U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF SOILS.

SOIL SURVEY OF PERRY COUNTY, ARKANSAS.

BY

E. B. DEETER, IN CHARGE, T. M. BUSHNELL, AND LOUIS A. WOLFANGER.

[Advance Sheets—Field Operations of the Bureau of Soils, 1920.]

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1923.

[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.]

CONTENTS.

ILLUSTRATIONS

FIGURE.

MAP.

SOIL SURVEY OF PERRY COUNTY, ARKANSAS.

By E. B. DEETER, In Charge, T. M. BUSHNELL, and LOUIS A. WOLFANGER.

DESCRIPTION OF THE AREA.

Perry County, Ark., is situated slightly northwest of the center of the State. The Arkansas River forms the eastern third of the northern boundary and the greater part of the eastern boundary. The county is very irregular in shape. Its greatest dimension east and west is 38 miles and its greatest dimension north and south is 20 miles. It is one of the smaller counties in the State and has a total area of 552 square miles, or 353,280 acres.

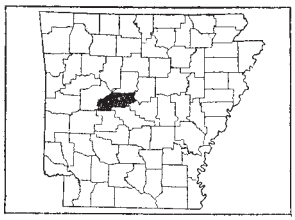


FIG. 15.—Sketch map showing location of the Perry County area, Arkansas.

Perry County is situated entirely within the Ouachita Mountains, which extend from Little Rock, Ark., to Atoka, Okla., a distance of 200 miles. Viewed in a general way, the area consists of mountains which have relatively flat or smooth tops or consist of long belts of parallel ridges with relatively sharp crests. The valleys range from narrow and V-shaped erosions to those having a maximum width of 5 miles. The wider valleys have broad strips of first and second bottoms along the streams, and the adjacent valley slopes are gently rolling to hilly, with numerous minor ridges. The valleys in the southern part of the county are rather narrow.

The principal flat-topped mountain occurs in the northwestern part of the county, where it is known in different localities as Petit Jean Mountain, Rose Creek Mountain, and Round Mountain. That part situated in Perry County has a length of about 10½ miles. Its outer edge varies from steep to precipitous. The interior has been carved out by stream action to form a valley whose floor lies from 350 to 650 feet below the outer rim, which has a maximum elevation of about 1,100 feet above sea level. The slopes of this valley vary from steep to gentle.

South of Casa, Adona, and Perry lies a wide belt of folds or linear ridges, coming in from Yell County, which extends in a direction slightly north of east, nearly to the Arkansas River. This system of ridges, with a maximum width of 3½ miles at the western boundary, gradually becomes narrower until it tapers off to a blunt point at its eastern extremity. The dominating ridge, traversing the center of this range, is known in its different parts as Fourche Mountain, Fourche Pinnacle, and Toms Mountain. The main ridge has only a few low gaps, but the minor folds have been cut through in many places. The ridges are in some places even-crested and in others

show pronounced local differences in elevation. Northwest of Perryville there are a number of prominent spurs, the highest of which, Fourche Pinnacle, is about 1,250 feet above sea level. With few exceptions, the slopes are steep and rough, even the lower ridges being quite stony. South of the Fourche Mountain, and separated from it by Fourche la Fave River, is another and wider system of ridges. The structure here is also a series of folds, but there is a radical difference in the topography, owing to the almost entire absence of strongly defined spurs and the fact that, in addition to long, steep slopes, there are also extensive areas which are gently sloping. This belt, which is about 5 miles wide, extends through the entire length of the county. The elevations vary from 650 to 1,200 feet above sea level.

The southern part of the county is characterized by rough, mountainous topography. This rough region includes practially all of T. 2 N., R. 21 W., and T. 2 N., R. 20 W.; and east of this it continues in a strip, 1 mile to 4 miles wide, along the entire southern border of the county. The ridges of this section have steep slopes and narrow crests and are generally thickly covered with rock débris. The slopes are traversed by numerous gullies and stream courses, which carry water only for a short time after rains. In some places the country of this rough topography has little semblance to a ridge, but rather has the appearance of a huge mountainous mass that has been deeply and somewhat irregularly carved and dissected by streams, forming deep gorges and narrow V-shaped valleys. Several high peaks resemble a steep-sided cone in shape. Prominent mountains and pinnacles, from west to east, are Potato Hill, 1,500 feet; Brushy Mountain, 1,850 feet; Deckard Mountain, 2,000 feet; Forked Mountain, 1,400 feet; Flatside Pinnacle, 1,800 feet; and North Fork Pinnacle, 1,600 feet.

The floors of the broader valleys vary from almost level to billowy and gently rolling or undulating, a large proportion of the land having sufficiently smooth topography for easy cultivation.

