iron concretions appear in the first and second layers, but rarely in the heavy clay or third layer. Two types of this series are mapped, a silt loam, the most important one, and a silty clay loam. The silt loam is the soil on which practically all the rice of the region is grown.

In the silty clay loam the first layer is absent or not very noticeable and the second layer constitutes the surface soil, owing to the washing away of the upper layers.

It is believed that the Arkansas River contributed much of the material of the terrace soils, particularly of that part of the terrace area occupied by the Crowley soils, because the deep substratum, as exposed in wells and along the slopes of stream valleys, in places consists of Indian-red material containing much lime in the form of lime concretions, like the substratum of the first bottoms of the Arkansas River. Also, the trunks of trees have been encountered at a depth of about 30 or 40 feet in digging wells.

The agencies of weathering, such as leaching, oxidation, and deoxidation under varying conditions of drainage, and the transposition of fine clay particles from the surface layers to the subsoil by percolating water, acting through long ages upon soil standing in places upon a comparatively level surface, have altered the former alluvium and caused it to acquire characteristics very different from those of the soils of the Arkansas River bottoms. The poorly drained types have been less modified by weathering and correspond more closely to similar poorly drained soils of the stream bottoms other than the Arkansas bottoms.

None of these terrace soils has lime carbonate in the 3-foot section, except the Morse, which is a slope soil, but they do have concretions in the substratum in places. Most of these soils are of the kind that would be designated "acid" soils.

The Calhoun soils are found in the same part of the county as the Crowley soils and are similar to them in general character, showing, however, the marks of more imperfect drainage than the latter. The soil section consists of a very light brown, a gray, or a mottled gray and yellow layer extending to a depth ranging from 5 to about 12 inches. The most common of these phases of this layer is the very light brown one. It is more often less than 7 inches thick than greater than that figure. Beneath this lies a layer of light-gray, nearly white material, always in the typical soil lighter in color than the first layer, containing some rusty-brown spots. It is a little heavier than the first layer but never tough and plastic. This layer becomes heavier downward and at 20 to 24 inches is a grayish to bluish clay or silty clay, in many places rather tough and compact. It is mottled gray, brownish, and pale yellow. These soils occupy lower country than the Crowley soils, but the two soils are closely related in character and in location, both being subjected to the influence of imperfect drainage due to occurrence on flat land. A silt loam, silty clay loam, and very fine sandy loam are mapped.

In the northeastern part of the county and in small areas elsewhere is a soil—the Richland silt loam—covering an aggregate area of several square miles. The surface soil is light brown in color to a depth of 3 to 6 inches below which the material is yellow and slightly heavier to about 8 inches. Below this depth the material is yellow, heavier than either of the higher layers, and moderately friable. This material extends to a depth of 3 feet or more, except in isolated small areas when the subsoil drainage is a little less perfect than in the soil, in which case there appear spots of gray in the yellow.

The Lintonia soils are associated with the Richland silt loam both in position and character. The soils of the two series are very much alike, differing only in a faint reddish color in the heavier layer in the Lintonia soils rather than yellow, as it is in the Richland. In the deep subsoil of the Lintonia the gray spots may appear, as in the Richland.

The Olivier soils constitute another group closely associated geographically with the Lintonia and Richland soils and differing from them mainly in those characteristics produced in soils by imperfect subsoil drainage. The surface soil is light brown like that of the two associated soils, and the second layer, appearing at a depth of 3 to 5 inches, is yellowish. This is succeeded, downward, by another

yellow layer, heavier than the first two, beginning at about 8 inches and being but a few inches thick. The next layer is compact, heavy, and mottled or mixed yellow and gray, with rusty-brown and black iron concretions and spots. Locally this lower horizon is very compact, approaching a hardpan.

The Morse soils, of which the clay loam type is mapped in Lonoke County, are similar in general physical features to the Susquehanna clay loam, but the heavy, reddish plastic clay in the subsoil contains considerable lime carbonate, either in concretions or distributed throughout the mass. The surface cover overlying this heavy clay is variable in character, ranging from a clay loam to silt loam. This soil occurs in only a few small areas in the county.

The extensive alluvial soils of the bottom lands south of Bayou Meto are derived from sediments deposited principally by the Arkansas River. This is indicated by the fact that the subsoil and substratum consist largely of Indian-red material, usually containing more or less of lime concretions, which is found in the alluvial soils in Arkansas only where the Arkansas and Red Rivers have been the principal sources of the sediments. This material owes its dominating color to sediments derived to a considerable extent from the Permian Red Beds of the red plains of western Oklahoma and northwestern Texas. The soils derived from this type of alluvium vary principally in texture and color in the upper 3 to 5 feet, the substratum consisting mainly of purplish-red clay. Three series of soils have been recognized in this division—the Portland, Perry, and Lonoke.

The Portland series is characterized by brown to chocolate-brown surface soils and a reddish-brown, salmon-red, or pinkish subsoil, with some grayish or yellowish mottling in the upper part. The Portland soils are the best drained of the soils derived from the Arkansas alluvium in Lonoke County; they have retained more of the Indian-red color of the original material.

The Perry series[5] includes types with gray to bluish-gray surface soils, usually mottled with rusty brown, over a light-gray to bluish-gray subsoil mottled locally with rusty brown, yellowish brown, and pale yellow. The lower subsoil in places contains red splotches. The deep substratum consists of calcareous purplish-red material, exactly the same as that beneath the Portland and Lonoke soils.

The Lonoke series includes the oldest alluvial material in the Arkansas bottoms. It is characterized by dark-brown surface soils, and a salmon-colored to light purplish red subsoil, usually having some yellowish to grayish mottling. The dark color of the soil, and locally of the subsurface and upper subsoil, is the most characteristic feature of the series. In places the subsurface layer is darker than the surface, and the upper subsoil is more mottled than the lower subsoil, showing more gray and yellow and less red. There is very little free lime carbonate in the 3-foot section, but lime concretions are present in the substratum, where, also, purplish-red clay is present. These soils occupy relatively high situations, whose surface slopes off very gradually toward the associated Portland and Perry

[5] In earlier surveys, such as the survey of Jefferson County, made in 1915, the poorly drained soils now classed in the Perry series were included in the Portland series.

soils. The gray mottling in the subsoil indicates imperfect underdrainage.

Before levees were built along the Arkansas River the bottom land is said to have been subject to inundation in times of very high water to a considerable extent, the higher ridges only remaining uncovered. At the present time much of the clay land is covered with water from such streams as Bayou Meto and its tributaries for marked periods after heavy rains, but the area of overflow is being rapidly lessened by canalization.

The first-bottom soils of the regions north of Bayou Meto differ from the soils of the Arkansas River alluvium. The former are derived from different sources, are noncalcareous, and do not show in the 3-foot section or deep substratum the purplish-red material present in the soils of the Arkansas River bottoms. These soils of the smaller bottoms are very similar in their visible characteristics in the terrace region, the sandstone region, and the coastal plain region; but they have been given different names in these three divisions because of differences in the origin of the materials.

The types of the Pope series, derived from the residual sandstone and shale soils of the uplands west of the Missouri Pacific Railroad, have brown surface soils over a yellow silty clay subsoil.

The Ochlockonee soils, derived from the coastal-plain soils east of the sandstone region, have brown surface soils underlain by a subsoil of lighter brown to yellowish silt loam or silty clay loam.

The Vicksburg soils, the material of which has been derived from the old alluvial terrace lands north of Bayou Meto, have brown surface soils and a subsoil of yellowish-brown to yellow silty clay loam to silty clay.

The three series last mentioned include the best drained of the stream-bottom soils in these regions. Although subject to frequent overflows, their drainage is fairly well established between periods of overflow. They are best drained near the banks of streams and on hummocks and faint ridges in the bottoms. The better oxidation due to this better drainage has resulted in the development of a brownish color in the soil and light-brown to yellowish color in the subsoil, with low percentage of gray and rusty-brown mottling and a low content of dark-brown concretionary material through the 3-foot section. Where the subsoils of these brown-colored series contain much gray and rusty-brown mottling and dark-colored concretionary material, the areas thus characterized represent soils which are gradational between the brown and the associated gray-colored series.

The light-colored alluvial soils north of Bayou Meto include the Atkins series of the sandstone region, the Bibb series of the coastal-plain section, and the Waverly series of the broad terrace region. The types of these series are not only subject to frequent overflows, but they have very poor drainage at all times, the subsoil seldom drying out, owing to the presence of impervious clay or hardpan layers in the substratum. These soils dry out to a much harder structure during protracted droughts than do the brown alluvial soils. When dry they are almost white or very light gray at the surface; when wet they are light gray to bluish gray in the surface soil, often mottled with yellowish or rusty-brown color,

and bluish gray to light gray in the subsoil, with numerous pale-yellow and rusty-brown mottlings. Small dark-colored concretions are present locally in both soil and subsoil. The lower subsoil contains much dark-colored concretionary material, and ordinarily this is so abundant as to constitute a virtual hardpan, which is impervious, and in many places the stiff clay below the hardpan may be comparatively dry even when the surface is covered with water.

In the bottoms of the streams outside the area of the Arkansas River bottom the gray and brown soils and the intermediate soils occur in such intricate or patchy association that satisfactory separations in the mapping could not be everywhere made; for this reason the brown soils as mapped include many small areas or patches of gray soil and soil of intermediate characteristics, and the gray soils contain patches of better drained brownish soils.

The soil types mapped in Lonoke County are described in detail in subsequent pages of this report. Their distribution is shown on the accompanying soil map. Their actual and relative extent are given in the table below:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil	Acres.	Per cent.
Crowley silt loam	51,968	18.3	Pope silt loam	6,656	1.3
Better drained phase	40,704		Portland clay	6,464	1.3
Perry clay	87,872	17.5	Atkins silty clay loam	6,400	1.3
Lintonia silt loam	41,792	8.2	Caddo silt loam	5,248	1.0
Portland very fine sandy loam	25,536	5.6	Bibb silt loam	5,120	1.0
Stiff-subsoil phase	3,200		Lonoke silty clay loam	5,120	1.0
Susquehanna fine sandy loam	24,384	4.8	Lintonia fine sandy loam	4,864	1.0
Lonoke very fine sandy loam	22,016	4.3	Calhoun silty clay loam	4,672	.9
Lonoke silt loam	18,240	3.8	Ochlockonee silt loam	4,608	.9
Imperfectly drained phase	1,088		Crowley silty clay loam	2,816	.6
Richland silt loam	17,088	3.4	Perry very fine sandy loam	2,752	.5
Perry silty clay loam	14,272	2.8	Lonoke clay	2,304	.4
Portland silty clay loam	6,784	2.7	Pulaski very fine sandy loam	2,304	.4
Stiff-subsoil phase	6,976		Calhoun very fine sandy loam	2,240	.4
Portland silt loam	12,992	2.6	Hanceville fine sandy loam	1,792	.4
Waverly silt loam	11,392	2.2	Caddo fine sandy loam	1,280	.3
Conway silt loam	9,984	2.0	Waverly silty clay loam	1,088	.2
Olivier silt loam	9,408	1.9	Susquehanna loam	960	.2
Hanceville stony loam	9,216	1.8	Morse clay loam	960	.2
Calhoun silt loam	9,088	1.8			
Vicksburg silt loam	8,320	1.6	Total	506,880	
Hanceville loam	6,912	1.4			

HANCEVILLE STONY LOAM.

The Hanceville stony loam consists of a light-brown to reddish-brown light-textured loam, ranging in places to rather heavy loam, underlain at about 4 to 12 inches by red to reddish-yellow fine sandy clay or clay loam to friable clay. Large and small fragments of sandstone are scattered over the surface, and in some places disintegrated bedrock is encountered at depths ranging from 10 to 30 inches.

Part of the type as mapped consists of stony fine sandy loam and stony very fine sandy loam, which were not separated on account of their patchy occurrence. Along some of the steeper slopes distinct outcrops or ledges of sandstone are present. Some of the type in forest areas consists of brown to reddish-brown heavy loam, grading at 3 or 4 inches into brownish-red clay loam to clay, quickly passing

into dull-red or yellowish-red clay, which is stiffer in the lower subsoil, reddish yellow in color, and showing in places some yellow and gray mottling, with disintegrated shale material in the lower part.

The type occupies the higher ridges in the northwestern part of the county, lying west of the Missouri Pacific Railroad. It is used principally for grazing cattle, hogs, goats, and work animals. A few scattering patches have been cleared of trees and stones, and the ordinary field crops and garden vegetables grown. It is estimated that about 95 per cent of the type is forested, the principal trees being red oak, post oak, blackjack oak, hickory, and dogwood.

The price of this land in 1921 ranged from about $8 to $12 an acre, according to the topography, stoniness, location, and improvements.

HANCEVILLE FINE SANDY LOAM.

The Hanceville fine sandy loam consists of a light-brown, pale yellowish brown, or brownish-gray fine sandy loam, passing at about 4 to 6 inches into yellowish-brown fine sandy loam gradually becoming more yellow and then reddish yellow with increase in depth. At about 15 to 20 inches the material is a reddish-yellow to brick-red friable fine sandy clay, which continues to a depth of 36 inches or more, the lower subsoil being more compact in places and mottled with yellowish, grayish, and deeper reddish colors.

The type is associated with the Hanceville stony loam, occupying gentle slopes, usually free from large stones but often containing angular fragments of sandstone. The topography being slightly rolling, the drainage is naturally good.

The type is not extensive, but the greater part of it is in cultivation. Cotton, corn, peanuts, and strawberries are the principal crops. The price of this land ranges from about $15 to $40 an acre, according to location, topography, and improvements.

A small area 1 mile north of the Pershing Highway, on the west county line southwest of Cabot, has been included with the Hanceville fine sandy loam. The material here conforms more closely to the Ruston fine sandy loam, as mapped in Pulaski County, and would have been mapped here as Ruston if the area had been of sufficient size to warrant establishing another type of soil.

HANCEVILLE LOAM.

The Hanceville loam consists of a brown or light-brown to slightly reddish brown loam passing at 6 or 8 inches into reddish-yellow clay loam and this into dull-red or reddish-yellow friable fine sandy clay, which at about 14 inches passes into yellow, reddish-yellow, or red clay containing some disintegrated sandstone material. Sandstone fragments are usually present.

A large part of the type occupies the gentle lower slopes below the Hanceville stony loam with a few small areas in the more gently undulating and gently rolling valley lands lying west of the Missouri Pacific Railroad. In places there is considerable colluvial material from the sandstone and shale soils occuping the higher slopes.

The principal crops grown are cotton and corn. Corn ordinarily yields 10 to 20 bushels per acre. Cotton yields one-fourth to one-

half bale, or even more in favorable years under good cultural methods. Garden vegetables and strawberries are grown very successfully. Peaches of excellent quality are produced.

Approximately 85 per cent of the type is in cultivation. Land values at present (1921) vary from $18 to $50 an acre, depending upon improvements, roads, and distance from towns.

CONWAY SILT LOAM.

The Conway silt loam consists of a light-brown silt loam passing at depths of about one-half inch to 6 inches into yellow or slightly brownish yellow silt loam. At 10 to 15 inches the material becomes yellow or pale-yellow silty clay and at about 24 to 30 inches yellow silty clay with grayish mottling, the gray increasing with depth. In places a tough clay or hardpanlike layer is encountered at about 30 to 36 inches. This is mottled bluish gray and pale yellow and contains yellowish-brown concretions and concretionary material in great abundance.

In some places colluvial material from the adjacent Hanceville soils has covered narrow strips of Conway silt loam, giving rise to a fine sandy loam. These areas, however, are so small that they have been included in the Conway silt loam. Numerous dome-shaped mounds appear; they are from 1 to 4 feet high and usually consist of very fine sandy loam or fine sandy loam over a yellow subsoil containing some small concretions. Sparkleberry or winter huckleberry is common on these mounds.

Post oak, blackjack oak, willow oak, hickory, dogwood, and sweetgum are the principal trees in the forest on this type. About 75 per cent of the land is in cultivation.

The Conway silt loam is a typical valley soil occupying gently undulating slopes adjacent to the sandstone ridges in the northwestern part of the county. Rain water collects and stands over the low, flat areas known as "slash" land. The higher areas have fairly good surface drainage but imperfect underdrainage.

This type is not considered a very strong soil. It is said to be best adapted to redtop (herd's grass), and various native grasses, lespedeza, and sorghum. Strawberries do well on newly cleared areas of sufficient drainage.

The type can be improved by drainage and by growing lespedeza or cowpeas in rotation with the crops commonly grown, corn and sorgo. Applications of lime probably would improve the land.

Present prices of farm lands of this type range from about $15 to $25 an acre, except near towns, where the prices may range to $50.

SUSQUEHANNA FINE SANDY LOAM.

The typical Susquehanna fine sandy loam is a yellowish-brown to reddish-yellow or reddish-brown loamy fine sand to fine sandy loam, underlain at 6 to 8 inches by yellowish-red to brick-red friable to moderately friable fine sandy clay, which becomes stiffer with increase of depth and passes at 16 to 20 inches into stiff, plastic clay, intensely mottled with gray, yellow, and red. In some exposures yellowish-gray or gray shale appears in the substratum at depths of 40 to 50 inches. In places the lower subsoil contains some fine sand.

On slopes there are many eroded patches in which the surface soil is a thin layer of reddish-brown or yellowish-red fine sandy clay loam underlain by stiff clay, the original lighter soil having been removed or partly removed by erosion. On some of the conspicuous slopes the clay subsoil is exposed. On a few of the higher ridge crests or knolls, such as appear south of Pleasant Hill Church about 6 miles south of Cabot, fragments of brown and reddish-brown ferruginous sandstone lie on the surface or at different levels in the soil section. This rock apparently is of local formation.

This type is confined to a roughly triangular area in the northwestern part of the county east of the Missouri Pacific Railroad, north of Bayou Two Prairie, and west of Pigeon Roost Creek. The soil is derived from what is believed to be a remnant of coastal plain material of Tertiary age.

The topography is generally gently rolling with a few rather steep slopes along small drainage ways. There are a number of flat areas where the surface slopes gradually to flat or gently undulating soils of the Caddo series and alluvial soils of the terrace lands. The general level is considerably lower than that of the Ozark sandstone ridges. The surface drainage is good, but undoubtedly the stiff lower subsoil impedes underdrainage.

Probably 75 to 80 per cent of the type is cleared. Some of this is in old fields abandoned on account of erosion. The forested areas are usually more rolling. The growth is mainly Spanish oak, post oak, and hickory.

The Susquehanna fine sandy loam is used chiefly for cotton and corn. Texas Rowden and Triumph are the principal varieties of cotton, and McFarland, Hickory King, and Mosby Prolific are the leading varieties of corn. The best yields of these crops are about 20 bushels of corn and two-thirds bale of cotton per acre; but the average yields are considerably lower, probably 12 bushels of corn and one-third bale of cotton. Some oats, cowpeas, and sweet potatoes are grown for home use. Lespedeza grows wild and affords valuable grazing.

Some fertilizers are used, the ordinary application being 200 pounds per acre. In 1920 at least 25 cars of fertilizer, averaging 30 tons per car, were sold at Cabot, the larger part being applied to this soil type.

Plowing is ususally done with a light plow drawn by one mule. The depth ordinarily is 4 inches, and rarely exceeds 5 inches. Much of this land has been in cultivation since the Civil War. Notwithstanding the contour cultivation commonly practiced, many fields have washed badly, so that the clay subsoil has been exposed in numerous patches. Fields of this kind are difficult to restore to a productive state. The most economical way probably is to establish efficient terraces to check this washing, and to grow cowpeas or lespedeza in rotation with such crops as oats, cotton, and corn, turning under one of the legume crops, at least occasionally.

The present price of land of this type ranges from about $15 to $25 an acre for the poorer land away from towns and $25 to $50 for the better improved land near towns.

SUSQUEHANNA LOAM.

The surface soil of the Susquehanna loam is a brown loam passing at 2 to 3 inches into reddish-brown, heavier loam, in places a clay loam. At 5 to 8 inches a red clay appears, which passes rather abruptly into stiff, plastic, heavy clay mottled with yellow or gray, or both. At greater depths this material is intensely mottled with red, gray, and yellow. In cultivated fields the surface soil has a distinctive reddish-brown color.

An included area northeast of Austin varies somewhat from the foregoing description. The soil consists of a light-brown to brown loam 4 or 5 inches deep, grading into yellowish-brown loam, extending to about 10 inches. This is underlain by reddish-yellow sandy clay loam, which passes at about 15 inches into brownish-red to reddish-yellow sandy clay, and this in turn into yellowish-red sandy clay with a faint reddish yellow mottling. The lower subsoil is a mottled red, yellow and gray, stiff, plastic sandy clay. An area east of Cabot has a brown or slightly reddish brown loam to silty clay loam surface soil, passing at about 8 inches into plastic clay loam or clay mottled with reddish brown, gray, and brick red, extending down to the 36-inch depth with little change.

The type is ususally gently rolling or sloping. It is of small extent and is associated with the Susquehanna fine sandy loam.

About 75 per cent of the type is in cultivation. The yields are better than on the average of the Susquehanna fine sandy loam. Corn and cotton are the principal crops. Land values are about the same as for the Susquehanna fine sandy loam.

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

Mechanical analyses of Susquehanna 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.*	*Per cent.*
4617102	Soil, 0 to 8 inches	2.2	7.0	3.9	14.7	8.6	45.0	18.6
4617103	Subsoil, 8 to 36 inches	3.2	3.6	1.4	5.0	3.4	24.1	59.5

CADDO FINE SANDY LOAM.

The Caddo fine sandy loam is a yellow fine sandy loam or loamy fine sand, underlain at about 6 to 10 inches by yellow, moderately friable fine sandy clay mottled with gray and in the lower subsoil with bluish gray. The lower subsoil is invariably stiffer or more compact, and contains a large percentage of iron concretions, which appear also in the surface soil and upper subsoil, though in smaller quantities.

This type is of small extent in Lonoke County. It is associated with the Susquehanna soils and occupies the lower gently undulating slopes. Dome-shaped mounds, about 1 to 4 feet high and 20 to 35 feet across, are scattered over the type.

Lespedeza, Bermuda grass, and sorghum do well. Corn and cotton, however, are the chief crops. About 80 per cent of the type

is in cultivation. The present price of farm lands varies from about $20 to $30 an acre, according to location and improvements.

CADDO SILT LOAM.

The surface soil of the Caddo silt loam consists of two layers—an upper layer of grayish or pale-yellowish friable silt loam 1 or 2 inches thick, and a lower layer of gray, yellowish-gray, or yellow silt loam, extending to 12 or 15 inches. This rests on mottled yellow and gray more compact silty clay loam, which at about 20 inches passes into mottled gray or bluish-gray and yellow silty clay. Small iron concretions are frequently present in the soil and subsoil, being most abundant below 20 inches. Dome-shaped mounds are scattered over the lower slopes. The material in these consists of a brownish to yellowish silt loam to very fine sandy loam, underlain by yellow or reddish-yellow friable silty clay loam.

The type is not extensive. It is associated with the Susquehanna soils and occupies lower gentle slopes of imperfect drainage. The land is in need of better drainage, liming, and organic matter. Drainage can be readily improved by open ditches. The crop adaptation and normal yields are about the same as on the Conway silt loam.