Almost all of the county drains east into the Arkansas River, with the Fourche la Fave River as its main feeder. This stream traverses the county from west to east, through a winding, tortuous channel. In the western two-thirds of the county the current is swift where it pours over numerous shoals which occur along its course, but in the eastern part the stream has more nearly reached base level, and its waters are generally deeper and flow more quietly. Throughout its course this river is fed by swift-flowing affluents. The main tributary is the South Fourche la Fave River, which, with its feeders, drains most of the southern part of the county. Maumelle Creek drains the southeastern part of the county.

The northern part of the county is drained by Big Creek, Rose Creek, and Cypress Creek. The first two unite and flow into Petit Jean Creek in Yell County, while the last, flowing eastward, empties directly into the Arkansas River. The only drainage that does not empty into the Arkansas River is in the extreme southern part of the county, where the waters of a few minor streams eventually reach the Ouachita and Saline Rivers.

Nearly all of Perry County is well drained. The exceptions are the outer edges of the bottoms along the Fourche la Fave River, the swampy area at Perry, and small "slashy" areas in the valleys.

Perry County was organized in 1840. That part of Conway County lying south of the Arkansas River was taken from Perry County in 1872. The first settlers came from Tennessee, Mississippi, Georgia, and other States east of the Mississippi River. Most of the population is of native birth. A number of people of German descent live in the vicinity of Bigelow, and some Italians live along the county line south of Ledwidge. In recent years a number of northern people have settled in the county. About 90 per cent of the population is white. The negro population is confined almost entirely to the Arkansas River bottoms, but a few negroes live in the vicinity of Houston and Bigelow. With few exceptions, the mountain areas are uninhabited, settlement being confined to the country along the railroads and the valleys of the Arkansas, Fourche la Fave, and South Fourche la Fave Rivers, and Rose Creek.

According to the 1920 census, the population is 9,905. None of the towns contain more than a few hundred people. Bigelow, Graytown, Fourche, Houston, Perry, Adona, and Casa are trading points along the Chicago, Rock Island & Pacific. Perryville, the county seat, Aplin, and Nimrod are the important towns in the Fourche Valley.

The main line of the Chicago, Rock Island & Pacific, between Memphis, Little Rock, and Oklahoma City, traverses the northern part of the county. The Fourche River Valley & Indian Territory Railway branches off from the Rock Island at Bigelow and extends 30 to 40 miles southward into the mountains, where it subdivides into numerous branches that are used for the transportation of logs to the large mill at Graytown. The use of trucks for transportation is increasing, but heretofore their use has been restricted by bad roads. Some of the roads connecting the principal towns are now being improved. A recently constructed steel bridge across the Arkansas River at Morrillton, Conway County, has facilitated communication with Perry County. There are still many frequently used public roads which are in very bad condition because they receive little or no attention. In the more remote and thinly populated sections roads are not only few in number, but even these few are covered in places with cobbles and bowlders, or follow the courses of streams, crossing and recrossing them at fords. This makes it impossible to haul even moderately heavy loads, and consequently precludes the profitable and efficient marketing of farm and forest products. Telephone service varies from fair to good, although lines do not reach into many parts of the county.

Most of the towns and more thickly populated settlements have good schools, but the length of the school term is in some cases rather short.

Products of the county are shipped to such points as Little Rock, Memphis, St. Louis, and Kansas City.

CLIMATE.

The climate of Perry County is characterized by short, moderately cold winters, long hot summers, moderate extremes of temperature, excessive humidity, and a fairly heavy rainfall.

There is no Weather Bureau station in Perry County, but the table below, compiled from the records of the station at Hot Springs, Gar-

land County, is believed to represent fairly the local climatic conditions. Records cover a period of 25 years. The station has an elevation above sea level of about 600 feet.

Normal monthly, seasonal, and annual temperature and precipitation at Hot Springs, Garland County.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1916).	Total amount for the wettest year (1890).
	°F.	°F.	°F.	Inches.	Inches.	Inches.
December	44.4	81	0	4.30	1.49	2.61
January	43.2	79	−1	5.10	8.76	6.39
February	46.1	82	−12	3.87	2.13	5.91
Winter	44.6	82	−12	13.27	12.38	14.91
March	53.2	93	9	5.08	1.30	9.03
April	63.0	94	26	6.06	2.55	12.95
May	69.6	97	31	6.01	1.82	6.36
Spring	61.9	97	9	17.15	5.67	28.34
June	77.1	106	45	4.74	5.50	9.72
July	81.1	107	51	4.54	2.65	4.18
August	79.5	108	43	3.83	5.91	3.83
Summer	79.2	108	43	13.11	14.06	17.73
September	75.0	105	37	3.58	1.73	12.62
October	63.7	98	24	2.70	1.59	2.25
November	52.6	87	14	4.47	3.29	5.00
Fall	63.8	105	14	10.75	6.61	19.87
Year	62.4	108	−12	54.28	38.72	80.85