Some corn and cotton are grown, but the soil is probably better adapted to herd's grass, lespedeza, Bermuda grass, and sorghum, especially where drainage is imperfect. It is estimated that between 70 and 80 per cent of the type is in cultivation. Present land values range from about $18 to $30 an acre, depending upon the location, improvements, area in forest, and condition of drainage.

CROWLEY SILT LOAM.

The typical Crowley silt loam is a brown silt loam faintly mottled with rusty brown and dark bluish gray, passing at about 6 to 10 inches into gray silty clay loam or silty clay, mottled more or less with pale yellow, and this into gray or bluish-gray silty clay mottled with yellow or pale yellow, and in many places slightly compact. The lower subsoil, beginning at depths ranging from about 18 to 30 inches, is a mottled bright-red and bluish-gray, moderately plastic to plastic silty clay or clay. Small black and brownish concretions are present in the soil and upper subsoil, but the red and gray plastic lower subsoil seldom contains any considerable number of concretions. The immediate surface of the Crowley silt loam dries out to a grayish color, but the brown material is encountered at very shallow depths immediately beneath the dry soil.

In rather wet situations there is little or no red mottling within the 3-foot section, but yellowish and grayish mottling instead, and concretions are present throughout the 3-foot section. There is less yellow and more gray in the upper subsoil of the less well drained flat areas, while on some of the better drained slightly higher lying areas and gentle slopes red mottling is encountered much nearer the surface than in the average of the type. On the rice fields, where the ground is kept almost permanently wet by irrigation and rain water, there is a tendency for the soil to be more mottled with dark bluish gray and rusty brown. In some flats of very poor natural drainage

the soil is lighter brown or grayish brown and the subsoil is light gray or bluish gray, with very little yellow, yet with some bright-red mottling in the lower subsoil.

In places near the outer edge of the prairie the upper subsoil runs high in silt. In such cases the soil is a grayish-brown to dark brownish gray silt loam faintly mottled with rusty brown, passing at 6 to 8 inches into brownish-gray silt loam showing some faint mottling of yellowish brown, passing at about 12 inches into heavy silt loam or silty clay loam, mottled pale yellow and gray, underlain at about 24 inches by silty clay loam to silty clay mottled bright red and bluish gray, and at about 28 inches by plastic clay mottled bright red and bluish gray. Some included areas show very little or no red mottling, and really represent either Olivier or Calhoun silt loam.

There are occasional dome-shaped mounds in which the material consists of brown silt loam passing into lighter brown silt loam and at depths of about 15 to 20 inches into grayish-brown silt loam mottled with gray, and this in turn at about 24 inches into mottled pale-yellow and gray to bluish-gray silty clay loam, which is less plastic than the average of the type. These mounds are usually confined to the outer edge of the prairie or to slightly higher situations within the main prairie.

There is no evidence of lime carbonate in the 3-foot section, but lime concretions are present in the deep substratum, at least in places.

The topography of the Crowley silt loam ranges from nearly level to undulating. In general the surface has sufficient fall to give gradual drainage, yet many small areas of water collect in the faint depressions during winter. This is not a soil of good natural drainage, although much of it is well enough drained to allow the growing of corn, cotton, and oats. The underdrainage is rather slow, but not so slow as in soils like the Calhoun, which are more impervious in the lower subsoil.

The Crowley silt loam is confined mainly to Grand Prairie and Prairie Longue, upon which the towns of Carlisle and Lonoke are built. It is the most extensive type mapped on the second bottoms.

According to a rough estimate, between 80 and 90 per cent of the type is in cultivation. Some forested areas occur north and northwest of Lonoke along the outer edge of the prairie. The prairies were formerly covered with nutritious grasses, and dairying and stock raising were followed until rice growing was introduced. Some areas are still in the virgin prairie condition, producing prairie hay for use on the farms and for sale in near-by towns. The yield of hay averages 1 to 1¼ tons per acre. Some fall-sown and spring-sown oats are grown. Lespedeza is an excellent crop to grow in rotation with rice, but it is not extensively grown. Some vegetables are produced, primarily for home use.

Rice is the most extensive crop grown on the Crowley silt loam. The yields usually average between 40 and 50 bushels of rough rice per acre, but yields of 80 bushels are said to be common and as much as 125 bushels have been reported. Freshly broken prairie land, when properly handled, ordinarily yields 60 to 70 bushels per acre the first year, 70 to 80 bushels the second year, 60 to 70 bushels the

third year, and around 50 bushels by the fifth year. It is a common practice to let fields lie fallow the sixth year, using them for pasturing cattle. After this about 60 bushels an acre may be expected, according to reports of growers.

The soil is often plowed in a wet condition for rice, subsequent rains being depended upon to crumble the clods.

Prior to the cultivation of rice, land of this type was utilized for hay and pasture and could be bought for 50 cents to $4 an acre. At present the land at some distance from towns sells for $25 or $30 an acre in forest and $45 to $50 an acre in virgin prairie. Improved rice farms near towns range in price from $75 to $100 or more an acre, depending on the location, buildings, and other improvements.

Crowley silt loam, better drained phase.—The better drained phase of the Crowley silt loam occupies gentle slopes along small drainage ways and slightly higher, better drained areas associated with the typical Crowley silt loam.

The soil is a brown to light-brown silt loam which passes at about 3 to 8 inches into yellowish-brown silt loam to silty clay loam, and extends where deepest to 12 inches. The upper subsoil is a yellow or brownish-yellow silty clay loam, passing into yellow or pale-yellow moderately friable silty clay, extending to 18 to 24 inches, and often somewhat compact in the lower part. Below this a red and gray or bluish-gray plastic clay is generally encountered. In places the upper subsoil has a slightly reddish cast. Some of the forested areas seem to have a somewhat shallower layer of the brown surface soil.

A noticeable feature of this phase is the presence of numerous mounds, varying from 1 to 3 or 4 feet in height and from about 20 to 100 feet in diameter. (Pl. XL, fig. 1.) Geologists have studied these mounds, but have not solved their origin conclusively.[6]

The principal crops grown on this phase of the Crowley silt loam are cotton, corn, cowpeas, sweet potatoes, oats, vegetables, and prairie hay. Lespedeza grows wild and affords valuable grazing as well as hay. In the eastern part of the county, around Carlisle, where dairying is practiced, a considerable part of the type is used for grazing. It is estimated that about 25 per cent of the type is in forest consisting principally of sweetgum, black gum, elm, hickory, dogwood, and various oaks.

Present land values range from $30 to $50 an acre, with some of the better improved areas near Lonoke and Carlisle held at $60 to $75 an acre.

CROWLEY SILTY CLAY LOAM.

The surface soil of the Crowley silty clay loam is a mottled brown, rusty-brown, and grayish-brown silty clay loam, about 10 inches deep. The upper subsoil is a gray or yellowish-gray clay mottled with dark rusty brown, grayish brown, and bluish gray, and at about 18 to 20 inches with red. This passes at about 20 to 24 inches into impervious plastic clay, mottled with red, yellowish brown, and bluish gray, the red mottling being slightly more noticeable in the lower part of the 3-foot section. A few included areas consist of

[6] These hummocks are discussed by L. W. Stephenson and A. F. Criden in Water Supply Paper No. 339, U. S. Geological Survey 1916; and by M. R. Campbell in the Journal of Geology, XIV, 708–717, 1916. Similar mounds are present in many other parts of Arkansas and in eastern Texas and Louisiana.

Crowley clay. An area of clay about 6½ miles southwest of Carlisle consists of mottled rusty-brown and bluish-gray silty clay, passing into bluish-gray silty clay mottled with yellowish brown, and this into bluish-gray plastic clay mottled in the lower subsoil with reddish yellow or yellowish red.

The largest silty clay loam area is about 6 miles southwest of Carlisle and another area lies about 6 miles west of Carlisle. The surface is rather flat in places, but usually it has a noticeable slope, which insures fair surface drainage. Practically all of the type is used for rice. The yields are about the same as those obtained on the Crowley silt loam. The price of this land varies from about $50 to $70 an acre.

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

Crowley 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.*	*Per cent.*
461755	Soil, 0 to 9 inches	0.8	0.8	0.6	1.4	9.5	60.5	26.5
461756	Subsurface, 9 to 24 inches	.6	1.8	.8	1.3	8.8	52.1	34.6
461757	Subsoil, 24 to 36 inches	.2	.8	.3	1.0	5.8	46.3	45.6

CALHOUN VERY FINE SANDY LOAM.

The Calhoun very fine sandy loam is a light-gray to whitish, heavy very fine sandy loam, sometimes faintly mottled with yellow, passing at about 10 to 12 inches into white or very light gray mottled with bluish-gray very fine sandy clay. At about 24 inches there appears a very fine to fine sandy clay hardpan layer, which can with difficulty be penetrated with a soil auger. This layer is relatively dry, even when water covers the surface soil.

The type is covered with water for a considerable part of the year. Practically all of it is in forest in which pin oak, willow oak, white oak, post oak, elm, maple, sweetgum, and black gum are prominent species. Spanish moss hangs in great quantities from the trees.

About 12 miles south of Carlisle a few post-oak glades are mapped with the type. Here the yellowish-gray color is more pronounced and water does not stand on the surface for such long periods. This variation is no better than the typical soil, as far as cultivated crops are concerned.

This type is best suited to use as forest and pasture land. If drained of standing water, which can be accomplished by ditches, lespedeza could be grown successfully.

CALHOUN SILT LOAM.

The Calhoun silt loam is a gray, mottled gray, and pale-yellow or light-brown silt loam passing at 5 to 10 inches into light-gray or bluish-gray silty clay loam or heavy silt loam, somewhat mottled with rusty brown or pale yellow. At 20 to 24 inches there appears a light-gray or bluish-gray usually compact silty clay or silty clay loam,

mottled in most areas with brownish or pale yellow. In places the lower subsoil is an ashy-gray, tough plastic clay. Even where not so heavy, the compact structure causes the lower subsoil to be very impervious. When dry the soil has a whitish or ashy appearance.

This type is very poorly drained. It occupies low flats of the second-bottom country, which generally lie from 1 to 6 feet lower than the surrounding soils and are covered with standing water for long periods after heavy rains. It is most extensively developed 4 to 8 miles north, northeast, and northwest of Lonoke, and is locally known as "slash land" or "pin-oak flats."

It is roughly estimated that between 15 and 20 per cent of the type is in cultivation. Rice and lespedeza are the crops grown. The forest growth consists almost exclusively of pin oak and sweetgum, with occasional elm, maple, and hickory trees. The type is valued at $10 to $15 an acre in the more inaccessible areas. The cultivated areas are small and are sold in conjunction with adjoining soil types.

Drainage, the growing of the soil-improving crops, such as lespedeza, the use of lime, and the use of fertilizer, are some of the means of improving yields on this soil. In the natural condition the soil is best suited to lespedeza and rice.

CALHOUN SILTY CLAY LOAM.

The surface soil of the Calhoun silty clay loam consists of two parts—an upper layer of gray silty clay loam 1 or 2 inches thick and a lower of light-gray silty clay loam, somewhat mottled with rusty-brown or yellowish-brown in places, extending 6 or 7 inches. The subsoil begins as a light-gray or bluish-gray silty clay, but passes either into tough bluish-gray clay or into a compact, mottled pale-yellow and ashy-gray silty clay. Fragments of this lower stratum are rather friable when mashed between the fingers.

The type occupies very poorly drained flats supporting a growth of pin oak, sweetgum, shellbark hickory, maple, and elm. Practically all the type is in forest. The larger areas lie about 10 miles south of Carlisle. Some areas are occupied by pin oak almost exclusively, and the type has the local name of "pin-oak flats" or "pin-oak slashes."

Land of this type can be bought at the present time (1921) for about $10 to $15 an acre.

This soil is valued chiefly for its forest products and pasturage. Lespedeza could be grown for hay and pastured by providing outlets for the water that stands after rains.

LINTONIA FINE SANDY LOAM.

The Lintonia fine sandy loam is a brown, pale yellowish brown, or reddish-brown fine sandy loam, 8 to 12 inches deep, underlain by reddish-brown fine sandy loam to sandy clay loam, passing quickly into friable, dull-red to reddish-yellow fine sandy clay. The subsoil is more compact and contains more concretionary material in the lower part. In places the subsoil shows some mottling of yellow. The higher and less sloping areas have a brown to yellowish-brown color at the surface; the more eroded lower slopes are dark reddish brown in color. This variation in the surface color gives fields a

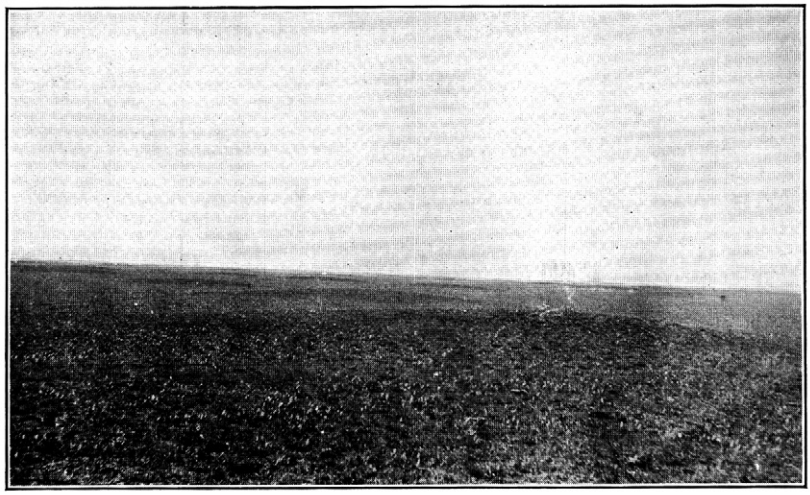

FIG. 1.—LOW MOUNDS ON CROWLEY SILT LOAM.

FIG. 2.—WATERMARK ON TREES FROM OVERFLOW ON THE PERRY CLAY.

Note the absence of undergrowth.

spotted appearance. The larger areas lie 2 to 4 miles north and a short distance northeast of Kerrs.

The type occurs in well-drained parts of the second-bottom or terrace country. The surface is gently rolling, and erosion has done some damage. The slopes where cultivated are usually terraced.

Probably 80 per cent of the type is in cultivation. Corn and cotton are the leading crops. The yields are about the same as on the Lintonia silt loam. Legumes should be grown and a crop occasionally plowed under. Fertilizers are needed as on the silt loam. The present price of this kind of land ranges from about $20 to $40 an acre, according to location, roads, and farm improvements.

A few areas of Lintonia very fine sandy loam lie 5 to 7 miles northwest of Lonoke. The total area of this texture, however, is not extensive and for this reason these areas are not shown separately on the soil map.

LINTONIA SILT LOAM.

The soil of the typical Lintonia silt loam consists of two layers; an upper one of brown to light-brown silt loam 5 to 6 inches thick and a lower one of yellowish-brown silty clay loam 3 or 4 inches thick. The upper subsoil is a reddish-yellow to dull-red moderately friable silty clay. Below this is a layer of reddish-yellow or yellow silty clay, which in some areas is more silty and friable in the lower part of the 3-foot section than in the upper subsoil. On some of the well-drained slopes the soil is a brown silt loam overlying reddish-brown silty clay loam, passing into a dull-red to reddish-yellow moderately friable silty clay and grading into a lower subsoil of yellow or reddish silty clay mottled with gray, bluish gray and red. In some of the forested areas the soil is yellowish near the surface. In places where the surface is subject to rather excessive erosion the silt loam is shallow, the soil approaching a silty clay loam, as in the area 4 miles east of Wattensaw. These areas are small, however, and therefore have been included in the silt loam.

In digging a well at Wattensaw, lime concretions were found at depths of about 28 or 29 feet. These occurred in purplish-red silty clay, parts of which are highly calcareous. No lime carbonate is present in the material of this soil within the 3-foot section.

The type is developed in the big terrace area, and most extensively north of Wattensaw Creek. Smaller areas lie near the bottoms of Bayou Two Prairie, Bayou Meto, and Pigeon Roost Creek. It occupies well-drained flats near stream slopes, undulating areas, and slopes rising from stream bottoms. It has good surface and internal drainage.

The Lintonia silt loam is used for general farm crops, chiefly corn and cotton, and is one of the most desirable terrace soils in the county. With good farming it produces well, though not so well as the Portland or Lonoke silt loam of the Arkansas bottoms. Cotton ordinarily yields one-half to three-fourths bale per acre, corn 20 to 40 bushels per acre, potatoes 60 to 100 bushels, sweet potatoes 80 to 150 bushels, and cowpea hay 1 to 2 tons per acre. Garden vegetables do well, but trucking is not followed because of the distance from railroads. It is estimated that about 80 or 85 per cent of the

type is in cultivation. Forested areas support a growth of blackjack oak, red oak, Spanish oak, hickory, dogwood, sweetgum, elm, and honeylocust.

Land values at the time of the survey (1921) ranged from $25 to $50 an acre, depending upon improvements and location.

The soil can be improved by including legumes, such as lespedeza and cowpeas, in rotation with the nonlegume crops. Fertilizer will increase the yields and probably 300 or 400 pounds per acre of a mixture containing about 10 per cent phosphoric acid and 4 per cent nitrogen could be profitably used for cotton, and perhaps also for corn. Sodium nitrate or other quickly acting nitrogenous fertilizer very likely would give profitable increases in the yield of cotton, corn, and oats, particularly when the plants show signs of lagging in growth in the early part of the season.

RICHLAND SILT LOAM.

The Richland silt loam is a light-brown silt loam passing at 3 to 6 inches into yellow silt loam to silty clay loam and at about 6 to 8 inches into moderately friable yellow silty clay which shows little change within the 3-foot depth. The lower subsoil in places is pale yellow in color, slightly mottled with gray, but it is not so compact and is not nearly so mottled as the Olivier silt loam, with which it is often associated. It may be considered a yellow-subsoil variation of the Lintonia, or an intermediate soil in point of drainage and weathering between the Lintonia and Olivier soils. There are very few concretions in the soil or subsoil.

The type occurs largely north of Wattensaw Creek and east of Pigeon Roost Creek. Important areas also lie south of Cypress Creek, and in the western part between Meto Bayou and Two Prairie Bayou. The surface is nearly level to faintly undulating. It is not so well drained as the Lintonia and usually is less productive. Probably 50 or 60 per cent of the type is in cultivation. The remainder is in forest, chiefly of blackjack oak, post oak, hickory, and sweetgum.

This soil makes good pasture land. The crop adaptation is about the same as that of the Olivier. Probably the supply of moisture is better in dry seasons than on the Olivier, as there is no compact layer to interfere with internal circulation of the water.

Land values range from about $15 to $40 an acre, depending on location and farm improvements.

OLIVIER SILT LOAM.

The surface soil of the Olivier silt loam consists of an upper layer of light-brown to brown silt loam 3 to 5 inches deep and a lower layer of yellowish-brown or yellow silt loam extending to 6 or 8 inches below the surface. The subsoil is a yellow silty clay loam or silty clay, which passes quickly into compact silty clay, mottled with pale yellow, gray, or bluish gray, and containing more or less rusty-brown and black concretions and soft concretionary material. In places the grayish or brownish mottling continues from the surface to 3 feet or more, but such areas represent inclusions of Calhoun silt loam. Locally the lower subsoil is very compact, approaching a hardpan.

This type occupies flat areas in the terrace country, slightly higher and better drained than the Calhoun soils and not so well drained as the Lintonia and Richland soils. The surface in general is nearly level, but is modified here and there by dome-shaped mounds. The most extensive areas are west of Pigeon Roost Creek in the northeastern part of the county.

Owing to the imperfect drainage the greater part of the type still is in forest. It is estimated that between 25 and 40 per cent of the type is in cultivation. The forest consists mostly of sweetgum, elm, dogwood, hickory, pecan, and oak.

Cleared land is valued at the present time (1921) at $20 or $25 an acre, and uncleared land can be bought for $15 to $18 an acre. The price varies considerably with the location and the character of the roads.

This is an excellent soil for lespedeza and Bermuda grass, and with ditches to remove surplus water it can be economically used for cotton, corn, soybeans, cowpeas, and the other crops of the region, even including rice, where irrigation water can be put on the land without too much expense. Fertilizer will be needed about as on the Lintonia silt loam, 300 or 400 pounds probably of a good phosphate-nitrogen mixture. Lime would improve the condition of the soil for some of the legumes, but there are no results of tests available to show whether lime can be used profitably. This soil, like the Richland, is very low in lime carbonate; it is an "acid" soil.

Owing to their small extent some areas of Olivier very fine sandy loam have been included with the Olivier silt loam. The Olivier very fine sandy loam is a brown, light-brown, or yellowish-brown very fine sandy loam, usually containing numerous rather soft dark concretions, passing at 6 to 10 inches into light-gray or mottled gray and yellowish fine sandy clay or sandy clay loam, which grades at 18 to 22 inches into rather compact fine sandy clay, mottled gray or bluish gray and yellowish. In places the lower subsoil is a sandy clay mottled with reddish brown instead of the more common grayish and yellowish shades. Concretions are present in varying quantity in both the soil and subsoil.

The principal areas lie on the terrace about 10 miles south of Carlisle. The surface is flat to gently undulating, with numerous dome-shaped mounds. About half of the type is in cultivation, corn and cotton being the chief crops. The forest areas support mainly sweetgum, hickory, pecan, dogwood, and various oaks. Land values range from $15 to $25 an acre.

MORSE CLAY LOAM.

The Morse clay loam varies considerably in texture and color at the surface. The greater part of the type averages a clay loam of reddish to dull-red or purplish-red color, underlain at about 4 to 6 inches by dull-red heavy, plastic clay. On upper slopes the surface soil in places is a brown or light-brown silt loam 3 to 5 inches deep, becoming more shallow down the slope. In many places the soil has been entirely washed off, exposing the subsoil clay, and giving cultivated fields a spotted appearance. These exposures in many places contain abundant lime concretions and the clay itself frequently effervesces freely with hydrochloric acid. The soil in places

shows no effervescence, but such areas were not considered important enough to separate.

This type occurs in patchy areas or strips along the slopes of such streams as Bayou Meto, Bayou Two Prairie, and Wattensaw Creek. The surface, therefore, is steep, and with its very numerous washes or gullies, it is more or less rough.

Probably more than half of the type is in cultivation, the remainder supporting a forest growth of post oak, red oak, hickory, dogwood, honey locust, and elm. This land can be bought at the present time for $15 to $25 an acre.

PORTLAND VERY FINE SANDY LOAM.

The typical Portland very fine sandy loam is a brown to light-brown very fine sandy loam, underlain at 8 to 10 inches by light-brown to pale reddish brown heavy very fine sandy loam, and at 12 to 16 inches by light brownish red to chocolate, somewhat plastic silty clay, showing in many places faint gray mottling. In the lower situations the subsoil is mottled locally with light gray and yellow or is buff colored in the upper part and light brownish red or salmon colored in the lower part, with some gray mottling. In some areas the subsoil is somewhat sandy. In places small black concretions are present in both the soil and subsoil.

This type occurs as well-drained, nearly level to gently sloping land, normally occupying long belts along Bakers Bayou, Indian Bayou, Bayou Meto, and Crooked Creek. These areas lie 3 to 15 feet above the bayou or the lower bottoms of the Arkansas River, and the type is one of the best drained soils in the bottoms.