The mean annual precipitation at Hot Springs is somewhat over 54 inches. It is, if anything, high for Perry County. The records at Little Rock, Dardanelle, and Mena show about 49, 44, and 50 inches, respectively. The average annual snowfall is not large, and a snowfall of as much as 4 to 6 inches does not occur frequently, and snowfall of about 20 inches, like that of January, 1918, is very unusual. Prolonged periods of rainy weather may occur during almost any month of the year, but the greatest amount of rainfall commonly occurs in March, April, and May. September and October are the driest months. There are periods of high temperatures and no rainfall, when crops may suffer and thereby give a low yield, but a total failure is practically unknown.

During the hot summer months the rate of evaporation is high, and as the rainfall of the thunderstorms runs off quickly, the crops are more or less subject to injury by drought. Loss is greatly lessened where cultural methods are practiced which increase the moisture-holding capacity of the soil, such as deep preliminary breaking of the soil and frequent shallow cultivation to maintain an efficient dust mulch.

The mean annual temperature is 62.4° F. and the extreme range 120°, or from −12° F. to 108° F. Such extremes are of rare occurrence, and when they do occur they are of short duration.

Killing frosts have occurred as late as May 1 and as early as October 10. The average date of the last killing frost in the spring is April 5 and of the first in fall November 1. This gives an average growing season of 210 days. Accordingly, the season is long enough to mature a wide diversity of crops, and it also permits the growing of two crops, such as potatoes, during the same season. Forage crops, such as cowpeas or soy beans, may follow grain crops, such as oats and wheat.

AGRICULTURE.

The first settlers in Perry County selected the higher valley lands, which were more easily cleared of timber than the more fertile bottom lands, the former supporting a forest without undergrowth, while the latter were covered with a growth of hardwoods, with a dense undergrowth of cane, briers, vines, and hardwoods.

The early agriculture included crops that were necessary to supply the actual wants of the settlers. Chief among these crops were corn, oats, wheat, and garden produce. Very little hay was made, and not much attention was paid to the feeding of livestock, cattle, and hogs, which were allowed the free range of the mountains, which at that time afforded good grazing and in season much mast. Oxen were used largely for hauling and farm operations. Hunting, fishing, and trapping were an important source of income.

Little cotton was grown as a money crop before the Civil War. About 1865 the first gin was built on the Arkansas River. It was operated with horsepower and had a capacity of 3 bales of cotton a day. The fertile Arkansas River bottoms were then gradually placed in cultivation, cotton became of increasing importance, and steamboats came up the Arkansas River, and also up the Fourche la Fave River to Perryville, which became an important trading center and river town. Old Louisburg, on the Arkansas River, also handled a large volume of business. The rafting of logs to Little Rock, via the Fourche la Fave and Arkansas Rivers, became an important industry.

With the building of the Rock Island Railway in 1900, however, the river traffic ceased almost entirely and the importance of some of the early places waned, much of the trade of the county being diverted to the railroad.

In the period of 1903 to 1906 the value of the timber was fully recognized, and the demand for land greatly increased, resulting in the taking up of many homesteads, and also of a large acreage of timber and stone claims. The title to a large acreage of these homesteads has passed from the original patentee to lumber companies and speculators. Large areas of virgin pine are now being rapidly cut over through operations of these lumber companies. Most of the desirable tillable land on homesteads now owned by individuals is being farmed or, where in forest, is being held for future farming.

The land over a large area in the southern part of the county was withdrawn from entry in July, 1906, and was created a national forest in April, 1907. Since that time the examination of the tracts for which an application has been filed has resulted in the granting of fractional homesteads containing only that part of the tract which the Forest Service officials considered suitable for agriculture.

The following table shows the acreage and production of the four principal crops of Perry County in 1879, 1889, 1899, 1909, and 1919, as reported by the Federal census:

Acreage and production of leading crops.

Year.	Cotton.		Corn.		Oats.		Hay and forage.	
	Area.	Production.	Area.	Production.	Area.	Production.	Area.	Production.
	Acres.	*Bales.*	*Acres.*	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Tons.*
1879	5,082	3,314	6,469	134,935	842	11,119	127	94
1889	11,219	4,252	9,176	210,555	1,052	24,214	618	654
1899	11,508	5,549	13,250	246,240	1,905	28,730	285	269
1909	13,882	4,619	13,726	212,183	1,003	11,368	1,615	1,941
1919	13,973	4,494	14,810	224,481	795	13,322	4,551	3,999

The table below shows the actual and relative values of different classes of products for the year 1919:

Value in 1919 of farm products by classes.