Approximately 85 or 90 per cent of the type, as roughly estimated, is in cultivation. The forested areas are mainly along the bends of Crooked Creek in the southeastern part of the county. The original growth consists of red oak, black oak, white oak, sweetgum, shellbark and pignut hickory, and scattering mulberry, elm, maple, ash, dogwood, pecan, red haw, hackberry, walnut, honeylocust (or water locust), holly, and willow.

The land is used chiefly for corn and cotton. The yields range from 20 to 40 bushels of corn and one-half to three-fourths bale of cotton per acre, without fertilizer. With applications of manure or fertilizer it is stated that corn can be made to yield 50 bushels or more and cotton about 1 bale per acre. The yields at present are less than formerly, because in many fields corn and cotton have been grown continually for 20 or 30 years. The soil is well suited to soybeans, cowpeas, vetch, white and bur clover, lespedeza, oats, potatoes, sweet potatoes, peanuts, melons, and vegetables. Alfalfa is not generally successful, possibly because the content of lime carbonate is low and present too far below the surface to be available. The plants are said to start well, but die out before the stand becomes well established.

This type responds very readily to manure and commercial fertilizers. A farmer at Kerrs, in 1921, applied 500 pounds per acre of 11–0–3 mixed fertilizer and obtained 74 bushels of Red Appler oats per acre. Without fertilizer a yield of 20 bushels is all that is usually expected. Oats could be made a profitable feed crop. The yields of all crops grown could be materially increased by the use

of fertilizers and the introduction of crop rotations including the legumes.

The Portland very fine sandy loam is considered one of the best soils for general farming in the Arkansas bottoms. It is easy to cultivate and does not bake on drying. Its well-drained surface practically insures a crop even in extremely wet seasons. Ordinarily land values range from about $50 to $100 an acre, but a few well-improved plantations are held at a much higher price. A few forested areas on Crooked Creek still can be bought for $20 to $35 an acre.

Portland very fine sandy loam, stiff-subsoil phase.—The stiff-subsoil phase of the Portland very fine sandy loam is a brown to yellowish-brown very fine sandy loam, passing at about 6 to 15 inches into reddish-brown or salmon-colored fine to very fine sandy clay, which in turn passes at about 10 to 20 inches into stiff reddish clay, somewhat mottled with yellowish and grayish colors. Locally the subsoil contains concretions and concretionary material. In places the surface layer of very fine sandy loam is so shallow that cultivation brings up the heavier material and changes the surface texture.

This phase is not extensive; it occurs principally along some of the bends of Crooked Creek in long and narrow strips. About 40 or 50 per cent of it is in forest, in which white oak, post oak, Spanish oak, scrub oak, hickory, elm, maple, mulberry, and red haw are common trees. Corn and cotton are the chief crops, the yields being lower than on land having a lighter subsoil. Land values vary from about $20 to $50 an acre.

PORTLAND SILT LOAM.

The Portland silt loam consists of brown to light-brown silt loam, showing some faint grayish or yellowish mottling, passing at about 6 to 10 inches into mottled gray and yellow or yellowish-brown silty clay loam. The subsoil, beginning at 8 to 12 inches, is in the upper part a light purplish red or salmon-colored plastic silty clay, and in the lower part a clay of stronger more purplish red color. In places the lower subsoil is a tough clay, mottled red and yellow or pinkish red and limonite yellow, and containing considerable concretionary material. Near the Lonoke soils the soil to a depth of 10 to 15 inches is a rich-brown silt loam passing into lighter brown or mottled yellowish and brownish silt loam, and this at 20 to 24 inches into pinkish or salmon-colored friable silty clay loam to silty clay. A few small areas are included which have a brown to reddish-brown silt loam soil, underlain at about 20 inches by purplish-red silty clay loam, and this in turn by purplish-red clay; these are really Miller clay. In places the subsoil is somewhat sandy, especially in the lower part of the 3-foot section.

The Portland silt loam occurs in the Arkansas River bottoms. The surface is nearly level. The soil is sufficiently well drained for cultivation, but in many places the drainage could be improved by ditching or tiling. Only the well-drained areas have lime carbonate in the subsoil; even in these it is often absent in the 3-foot section, though present as concretions in the substratum. There are some dome-shaped mounds of brown very fine sandy loam on which sparkleberry or winter huckleberry are commonly present.

Corn and cotton are the principal crops. Corn yields 20 to 40 bushels per acre; cotton from one-fourth to three-fourths bale, and sometimes a bale per acre. Oats do well, and with a little care in seeding and proper fertilization produce 50 to 70 bushels per acre. The type is greatly benefited by growing such crops as cowpeas, lespedeza, soybeans, and white clover or bur clover, and by turning under a green-manure crop occasionally. This is not a common practice.

Probably 50 to 60 per cent of the type is in cultivation. The forested areas are mainly north of Ryan and south of Humnoke. Pin oak, post oak, willow oak, Spanish oak, and some mulberry, maple, hickory, elm, and pecan constitute the growth. The more desirable areas in cultivation are held at prices ranging from $40 to $80 an acre, while some of the forest areas near Humnoke and Allport can be bought for $15 to $25 an acre.

A few small areas included in the type have poor drainage, and would have been mapped as an imperfectly drained phase if they had been more extensive. Most of the areas of this sort are in the bends of Crooked Creek and Bayou Meto. Very little of this land is in cultivation.

The results of mechanical analyses of samples of the soil and subsoil of the typical Portland silt loam are given in the following table:

Mechanical analyses of Portland silt 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.*	*Per cent.*
461793	Soil, 0 to 12 inches	0.2	0.6	0.4	1.3	17.6	56.9	23.1
461794	Subsoil, 12 to 36 inches	.4	.8	.4	1.4	20.4	55.3	21.3

PORTLAND SILTY CLAY LOAM.

The surface soil of the Portland silty clay loam is a dark-brown or brown to reddish-brown silty clay loam, about 10 inches deep. The subsoil consists of mottled bluish-gray or dark bluish gray and yellowish-brown plastic sticky clay to 24 inches, and below this a dark chocolate brown plastic silty clay, which in the lower subsoil changes to a reddish-brown plastic clay. In the better drained situations near stream banks, the chocolate-brown subsoil appears near the surface and contains lime concretions, while in those places where the drainage is not so good the upper subsoil has more grayish and yellowish mottling and the lime concretions are not present. In places the soil is a brown silty clay loam, 5 or 6 inches deep, overlying light-brown or yellowish-brown silty clay, passing down into chocolate-brown silty clay and this in the lower part of the 3-foot section into chocolate-brown or salmon-colored fine sandy clay loam or even fine sandy loam. This variation also includes lime concretions in some places.

This type occupies situations 4 to 6 feet above the lower Arkansas River bottom soils, and in general it is well drained. It has a tendency to bake and crust during dry spells. Rains cause any clods formed to break down into small aggregates upon drying.

The soil is greatly improved by growing and plowing under leguminous crops and by the addition of manure.

The larger areas of this type lie northwest and southwest of England and in the proximity of Steele Brake. It is estimated that 95 per cent of the type is in cultivation. Cotton and corn are the chief crops grown, with yields averaging about the same as those on the Portland silt loam. Alfalfa succeeds in the better drained situations, especially where the purplish-red subsoil lies near the surface.

Land values range from $40 to $100 an acre, depending upon improvements and distance from towns or good roads.

Portland silty clay loam, stiff-subsoil phase.—The stiff-subsoil phase of the Portland silty clay loam consists of brown to chocolate-brown silty clay loam, passing at 3 or 4 inches into mottled gray and yellow or mottled gray, yellow, and salmon silty clay loam, which passes at about 8 inches into salmon-colored, light brownish red or reddish chocolate brown silty clay loam, which becomes abruptly stiff and plastic. In places the lower subsoil is so stiff or compact it can scarcely be penetrated with a soil auger even when water is standing on the surface. Small black concretions are present in the soil and subsoil. In places these are very abundant.

This phase occupies faint ridges or swells standing 4 to 8 feet above the lower lying Perry soils. In places the surface is almost flat. The largest areas lie 7 miles west of Lonoke, 3 or 4 miles southwest of Lonoke, and 4 or 5 miles south of Lonoke, in the first bottoms. There are also a few scattering areas along the bends of Crooked Creek.

Half of the type is in cultivation, the remainder being forested chiefly with post oak, black oak, hickory, red haw, blackjack oak, Spanish oak, water oak, and black gum. Lespedeza does well, but corn and cotton yields are comparatively low. Alfalfa, it is believed, would not succeed nearly as well as on the typical soil. Present land values range from about $15 to $50 an acre.

The table below gives the results of mechanical analyses of samples of the soil, subsurface, and subsoil of the typical Portland silty clay loam:

Mechanical analyses of Portland 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.*	*Per cent.*
461720	Soil, 0 to 6 inches	0.7	3.0	1.4	3.2	11.3	54.4	26.0
461721	Subsurface, 6 to 20 inches	.2	1.4	.7	1.8	8.7	41.8	45.2
461722	Subsoil, 20 to 36 inches	1.8	.3	.2	1.4	13.2	43.0	40.1

PORTLAND CLAY.

The Portland clay typically is a brown, dark-brown, or chocolate-brown silty clay passing at about 6 to 12 inches into chocolate-brown to reddish-brown plastic silty clay. Yellowish-brown and faint grayish mottlings are present locally in the soil and subsoil, but the chocolate-brown color predominates. A variation of considerable extent occurs in this county. In this the soil is a brown or chocolate-

brown silty clay, and is underlain at 8 to 10 inches by dark ashy gray clay, mottled faintly with yellowish brown, and this in turn, at 26 to 28 inches, by mottled purplish-red and brown silty clay, the proportion of purplish-red color increasing with depth, and dominating in the lower subsoil. Where the surface is well drained or sloping, as near stream slopes or slopes to lower areas, lime concretions are present in the surface soil or subsoil. The dry soil has a dull-reddish cast and crumbles to a "buckshot" structure. The type is high in lime.

This is a well-drained first-bottom soil, protected from overflow by levees. It occupies gently sloping areas, standing 4 to 6 feet above the lower lying Perry clay.

The principal crops are cotton and corn. Cotton yields three-fourths to 1 bale per acre and corn 20 to 50 bushels per acre, without fertilizer. Oats, lespedeza, cowpeas, and alfalfa do well. The high lime content makes this a good alfalfa soil. Three or four cuttings may be harvested annually.

It is estimated that about 90 per cent of the type is in cultivation. The largest single area is situated 2 to 4 miles northeast of England. Several areas extend from a point 1 mile west of England south to the county line. A few smaller areas lie near Steele Brake, just north of Mound Lake, and larger areas 2 to 4 miles southeast of this place. Land values range from $70 to $125 an acre.

The following table gives the results of mechanical analyses of samples of the soil, subsurface, and subsoil of the Portland clay:

Mechanical analyses of Portland 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.*	*Per cent.*
461782	Soil, 0 to 6 inches	0.1	1.6	3.0	13.2	4.4	34.2	43.8
461783	Subsurface, 6 to 22 inches	.0	4.0	7.0	13.8	1.7	22.8	50.8
461784	Subsoil, 22 to 36 inches	.2	2.2	4.4	12.8	2.6	31.7	46.1

PULASKI VERY FINE SANDY LOAM.

The surface soil of the Pulaski very fine sandy loam is a brown to light-brown very fine sandy loam, 10 to 15 inches deep. The subsoil is a light-brown slightly heavier very fine sandy loam, mottled in many places with yellowish or grayish colors, passing at 18 to 24 inches into light-reddish or salmon-colored very fine sandy loam to fine sandy loam. Plowed fields of this type have a more reddish color than the fields of Portland very fine sandy loam.