Product.	Value.	Relative value.	Product.	Value.	Relative value.
Crops:	*Dollars.*	*Per ct.*	Livestock and products:	*Dollars.*	*Per ct.*
Cereals	433,905	21.1	Animals sold and slaughtered [1]	179,292	8.7
Other grains and seeds	3,222	.2	Dairy products (excluding home use)	75,795	3.7
Hay and forage	89,420	4.3	Poultry and eggs	78,908	3.9
Vegetables	183,594	9	Wool, mohair, and goat hair	302	(2)
Fruits and nuts	42,623	2.1	Honey and wax	1,411	.1
All other crops (principally cotton)	962,733	46.9	Total value	2,051,205	

[1] This item was not reported in the 1920 census. The value given is only approximate, and is based on the assumption that the ratio of the value of animals sold or slaughtered to the value of all domestic animals on farms was the same in 1919 as in 1909.

[2] Less than one-tenth of 1 per cent.

These tables show that cotton is the leading crop in Perry County. It has approximately the same acreage as corn and a total value that is much greater. In 1879 the acreage of cotton was less than that of corn; in 1889, however, this condition was reversed, and since that time cotton has been the chief cash crop, with a steady increase in acreage. Economic conditions determine to some extent the acreage planted to cotton, and weather conditions cause a wide variation in the number of bales produced. The yield in 1916 was 5,867 bales; in 1917, 6,103 bales; and in 1918 it fell to 3,629 bales. The average annual production is between 4,000 and 5,000 bales, with an average yield of about one-third bale per acre. Maximum yields are as high as one bale per acre. Not much attention is paid to growing a good variety of cotton, and seed of inferior, short-staple varieties is too frequently used. Rowden is a variety that is coming into favor. The best yields of cotton are obtained on the Portland, Yahola, and Bastrop soils, although the loam types of the Waynesboro, Hanceville, and Conway series produce fairly good yields.

Cotton is planted in April or early in May, in rows about 3 feet apart, and chopped or thinned with hand hoes to stand from 12 to

14 inches apart in the row. It is usually planted on low, flat ridges. The crop is cultivated two to four times, and as a rule is laid by late in July. Picking commences in September and often continues into December.

About 163 tons of commercial fertilizer were brought into Perry County in 1919, and most of this was used for the cotton crop. Most of the mixtures contain from 10 to 12 per cent of phosphoric acid and 1.65 to 2 per cent of nitrogen. Fertilizer is not used on cotton in the Arkansas River bottoms, and this is also true of many farms in the adjacent uplands. The use of fertilizer, however, is increasing. It is said to improve both the quality and the yield of cotton.

The boll weevil and army worm have been active, but thus far not enough damage has been done to discourage planting the crop. In many cases cotton is not protected properly before it is sold, and as a result it deteriorates in quality.

Corn is next to cotton in importance. The crop is used almost entirely on the farm, mainly for feeding livestock. The acreage devoted to corn has increased steadily from 6,469 acres in 1879 to 14,810 acres in 1919. The lands most highly esteemed for corn production are the first-bottom soils, such as the Pope silt loam, and the Casa, Yahola, and Portland soils. Generally not much attention is paid to varieties, and little care is used in the selection of seed. Early June, White Wonder, St. Charles, and Johnson County are among the varieties grown. Planting is done from April to the middle of May. Plows for two horses or mules are coming into common use, but a few one-mule plows are still in use. As a rule, the soil is plowed to a depth of 3 to 5 inches. Shallow, poor plowing is rather common. Where it is desired to get the soil warmed up early, as in a late season, or on low, wet ground, the land is "bedded up," and the corn is planted on low ridges. On the other hand, corn is often planted on the level so as to secure as much moisture for the crop as possible. The old method of a deep cultivation at "laying by" time is being rapidly discarded in favor of shallow cultivation. The corn crop is harvested by snapping the ears. Some leaves are pulled for fodder, but very little corn is cut for silage or fodder. The fertile alluvial lands yield from 25 to 50 bushels of corn per acre, and the better upland soils from 18 to 25 bushels per acre. However, on a large proportion of the land the yields are very low, and the average yield per acre for the county is about 15 bushels. Crabgrass and cocklebur are common, and in limited areas Johnson grass is troublesome.

Oats were grown on about 1,700 acres in 1919, mainly in small fields on a relatively large number of farms. Practically all of the crop is sown in the spring, usually in February or March.

The greater part of the crop is cut and fed as hay during the winter months, but some of it is threshed. Yields vary from 12 to 20 bushels per acre. The estimated acreage of wheat for 1919 was 1,500 acres. Yields as low as 5 to 10 bushels per acre are common.

Hay and forage are increasing in importance. According to the census, the area of these crops increased from 1,615 acres in 1909 to 4,551 acres in 1919. Notwithstanding this marked increase, not enough hay and forage is grown in the county to maintain the farm live stock, and much hay and feed is imported annually. Bermuda grass

and alfalfa produce excellent yields in the Arkansas River bottoms. Alfalfa does particularly well on the limy soils of the bottoms. Oats, lespedeza, cowpeas, redtop, sudan grass, and native wild grasses are the most common crops used for hay. Corn, sorghum, and kafir constitute the coarse forage. Timothy and clover do not appear to thrive, although better soil preparation and liming might remedy the unfavorable conditions.

Irish potatoes are grown in small fields for home consumption. Red Triumph is a common variety, and Burbank is also grown. Potatoes are planted the latter part of February and early in March. Yields average 65 to 100 bushels per acre.

Sweet potatoes, mainly of the Nancy Hall variety, are being more extensively grown. In addition to those grown for home use, about nine carloads of the 1919 crop were shipped from Casa. Yields as high as 150 and 200 bushels per acre are obtained on sandy bottom soils. The crop also is said to do well on sandy hill land, which is not considered very productive. Black rot is beginning to appear.

Vegetables are grown almost entirely for home use, but there would seem to be an excellent opportunity for the development of the trucking industry. Strawberries, muskmelons, and watermelons are grown only in small patches. Peaches are grown successfully, but there are no large commercial orchards. From 2 to 10 carloads of peaches are shipped annually from Adona, most of the crop coming from Round Mountain. Small apple orchards are scattered over the county, but it is said that many of the trees do not thrive. With proper pruning, spraying, and fertilization, fruit generally would give better results. The 1920 census reports 12,124 peach trees of bearing age, with a production in 1919 of 16,285 bushels; 5,852 apple trees, with a yield of 8,845 bushels; and 5,305 grapevines. Blackberries grow wild in abundance.

About 16 per cent of the total value of all farm products in 1919 was derived from livestock. The census report shows that on January 1, 1920, there were in the county 7,522 cattle, 269 sheep, 763 goats, 7,430 hogs, and 34,702 chickens.

The herds of cattle vary in size from a few to several hundred. Usually the cattle are not of very high grade. They subsist mainly on the open range in the mountains, on private and public land. Often they are not fed enough during the winter, and consequently are in poor condition in the spring. One ranch of about 20,000 acres has recently started operations with about 1,000 cattle. Dipping for the cattle tick is now being enforced. Dairying is not practiced to an important extent. Hogs running loose generally support themselves the greater part of the year. Small flocks of sheep and a number of herds of goats are scattered over the county. The goats easily maintain themselves on this range without attention.

In general the valleys are settled and well farmed and produce good crops, but with the large area of unused ridge and mountain land the total agricultural production of the county is much less than that of many counties in the State of equal size. The varied surface features of the county have had a marked influence on the selection of farm lands. With few exceptions the cultivated areas are confined to the alluvial belts along streams and the adjacent terraces and gentle valley slopes. In the southern part of the county some of the ridge crests are wide enough to allow cultivation, and in the south-

eastern part some mountain areas of gently rolling topography are being farmed.

The Arkansas River bottom soils are recognized as the best for cotton and alfalfa. Owing to their high lime content, they are especially suited to alfalfa. Corn is also successfully grown. The Pope silt loam, largely developed along the Fourche la Fave River, is highly esteemed for corn production, and probably more corn is grown on this soil type than on all the others combined. The alluvial Casa fine sandy loam, the second-bottom Waynesboro fine sandy loam, and the upland Hanceville fine sandy loam are the types most frequently used for growing sweet potatoes. Poorly drained soils are generally used for hay production and for pasture.

The mules and horses employed for farm work range from poor to good, with tendency to be rather light in weight. The census reported 1,765 mules and 1,581 horses in the county in January, 1920. Work animals are kept up and fed during a part of the cropping season, but during the rest of the year they are allowed mainly to shift for themselves, being given only a little supplementary feed. A few farm tractors are now in use.

Heavier plows and improved farm machinery are gradually displacing the light equipment which has usually been associated with poor farming. Farm buildings are for the most part inexpensive. Some of the barns are of good size, but more of them are small log structures. With cotton as the main crop, however, not much storage room is required.

Definite crop rotations are not usually practiced, and cotton or corn is frequently grown on the same field year after year, or in some cases these two crops are alternated. In a few instances a crop of oats or wheat is followed by cowpeas the same season.