One-half mile east of Keo the soil consists of light-brown to brown very fine sandy loam grading at 8 to 10 inches into mottled bluish or light-gray and yellow or slightly reddish yellow very fine sandy loam, which at 15 to 20 inches passes into salmon-colored fine sandy clay with some bluish-gray or gray mottling, and this into salmon-red or light brownish red silty to fine sandy clay. A small included area lying 2 miles southeast of Humnoke, near the center of section 23, T. 2 S., R. 7 W., consists of fine to coarse sand.

This type has long been recognized as a very desirable soil, and at present it is all in cultivation, excepting a few small areas

along Crooked Creek. It has good drainage and an almost flat surface. It is a light, warm soil, particularly well suited to the production of vegetables. Corn and cotton are the chief crops. Cotton yields one-half to three-fourths bale and occasionally 1 bale per acre. Corn ordinarily yields 20 to 40 bushels per acre; yields of 50 or 60 bushels are reported. As yet commercial fertilizers are not used generally, but good results have followed their use. Many fields near Scott have been in corn and cotton continuously for 30 to 50 years. Growing cowpeas, lespedeza, or soybeans would greatly improve the condition of these fields.

Land values vary, ranging from $75 to $150 an acre near Scott to $30 to $50 along Crooked Creek.

PERRY VERY FINE SANDY LOAM.

The Perry very fine sandy loam is a brown or grayish-brown very fine sandy loam, with dark-gray and rusty-brown mottling, passing at 1 or 2 inches into light-gray very fine sandy loam. This continues to 18 or 20 inches, where there appears a light-gray heavy very fine sandy loam to fine sandy clay, which grades into ashy-gray, compact fine sandy clay, mottled with yellow and reddish yellow. Rusty-brown and dark-colored concretionary material is present from the surface down.

This type occupies poorly drained flattish areas associated with the Lonoke or Portland very fine sandy loam. The drainage canals are bringing this type into a much better drained condition. Some areas, as those north of Humnoke, occupy depressions and are poorly drained.

The Perry very fine sandy loam is not extensive. The larger areas occur just north of Kerrs and north of Humnoke. From 40 to 50 per cent of the land is in cultivation. Forested areas support a growth consisting principally of sweetgum, various oaks, hickory, maple, and elm.

Corn and cotton are the leading crops. Where proper drainage has been provided the type is productive. Cotton ordinarily yields one-half to three-fourths bale, and corn 20 to 40 bushels per acre.

Land of this type can be bought for $25 to $40 an acre where forested, and around $50 to $75 where cleared, as north of Kerrs.

PERRY SILTY CLAY LOAM.

The Perry silty clay loam in its virgin state consists of a brown silty clay loam with some faint rusty brown and gray mottling, passing at about one-half to 1 inch into bluish-gray silty clay loam, mottled with yellow or yellowish brown. At an average depth of 10 inches a bluish-gray or bluish-brown plastic silty clay appears and below this layer a similarly colored stiffer clay. The subsoil, at depths varying from about 14 to 24 inches, is a yellowish-brown plastic silty clay which passes abruptly into chocolate-brown or reddish-brown, plastic, stiff silty clay. Small dark concretions are present in places in soil and subsoil. Lime concretions occur locally in the lower subsoil.

This type is not very extensive. It occurs principally north and south of Allport and Humnoke. Water stands on the surface for considerable periods after rains, especially where the type is in forest and the necessary lateral ditches have not been dug to the main drainage canals.

Approximately 25 per cent is in cultivation, as roughly estimated, the remainder being forested with cow oak, post oak, willow oak, water oak, shellbark and pignut hickory, and a little elm, ash, hackberry, locust, and pecan. Corn and cotton are the chief crops. It is considered a productive soil when drained. A large part of it at present is used for grazing.

The results of mechanical analyses of samples of the soil, subsurface, and subsoil of the Perry silty clay loam are given in the following table:

Mechanical analyses of Perry 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.*	*Per cent.*
461764	Soil, 0 to 6 inches	1.7	1.2	0.6	1.7	14.4	49.2	31.1
461765	Subsurface, 6 to 20 inches	.4	1.2	.4	1.2	14.8	42.4	39.6
461766	Subsoil, 20 to 36 inches	.6	1.1	.4	2.2	13.0	39.3	43.4

PERRY CLAY.

The Perry clay is a mottled dark bluish gray and yellowish-brown or rusty-brown silty clay passing at about 6 inches into chocolate-brown silty clay mottled with dark bluish gray and having a plastic structure. At 15 inches there appears a bluish-gray plastic silty clay, mottled some with brown and dark bluish gray. The material of the lower subsoil in some of the large flats is a chocolate-brown or reddish-brown plastic silty clay, locally containing lime concretions. Black concretions, probably high in iron, are common in the soil and subsoil.

An area 1¼ miles east of England, covered with water, consists of brownish-gray silty clay with a little yellowish-brown mottling, and below this chocolate-brown mottling. About 3 miles north of Keo the soil is a mottled dark bluish gray and chocolate-brown or yellowish-brown, sticky silty clay, passing at about 10 to 12 inches into mottled bluish-gray and yellowish-brown plastic, sticky silty clay.

The Perry clay is the most extensive soil type in Lonoke County. It occupies the poorly drained flats in the Arkansas bottoms and is commonly referred to as "buckshot land." Water stands on the surface for some time after rains. (Pl. XL, fig. 2.) The projected drainage canals will correct this, especially when the land is cleared and lateral ditches are dug.

At the time of the survey (1921) 85 or 90 per cent of the type was forested. The forest consists mainly of cow oak, overcup oak, willow oak, water oak, shellbark hickory, red hickory, and pignut hickory, with a scattering of elm, ash, hackberry, mulberry, pecan, honey-locust (or water locust), maple, and cypress. In the southeastern

part of the county catalpa formerly was very abundant, but has largely been cut for commercial use. This area is known as Catalpa Flat.

The Perry clay is very productive when properly drained. In clearing these areas it is the local custom to deaden the trees. The smaller trees are removed in preparation for the first crop, but many large deadened trees are left and removed several years later.

On some of the better drained areas, cotton yields have averaged 1 bale per acre. Some corn is grown, but cotton is likely to continue to be the chief cash crop for some time. Alfalfa does well where complete drainage is effected, especially where lime carbonate is present in the subsoil.

At the time of the survey (1921) about 70 miles of drainage canals traversed the type. A large canal is projected to extend in a southeasterly direction from Bayou Meto and rejoin Bayou Meto about 1¾ miles above the southeastern corner of the county. Large quantities of purplish-red clay have been thrown up on both sides of the main canals. The material exposed contains numerous lime concretions, ranging from the size of a pea to that of a hen's egg. In time these embankments may be leveled down enough to permit cropping. Alfalfa probably would succeed on them on account of the high content of lime.

Land values vary considerably according to improvements and distance from towns. The best improved land close to towns is held for about $100 an acre. A large part of the forested land in the southeastern part of the county can be bought for $20 to $40 an acre and where cleared, well drained, and situated near hard-surfaced roads for $50 to $70.

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

Mechanical analyses of Perry 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.*	*Per cent.*
461786	Soil, 0 to 6 inches	4.0	2.0	1.4	4.6	4.5	33.6	49.9
461787	Subsoil, 6 to 36 inches	1.4	3.6	2.8	5.9	2.8	29.6	53.9

LONOKE VERY FINE SANDY LOAM.

The surface soil of the Lonoke very fine sandy loam typically is brown to dark-brown very fine sandy loam which becomes darker in color at depths of 6 to 12 inches. The subsoil, beginning at depths ranging from 12 to 16 inches, is a brown, light-brown, or grayish-brown very fine sandy loam showing some rusty-brown or yellowish mottling, grading at about 16 to 20 inches into chocolate-brown fine sandy clay, or silty clay, mottled with light gray and yellowish brown. The lower subsoil ranges from mottled yellowish and purplish silty clay to brownish-red or salmon-colored silty clay to moderately friable fine sandy clay. Freshly plowed fields have a darker brown color than those which have not been disturbed for some time.

In places the dark-colored material extends to depths of about 24 inches before the lighter subsoil is reached. Locally near areas of Portland very fine sandy loam the brown, reddish-brown, or salmon-colored material appears at depths of about 12 to 16 inches, and probably some small areas of Portland soil have been included.

As mapped the type includes some areas whose soil is not dark enough for good Lonoke. These, where large enough, should have been separated and classed as Portland.

This type occupies relatively high situations in the Arkansas bottoms and is usually fairly well drained to well drained. Large areas occur around the bends of Bakers Bayou. The largest single area extends through England in a slightly northwesterly direction to Steele Brake. This area is about 13 miles long and averages from one-half to three-fourths of a mile wide. It lies from 4 to 12 feet above the lower lying Perry soils and probably is the oldest undisturbed soil type in the Arkansas bottoms. Overflow waters seldom covered this area even before the Arkansas River was confined by levees. Considerable areas are mapped in the vicinity of Bearskin and Mound Lakes.

This type is one of the best general farming soils in the county. It is easy to cultivate and does not bake on drying. Corn and cotton are the principal crops. Corn yields from 20 to 60 bushels, and cotton two-thirds to 1 bale per acre. Commercial fertilizers are seldom used. Oats, cowpeas, peanuts, potatoes, white clover, and lespedeza do well. The lime in the 3-foot section generally is not sufficient for alfalfa to thrive. The texture and relatively high content of organic matter make this soil very favorable for potatoes. It is believed potatoes could be made an important and profitable crop when proper methods of growing, handling, and marketing the crop are established among the growers. Truck crops might also be produced with success.

It is roughly estimated that from 90 to 95 per cent of the type is in cultivation. The original forest growth was the most varied in the Arkansas bottoms, consisting mainly of red oak, Spanish oak, white oak, black gum, sweetgum, shellbark hickory, and pignut hickory, with other scattering trees, such as ash, dogwood, pecan, black haw, red haw, hackberry, walnut, mulberry, honeylocust, holly, willow, elm, and maple.

Land values range from $70 to $150 an acre, depending upon farm improvements, location, and roads.

The results of mechanical analyses of samples of the soil, subsurface, and subsoil of the Lonoke very fine sandy loam are given in the following table:

Mechanical analyses of Lonoke 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.*	*Per cent.*
461776	Soil, 0 to 20 inches	0.0	0.1	0.0	0.6	59.1	31.2	9.0
461777	Subsurface, 20 to 26 inches	.0	.0	.0	.6	59.0	32.9	7.3
461778	Subsoil, 26 to 36 inches	.0	.0	.2	.8	50.4	37.0	11.6

LONOKE SILT LOAM.

The Lonoke silt loam is a brown to moderately dark brown, mellow silt loam, underlain at 6 to 10 inches by darker brown silt loam, extending to an average depth of 12 inches. At this point there appears a brown silty clay with faint gray or dark-gray mottling, this grading at about 15 to 20 inches into light-brown or yellowish-brown silty clay with some bluish-gray and red or reddish-yellow mottling, and this into salmon-colored silty clay with some brown mottling. The lower subsoil usually is purplish red to chocolate brown in color, while a few areas near the lower lying soils show yellowish or grayish mottling. Some areas consist of moderately dark brown silt loam, faintly mottled with ashy gray at about 8 inches, this passing at about 12 inches into mottled ashy gray and brown or yellowish-brown fine sandy clay of friable structure. At 18 to 20 inches a slightly plastic silty clay of mottled ashy-gray and red or reddish-yellow color is encountered and the lower subsoil consists of mottled yellowish-brown and ashy-gray material of the same texture.

In places this type contains considerable very fine sand, and some small areas occupying the higher situations range to a light silt loam to loam or very fine sandy loam. Mounds are common. These range from 2 to 3 feet in height and 20 to 80 feet in diameter. Ordinarily they are occupied by a very fine sandy loam having a lighter colored subsoil. This lies near the surface in old cultivated fields. Plowed fields often have a spotted appearance. The surface is always darker colored when freshly plowed than after it has been exposed for some months.