There has been a decided change in labor conditions. Five or six years ago efficient farm laborers could be obtained at $1 a day and at $12 to $18 a month. At the present time (1920) the laborers available are said not to be the most efficient, and wages are $2 to $3 a day, with the monthly wages ranging from $40 to $50. Negro laborers are often employed in the Arkansas River bottoms and in the near-by country, but through the rest of the county the laborers are white.

According to the 1920 census, there are 1,265 farms in the county, with an average size of 68.6 acres, of which 51.5 per cent, or an average of 35.3 acres, is classed as improved. The farms range in size from a few acres to several hundred acres, but excepting one ranch of 20,000 acres, part of which is in Pulaski County, there are few very large farms. About one-fourth of the total area of the county is included in farms. Thousands of acres of forest and cut-over lands are owned by lumber companies. Except along the Arkansas River, there are not many farms that do not include a tract of woodland.

The 1920 census report shows that about 55 per cent of the farms are operated by owners and the rest by tenants. The 1880 census reported 79 per cent of the farms operated by owners. Some landowners direct the operation of their tenants from the home farm, while others live in the small towns or in near-by counties and leave the operations entirely to the initiative of the tenants. Cash rent is the prevailing system in the Arkansas River bottoms, the rentals ranging from $15 to $20 an acre.

The common share-cropping systems prevail in the rest of the county. Where the tenant furnishes the work stock and implements, the landlord receives one-third of the corn and one-fourth of the cotton. Where the landlord provides the outfit, the crops are equally divided.

The selling price of land varies greatly. At present (1920) land values are considerably above normal. Cut-over mountain lands may be bought for $10 to $15 an acre. Good farms in the southern part of the county, but remote from markets, may be had at $15 to $25 an acre. In Fourche Valley and along the Chicago, Rock Island & Pacific Railway fair to very good land sells at $20 to $75 an acre. In the Arkansas River Valley the prices range from $50 to more than $200 an acre.

Lespedeza is a promising crop for the alluvial soils, especially those of poor drainage, which require expensive levees to protect them from overflow. The crop can be successfully grown on such land for pasturage and hay, since overflows do not kill it out. The same is true of Bermuda grass.

Peanuts probably could be made a profitable crop on the well-drained sandy soils. On similar soils in Texas, notably in the East and West Cross Timbers belts, peanuts have in recent years become a very important commercial crop for the production of oil, peanut meal, and peanut hay. The crop is also very profitably grown on well-drained sandy soils of the Coastal Plain region of Georgia and Alabama as a field forage crop for hogs. It is believed it could be used successfully here for these purposes on the better drained sandy lands.

Much rough and stony mountain land in this county, while possessing little or no value for the tilled crops, can be used for pasturing live stock—cattle, hogs, mules, sheep, and goats. A number of native grasses and plants growing in this rocky, rough country afford nutritious and cheap grazing on an extensive scale.

SOILS.[1]

Primarily a country of linear mountain ridges and intervening valleys, the region in which Perry County is located is generally known as the Ouachita Mountains. The upland soils are classified as belonging to the Appalachian Mountain province and are residual from fine-grained and very fine grained sandstone, arenaceous shale, and argillaceous shale. These rocks are of sedimentary origin, the few fossils that have been found being probably of Lower Carboniferous age. The shales have weathered and eroded more rapidly than the sandstones and now largely constitute the soil-forming rock of the lowland or valley areas, while the more resistant sandstones are left as steep-sided and generally narrow-crested ridges. Petit Jean Mountain, in the northwestern part of the county, represents the only area of considerable size where the rock strata still lie in a hori-

[1] The soils of Perry County do not join with those of Yell County. The failure to join is due mainly to the greater detail in which the Hanceville soils are mapped in Perry County. In Yell County broad belts of Hanceville soils were mapped as units, while the same belts in Perry County have been divided into Hanceville stony fine sandy loam, Hanceville stony loam, Hanceville stony loam, steep phase, Hanceville gravelly fine sandy loam, Hanceville very fine sandy loam, Hanceville fine sandy loam, Hanceville loam, and Rough stony land. Further lack of uniformity is due to the establishing of the Casa series to take care of the reddish-brown alluvial soils which were mapped in Yell County with the Pope series.

zontal position. In the southern part of the county quartz fragments are abundant on the surface and in the soil. These have come from quartz veins in the shales, the quartz being more resistant, persisting after removal of the shale by weathering. This quartz has contributed little if anything to the fine material of the soil, and no special classification was deemed necessary because of its presence.

The processes above described have effected topographic features which determine the area of tillable land in the region. On the steep ridge slopes there are rock outcrops and an abundance of sandstone fragments, which features, with the steep gradient, make such areas of little or no agricultural value, while the valley soils, largely derived from shale, are almost free from rock fragments, have a much smoother topography, and constitute an important part of the farm lands of the county.

According to the mode of origin of the soil material, the soils of Perry County are divided into two groups, (1) residual soils, or soils derived in place from the rocks underlying them, and (2) alluvial soils, or those formed from sediments deposited during stream overflows. Residual soils cover much the larger part of the county, though the alluvial soils are perhaps of equal or greater present economic importance.

On the better drained uplands, including the greater proportion of the uplands—the ridges, slopes, and gentle rolling areas in the valleys—the subsoils are uniformly reddish and generally moderately friable, but are rather stiff in small areas where argillaceous shale constitutes the parent rock. In the poorer drained valley areas, the flats and depressions, the subsoils are mottled yellowish and grayish and are generally compact; in places they have the nature of hardpan and contain much dark-colored concretionary material. A soil condition intermediate between the soils having red subsoils (Hanceville series) and those having mottled yellow and gray subsoils (Conway series) occurs where the upper subsoil is reddish and the lower subsoil, or lower part of the 3-foot section, is yellow or mottled yellow and gray; but the areas of this intermediate soil are not very extensive, and the soil has been mapped as Hanceville loam, valley phase.

The alluvial soils are of two principal kinds with respect to origin, (1) those washed from the upland soils of the area and showing no evidence of free lime carbonate either in the 3-foot section or the substratum and (2) those containing some wash brought down from the dry plains region of Oklahoma and Texas by the Arkansas River. The latter soils are confined to the first and second bottoms of the Arkansas River and to the lower courses of tributary streams, where backwater causes the deposition of Arkansas River sediments. The peculiar Indian-red material of the Arkansas River, which is unlike the brick-red and lighter red materials of the other soils of the area, is found at some depths nearly everywhere in the true Arkansas alluvium. This material contains enough free lime carbonate or lime concretions, or both, to effervesce freely with hydrochloric acid, either in the subsoil or substratum. On some of the more poorly drained flats of the second bottoms the old alluvium of the Arkansas River, with Indian-red, highly calcareous clay at depths of 5 feet or more, has been so altered by processes of weathering that the material has

been changed in its apparent physical features to a grayish soil with mottled grayish and yellowish subsoil, in places containing black concretionary material in the lower subsoil. In the flat terrace area about 5 miles southeast of Perryville, for example, a soil has been formed from river alluvium, which, through processes of weathering, has been made to resemble in physical characteristics another soil of the area, the Conway silt loam, which is residual from shale.

The soils of Perry County are grouped in soil series on the basis of similarity in origin, color, topography, and structural characteristics. Each series is divided into soil types, the units of soil mapping, on the basis of difference in texture or the proportion of finer and coarser particles composing the surface soil. Twenty-eight types, representing 13 series, and 2 miscellaneous types, classed as Rough stony land and Riverwash, have been mapped in this survey.

In this report the various soils are described as they occur in virgin or uncultivated areas. In considering colors, also, some allowance must be made for the fact that the colors of soil materials when in an air-dry condition are lighter and less intense than under moist field conditions.

The Hanceville series consists of types with light-brown to reddish-brown surface soils, and red, moderately friable subsoils mottled in places with yellow in the lower subsoil. The topography varies from gently rolling in the valleys and over the broader mountain tops to very strongly rolling or mountainous. The soils are derived from sandstones and shales, which in places appear to be higher in iron-bearing minerals than the rocks giving rise to the Dekalb soils so extensively developed through the Appalachian Mountains from Alabama to New York State. These soils are the most extensive in the county.

The types of the Conway series are typical valley soils. The surface soils are light brown to yellowish or grayish brown and the upper subsoil is yellowish; the lower part is generally mottled yellow and gray. Iron concretions occur throughout the 3-foot section. In places a ferruginous hardpan is developed in the lower subsoil. The Conway soils are largely derived from shales. Low, dome-shaped mounds are common, but in general the surface varies from gently undulating to flat. Drainage is fair to poor.

The sediments forming the alluvial or first-bottom soils of the county have come from two distinct and widely separated sources. The soils developed from materials derived from sandstone and shales of the near-by uplands are classed in the Pope, Atkins, and Casa series.

The types of the Pope series are characterized by brown surface soils and a light-brown to yellowish-brown subsoil. These soils consist of alluvial material washed principally from sandstone and shale areas and from areas of related sedimentary rocks. They do not contain wash from limestone formations, or at least have not been influenced by calcareous material to any important degree.