The Lonoke silt loam is developed quite extensively along Bakers Bayou, the largest single area being situated east of Indian Bayou and southeast of Coy. The type occupies almost flat to slightly sloping situations, or continuations of the gently sloping areas of Lonoke very fine sandy loam.

It is roughly estimated that 90 to 95 per cent of the type is in cultivation. The original forest was practically the same as on the Lonoke very fine sandy loam. Corn and cotton are the chief crops, with yields about the same as on the very fine sandy loam, averaging perhaps a little better. Alfalfa is successful in only a few places where lime concretions are plentiful in the subsoil. Even then it seems advisable to supply lime before seeding, and inoculation appears to be advisable everywhere.

The type is highly esteemed for general farming. With a system of rotation and more purebred livestock this type would continue to give excellent yields, but under the present system of corn and cotton production the land is gradually decreasing in productiveness.

Land values range from $60 to $150 an acre, depending upon farm improvements and distance from towns and hard-surfaced roads.

Lonoke silt loam, imperfectly drained phase.—The imperfectly drained phase of the Lonoke silt loam consists of a brown to grayish-brown silt loam to very fine sandy loam underlain at about 4 to 8 inches by gray to yellowish or brownish-gray silt loam to very fine sandy loam. At about 15 to 20 inches a yellowish-gray to light-gray heavy silt loam or very fine sandy loam appears, and the lower subsoil is more compact in structure and mottled with yellow and red-

dish yellow. Some brown and dark-brown concretionary material is present.

The areas of this phase are small and widely scattered over the Arkansas bottoms. They are mostly in cultivation, but are not as valuable as adjoining areas of other types on account of imperfect drainage.

The following table gives the results of mechanical analyses of samples of the soil, subsurface, and subsoil of the typical Lonoke silt loam:

Mechanical analyses of Lonoke silt 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.*	*Per cent.*
4617109	Soil, 0 to 8 inches	0.3	0.7	0.6	2.2	27.4	57.7	11.1
4617110	Subsurface, 8 to 24 inches	.0	.6	.4	3.0	22.6	57.0	16.5
4617111	Subsoil, 24 to 36 inches	.0	.2	.2	3.6	22.1	57.4	16.4

LONOKE SILTY CLAY LOAM.

The Lonoke silty clay loam is composed of (1) a dark-brown to dark grayish brown silt loam to silty clay loam, about 6 inches deep, (2) a dark-brown or very dark brown plastic silty clay with some dark-gray, ashy-gray, or yellowish-brown mottling extending to 12 to 16 inches, (3) a dark-brown to chocolate-brown plastic silty clay showing rather faint bluish gray to yellowish-brown or rusty-brown mottling. The lower subsoil usually consists of a dark brownish red or reddish-brown to salmon-colored silty clay, with some faint rusty brown, gray or bluish-gray mottling.

A somewhat common variation consists of a soil of dark-brown silty clay loam or silt loam passing at 3 to 4 inches into silty clay loam, locally showing some faint ashy colored mottling in the subsurface section, and a subsoil, beginning at about 8 to 12 inches, consisting of dark bluish gray or ashy-gray silty clay with faint yellowish brown or rusty-brown mottling. In the lower part of the subsoil the material is plastic, and has a salmon-red or chocolate-brown color with bluish-gray or ashy-gray mottling.

This type is not extensive, and the areas are more scattered than those of other Lonoke soils. It occurs in small elongated strips on the lower gentle slopes, lying very slightly above the Perry clay. In many places the drainage is rather imperfect, and small lateral or field drains would be beneficial.

Probably 90 to 95 per cent of the type is in cultivation. Where well drained the land is held in high esteem by farmers. Its value averages lower than that of the Lonoke silt loam or very fine sandy loam, owing to poorer drainage and less desirable location for buildings.

The results of mechanical analyses of samples of the soil, subsurface and subsoil of the Lonoke silty clay loam are presented in the table following:

Mechanical analyses of Lonoke 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.*	*Per cent.*
461773	Soil, 0 to 6 inches	0.0	1.4	0.8	1.7	20.7	58.0	17.5
461774	Subsurface, 6 to 26 inches	.3	1.0	.6	2.8	19.5	55.1	20.8
461775	Subsoil, 26 to 36 inches	.6	1.2	.7	1.0	24.4	54.6	17.7

LONOKE CLAY.

The Lonoke clay is a dark-brown, very dark blue, or bluish-black silty clay to clay faintly mottled with yellowish brown or rusty brown, underlain at 6 to 10 inches by dark bluish gray plastic silty clay showing some small yellowish-brown mottles. This subsoil material continues to 3 feet with little change, except that mottling diminishes with depth, and that in places the lower subsoil has a lighter bluish gray color than the upper subsoil. Lime concretions are usually abundant in the lower subsoil or substratum and are present in places in the soil.

This type is not extensive. It occupies slightly higher situations than the Perry clay and is better drained. The largest areas are situated 3 to 4 miles southeast of England, 2 to 3 miles northeast of England, and 6 to 8 miles south of Lonoke.

About half of the Lonoke clay is in cultivation, the rest being forested with red oak, overcup oak, willow oak, water oak, shellbark and pignut hickory, and a few scattering ash, elm, pecan, hackberry, mulberry, and honeylocust (or water locust) trees.

Cotton is the chief crop. Where the drainage is good yields vary from two-thirds to 1 bale per acre. Alfalfa succeeds on the better drained situations. The soil is very productive, but its heavy texture makes it difficult to work. It crumbles after rains to a buckshot structure and is locally known as "black buckshot land." With small lateral ditches to the main drainage canals, all the type can be farmed.

Land values range from $40 to $75 an acre, according to location, drainage conditions, and farm improvements.

The table below gives the results of mechanical analyses of samples of the soil and subsoil of the Lonoke clay:

Mechanical analyses of Lonoke 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.*	*Per cent.*
461791	Soil, 0 to 6 inches	1.0	3.0	2.0	6.0	3.0	36.7	48.5
461792	Subsoil, 6 to 36 inches	.4	3.6	2.4	4.6	1.4	34.3	53.3

POPE SILT LOAM.

The Pope silt loam consists of a brown mellow silt loam, passing at 8 to 10 inches into a yellowish-brown silt loam and at about 12 inches into yellow silty clay which shows some grayish or pale-yellow mottling and contains small concretions in the lower subsoil. In

some rather poorly drained situations grayish and rusty-brown mottlings and dark-colored concretionary material are present in considerable quantities at depths of 20 inches and below.

This is a first-bottom soil developed along the upper courses of creeks and small streams which lie in the northwestern part of the county, mainly west of the Missouri Pacific Railroad. It is typically developed along Cypress, Fourmile, and Magness Creeks. This material is derived from wash from the noncalcareous soils formed from sandstone and shale.

A large part of the type is forested with sweetgum, black oak, willow oak, white oak, boxelder, ironwood, mulberry, sycamore, elm, honeylocust (water locust), willow, and cypress, the latter occurring along the banks of streams.

The soil is well adapted to corn and cotton. Yields of corn vary from 20 to 50 bushels, and cotton from one-half to three-fourths bale per acre. In some years much damage to cotton is caused by rust, the boll weevil, and overflows. Cocklebur and crab grass are troublesome weeds. Commercial fertilizers are used only to a slight extent. Corn is often put in rather late, as the type is frequently later than the upland types in drying out.

Land is held at $18 to $50 an acre at the time of writing (1921), depending upon drainage conditions, location, and improvements.

ATKINS SILTY CLAY LOAM.

The Atkins silty clay loam consists of a mottled grayish and brownish heavy silt loam to silty clay loam, passing at about 4 to 8 inches into gray to bluish-gray silty clay loam, mottled with brown, rusty brown, or pale yellow, and usually grading into similarly colored silty clay. The lower subsoil when in place is very compact, consisting, at depths of 15 to 30 inches, of dense, impervious, bluish-gray clay with yellowish or brownish mottling. In most areas small black concretions are present throughout the 3-foot section.

The type occurs in poorly drained situations in the bottoms of small streams. The material has been washed from the sandstone and shale uplands and deposited in periods of overflow in areas where the waters are more quiet. It is a type of small extent, with about 95 per cent of its area in forest including willow, water oak, red oak, sweetgum, black gum, maple, ash, elm, and cypress.

When broken, the soil has a tendency to form hard clods and run together after rains. It is used for pasture and sells for $10 to $18 an acre. It is probably better adapted to lespedeza and Bermuda grass for hay and pasture than any other crop, yet in favorable seasons of evenly distributed rainfall, corn and sorghum do fairly well. Rice would succeed if satisfactory drainage conditions could be maintained.

OCHLOCKONEE SILT LOAM.

The Ochlockonee silt loam is a brown mellow silt loam, underlain at about 8 to 16 inches by lighter brown to yellowish silt loam or silty clay loam, which continues to 36 inches without change except to become slightly heavier in the lower depths.

In some places, especially in the lower situations, there are poorly drained spots that have a grayish-brown surface soil, underlain by

mottled gray, bluish-gray, and yellowish silty clay loam to silty clay containing many iron concretions. These areas really represent Bibb silt loam, which are included with the Ochlockonee on account of their small size. There are small strips along small drains consisting of colluvio-alluvial material, often ranging to fine sandy loam in texture. These areas were not considered of enough importance to map separately as a fine sandy loam.

The Ochlockonee silt loam is a first-bottom soil subject to overflow, but is fairly well drained between overflows. It represents sediments derived mainly from the Susquehanna and Caddo soils.

It is estimated that less than half of the type is in cultivation. Corn and cotton are the principal crops. Cotton yields from one-half to 1 bale per acre, when the boll weevil is not too active. Corn yields from 25 to 50 bushels per acre. Practically no commercial fertilizers are used on the type. The forested areas are occupied chiefly by elm, maple, various oaks, sweetgum, and hickory.

Land of this type is usually sold in conjunction with the upland soils. Probably $20 to $35 an acre would buy most of it at the present time.

BIBB SILT LOAM.

The Bibb silt loam is a gray or mottled gray and light-brown heavy silt loam, passing at 8 or 10 inches into gray or bluish-gray silty clay loam, which is mottled locally with pale yellow and rusty brown and generally contains iron concretions. In some places these concretions are very abundant, forming a layer which has the characteristics of hardpan. Like the other light-colored soils, this is locally called "white land" and "crawfish land."

This type occurs in the poorly drained parts of the first bottoms of streams whose sediments have been washed from the soils of the coastal plain area, mainly from the Susquehanna fine sandy loam and the Caddo silt loam and fine sandy loam. The largest area is near the source of Wattensaw Creek, about 5 to 7 miles southeast of Cabot. An area lying 3 to 6 miles almost south of Cabot includes some patches of silty clay loam too small to be shown separately.

The Bibb silt loam is used to some extent as pasture land. Very little of it is farmed. About 95 per cent of it is in forest consisting chiefly of sweetgum, black gum, willow oak, white oak, water oak, pin oak, maple and elm.

The average value of land of this type is $12 or $15 an acre.

It is adapted to lespedeza, redtop, Bermuda grass, and sorghum. Rice will succeed where proper irrigation and protection from overflow can be economically provided. Forestry is a good use for soil of this kind, which at best is none too productive. Drainage, the growing of legumes, and the application of manure and fertilizer will improve the soil.

VICKSBURG SILT LOAM.

The Vicksburg silt loam is a brown mellow silt loam passing at 8 to 10 inches into lighter brown or yellowish-brown silty clay loam and this at 12 to 15 inches into yellow or brownish-yellow friable silty clay to silty clay loam. Some dark concretions appear in the

lower subsoil, and locally it is mottled with yellow and gray; this mottling is invariably present where drainage is imperfect. These small poorly drained areas are in reality occupied by Waverly soils.

The Vicksburg silt loam occupies the better drained situations in the first bottoms of streams flowing in the terrace country, such as Cypress, Duck, Pigeon Roost, and Wattensaw Creeks.

Probably at least 85 per cent of the type is in forest, consisting mainly of water oak, red oak, Spanish oak, white oak, hickory, elm, dogwood, and maple. The soil is very productive, especially where well drained, but as the entire bottoms are subject to frequent or occasional overflow, comparatively little of the type is in cultivation.

Land values range from $15 to $20 for forest and up to $35 an acre for cleared land.

The Vicksburg silt loam, where protected from overflows, produces good yields of corn, soybeans, and oats, and also of cotton, when the boll weevil is not too destructive. Cowpeas, lespedeza, and the native grass give good yields of hay, the last two in areas not protected from overflow.

WAVERLY SILT LOAM.

The Waverly silt loam is a mottled gray and brown silt loam passing at 2 to 5 inches into mottled gray or bluish-gray and pale-yellow silty clay loam. Below this there appears either bluish-gray to ashy-gray plastic silty clay or first a layer of compact grayish to mottled grayish and pale-yellow silty clay not so plastic and next the plastic silty clay. The compact layer may be comparatively dry when the surface is covered with water. Iron concretions and black or brownish concretionary materials are generally present in the soil and subsoil in varying quantities. When moist the soil is friable; when dry it bakes hard and has a light-gray appearance. It is noncalcareous.

As mapped in Lonoke County, the Waverly silt loam includes small patches of slightly higher ground in close proximity to stream channels, which consists of either Collins or Vicksburg silt loam. Some Waverly silty clay loam also has been included.

The type is developed mainly along Bayou Two Prairie. Because of its poorly drained condition and susceptibility to overflow it is rarely cultivated. Water stands on the lower situations for long periods, owing both to inadequate relief and to the impervious nature of the subsoil. The type supports an abundant growth of water oak, willow oak, post oak, pin oak, white oak, black gum, sweetgum, hickory, elm, and maple. About 2 miles north of Lonoke a considerable quantity of merchantable pine was standing at the time of the survey (1921). A few small strips leading from the prairie support a growth of coarse native grass and small persimmon trees.

By means of large drainage canals and small field ditches the type could be made a productive rice soil, but possibly its area is too small to justify the expense of drainage and clearing. At present it is utilized for its forest products and for grazing. It is adapted to lespedeza and could be used for hay in cleared areas. Fertilizer, lime, and manure could be used with good effect on the yields, if the land could be drained without too much expense.

Land of this type is held at $12 to $25 an acre. A few small strips through the prairie, associated with the Crowley soils, would bring more.

Some small areas of Collins silt loam have been included with the Waverly silt loam. The Collins silt loam is a brown silt loam mottled faintly with rusty brown, passing at 6 to 8 inches into mottled brown, rusty-brown, and gray silt loam, and this at 10 to 15 inches into light-gray or bluish-gray silty clay loam to silty clay mottled with yellow. Black concretions are present in this layer. In places the silt loam extends down to 3 feet, has a compact structure in the lower part, and is moderately dry even in wet seasons. In other situations the lower subsoil is a plastic silty clay with gray and yellow mottling. The brown surface soil is similar to that of the Vicksburg silt loam and the mottled subsoil is like that of the Waverly silt loam.

This soil is of small extent, with perhaps 25 per cent in cultivation. It is used for corn and cotton. Oats, lespedeza, sorghum, and the native grasses will succeed. Ditching and additions of fertilizers or manure are needed for good yields. Pasturage is good on this land, especially where cleared. It also gives good crops of hay.

WAVERLY SILTY CLAY LOAM.

The Waverly silty clay loam is a light-gray silty clay loam mottled with brown or yellow and passing at 6 to 8 inches into light-gray or plastic bluish-gray silty clay, mottled somewhat with pale yellow. At 20 to 26 inches this passes into either (1) compact silty clay mottled light gray and pale yellow and then into light-gray, ashy-gray, or bluish-gray plastic clay, or (2) directly into plastic clay without the overlying compact layer. Concretions are usually present in the soil and subsoil. There are some included patches of clay texture.

This type is more poorly drained than the Waverly silt loam, as it usually occupies lower situations. It is all in forest, the principal trees being post oak, pin oak, elm, shellbark hickory, cypress, and sweetgum.

The largest area is situated along Bayou Two Prairie, about 10 or 12 miles south of Carlisle. It is used mainly for pasture, the best timber having been cut. The land is valued at about $10 to $15 an acre.

SUMMARY.

Lonoke County, Ark., is situated slightly east of the center of the State. It has an area of 792 square miles, or 506,880 acres.

The county comprises four general divisions, namely (1) the sandstone ridges with intervening valleys, (2) the gently rolling coastal plain area, (3) the prairie or old alluvial terraces, and (4) the river bottoms. The first division is the least extensive; the last the most extensive.

The general slope of the county is to the southeast. Elevations in the towns range from 228 to 259 feet above sea level.

The southern two-thirds of the county is drained mainly by Bayou Meto, Bayou Two Prairie, Crooked Creek, and Bakers Bayou;

the northern third by Cypress, Pigeon Roost, Fourmile, and Wattensaw Creeks.

All the county was originally forested, except the second bottom or prairie. At present lumbering is confined mainly to the southeastern part of the county.

The first settlements were made between 1821 and 1842. The county was organized in 1873.

In 1920 the population was reported as 33,400. England, the largest town, with a population of 2,408, is an important cotton center. Lonoke is the county seat, with 1,711 inhabitants. Lonoke and Carlisle are noted as centers of the rice industry.

Excellent transportation facilities are provided by the Chicago, Rock Island & Pacific, the Missouri Pacific, and the St. Louis Southwestern railroads.

The county has a number of hard-surfaced roads connecting the principal towns.

The mean annual temperature at Lonoke is about 63° F. The mean annual precipitation is about 52 inches. The winters are short and mild. The average growing season is about 208 days. Serious droughts are rare.

Lonoke County is essentially an agricultural region. Cotton is the leading cash crop with an acreage exceeding all others. It is grown largely under the one-crop system, practically no crop rotation being practiced, especially in the lowlands. Corn is second in acreage, and rice third. Dairying is practiced chiefly about Carlisle.

Extensive drainage operations have been completed in the bottoms. In 1920, 172,007 acres were in drainage-tax districts.

Commercial fertilizers are used mainly in the northern part of the county.

The 1920 census reports 32.1 per cent of the farms operated by owners, 67.5 per cent by tenants, and 0.4 per cent by managers.

Farm labor is plentiful. Between 90 and 95 per cent of the laborers are negroes.

Upland soils sell for $10 to $50 an acre, second-bottom rice lands for $30 to $100, and first-bottom soils for $15 to $125 or more, depending upon drainage and other improvements, and distance from towns or hard-surfaced roads.

Thirty-seven soil types and 4 phases, representing 20 soil series, are mapped in the county.

The upland soils occupying the sandstone ridges and valleys are classed with the Hanceville and Conway series. The Hanceville stony loam is mainly in forest. The Hanceville loam and fine sandy loam of the lower slopes are used largely for corn and cotton. The Conway silt loam is best suited to forage crops.

The Atkins and Pope soils are the first-bottom soils derived from the sediments of the upland soils of the sandstone region. The Atkins silty clay loam is gray and poorly drained and best suited for pasture, while the Pope silt loam is better drained, has a brown color, and is used largely for corn and cotton.

The gently rolling areas of the coastal plain, southeast of Cabot and Ward, are classed with the Susquehanna and Caddo series. They are formed by the weathering of unconsolidated sedimentary deposits of Tertiary age. The Susquehanna soils are well drained

and are devoted largely to the production of cotton and corn. The Caddo soils have imperfect drainage. The associate first-bottom soils are the Bibb and Ocklockonee silt loams, the former being gray, poorly drained, and in forest, the latter being brown, better drained, and partly in cultivation.

The second-bottom or old alluvial terraces have given rise to the Crowley, Lintonia, Richland, Calhoun, Olivier, and Morse series, named in order of their relative importance, and the Vicksburg and Waverly soils of the associated first bottoms.

The Vicksburg silt loam is brown in color and fairly well drained, and the Waverly soils are gray, poorly drained, and not used for crops.

The Crowley silt loam and silty clay loam have a nearly flat surface and a heavy subsoil. They are devoted primarily to the production of rice under irrigation. The Calhoun soils are poorly drained and practically all in forest.

The Lintonia, Richland, Olivier, and Morse soils are developed mainly in the northern part of the broad terrace region. They vary in drainage from fair to good. Corn and cotton are the chief crops grown on these soils.

The Arkansas bottom soils consist in part of material that has been transported from the Permian Red Beds region of western Texas and Oklahoma. This red material is everywhere present in the lower subsoil or substratum of the Arkansas bottoms. It has a high lime content and a characteristic Indian-red or purplish-red color. The Portland, Perry, and Lonoke series comprise these bottom soils. Cotton and corn are the chief crops grown.

The Portland soils are brown in the surface soils and chocolate brown to Indian red in the subsoil. They are fairly well drained, produce good crops of corn and cotton, and are adapted to a variety of other crops.

The Perry series includes the poorly drained and heavier bottom soils. The Perry clay is the most extensive soil type in the county, with a very large proportion in forest. A considerable part has been improved by means of drainage canals. With proper drainage all of the type can be cultivated.

The Lonoke types are characterized by dark-gray to dark-brown, deep surface soils and a reddish or salmon-colored subsoil. The drainage varies from good to deficient. The better drained lands are highly prized for general farming, being adapted to a wide range of crops.

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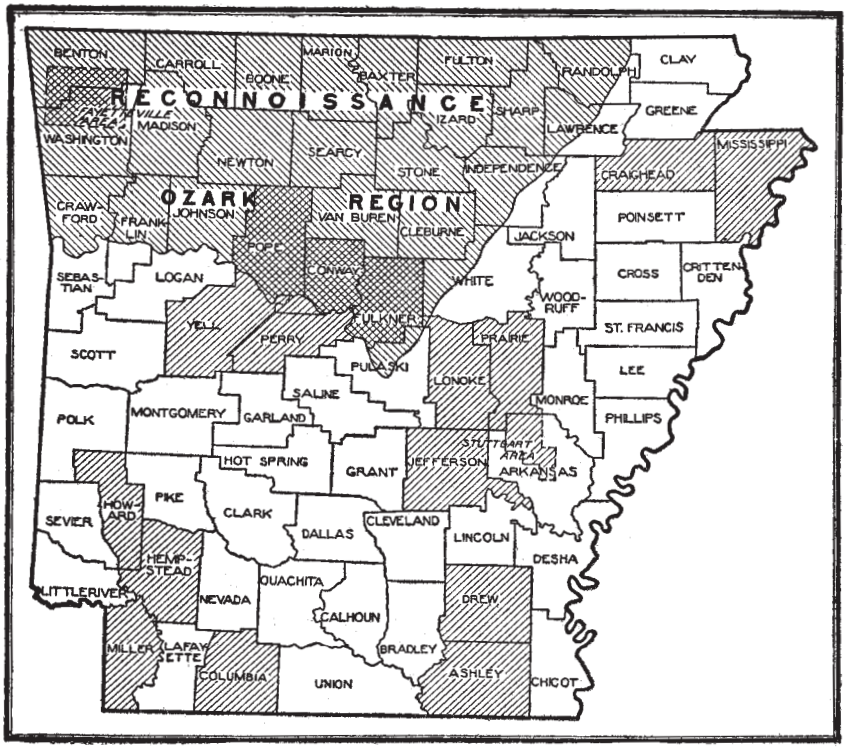

Areas surveyed in Arkansas, shown by shading.

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