The types of the Atkins series are characterized by the gray color of the surface material and by the compact, dense structure and the gray or drab or mottled grayish, yellowish, and drab color of the subsoil. They are subject to overflow and are poorly drained between overflows. The material consists entirely or very largely of wash

from soils derived from sandstone and shale or related sedimentary rocks. The Atkins series is the gray equivalent of the Pope series.

The Casa series consists of types with brown to reddish-brown surface soils, underlain by a reddish-brown to brownish-red friable subsoil, which in places grades into yellowish red or reddish yellow in the lower subsoil. The red color is probably due in part to the red color of the uplands (chiefly Hanceville soils) from which the material has been derived. These types are subject to overflow, but are well drained between overflows. In Perry County the Casa soils are confined to the relatively narrow bottoms of swift-flowing streams issuing from the ridges and mountains.

In marked contrast to the above-mentioned alluvial soils are those found along the Arkansas River and the lower courses of its tributary streams. While the alluvium undoubtedly contains some of the same materials—that is, local sandstone and shale sediments—it includes enough material transported from the Permian Red Beds region of western Oklahoma and Texas to impart to the soils a characteristic chocolate-brown or Indian-red color. These soils usually contain free lime carbonate. They have been classed in the Portland, Yahola, and Perry soils.

The Portland series includes some of the best soils in the county. The types are characterized by the brown or chocolate-brown color of the surface soil and by the salmon-red, light pinkish red, or Indian-red color of the subsoil. Grayish, reddish, and brownish mottlings occur here and there in the subsoil. The material is alluvial in origin and contains material derived from the Red Beds region, usually enough to impart an Indian-reddish color to the lower subsoil.

The types of the Yahola series are characterized by the Indian-red color of the surface soil and the lighter color and lighter texture of the subsoil. The extremely sandy types may vary from Indian red to brown or chocolate brown in the surface. In their surface soils the Yahola types are similar to the Miller soils, having the same Indian-red color and the same structure; but they differ considerably in the subsoil, both in the lighter texture, usually sandy, and the lighter color. Generally the color is light Indian red but in places it is almost gray. The series is confined to the overflowed stream bottoms. The reddish color of the material is due to the presence of sediments from the Permian Red Beds region.

The Perry series includes types with bluish or bluish-gray to gray surface soils, generally mottled with rusty brown, underlain by a light-gray to bluish-gray subsoil, mottled in places with rusty brown, yellowish brown, or pale yellow, and containing occasional splotches of reddish. The deep substratum consists of Indian-red, or chocolate-brown to salmon-red, or mottled reddish and yellowish material, and in places contains lime concretions. The series differs from the Portland in that it has poorer drainage, contains more gray, and typically does not have the Indian-red or chocolate-brown material, within the 3-foot section; but it does have this in the substratum. These soils occur in the poorly drained, low-lying areas along the Arkansas River bottoms, and its tributaries, the undrained areas being covered with water during much of the year. The material is derived from the same source as the Portland soils.

The terraces, or second bottoms, situated well above present-day overflow are the remnants of older bottoms deposited by the streams when they flowed at much higher levels than are now attained by even deep overflows.

The soils on terraces composed of material transported from the local sandstone and shale soils have been classed in the Waynesboro and Holston series. The soils on terraces composed in part of materials deposited by the Arkansas River have been included in the Teller, Bastrop, and Muskogee series.

The types of the Waynesboro series are characterized by the brown to reddish-brown color of the surface soil and the dull-red to brick-red color and friable structure of the subsoil. Water-rounded gravel and cobbles of sandstone, quartzite, and other rocks are of common occurrence. These soils occupy old stream terraces which in places have been considerably eroded. The drainage is well established.

The Holston series consists of types with yellowish-brown to brown surface soils and a yellow subsoil. In the lower part of the 3-foot section mottling of yellow and gray occurs over most of the silt loam type, which was mapped in Perry County. The series is developed in terrace positions which are only fairly well drained.

The Teller series includes types with light-brown to grayish-brown surface soils and a yellow to red or brick-red friable subsoil. These soils occupy old, high stream terraces which are well drained. They are derived in part from water-transported material which was carried hundreds of miles from residual prairie soils to the west before being laid down in Perry County.

The types of the Bastrop series have brown or chocolate-brown to brownish-red surface soils and a reddish-brown to Indian-red subsoil. The series represents in part old alluvial material brought down by streams from the Permian Red Beds and deposited as terraces, now lying entirely above overflow.

The types of the Muskogee series are characterized by the gray, grayish-brown or yellowish-brown color of the surface soil, the yellowish color and generally friable structure of the heavier subsurface layer, and the yellow, mottled yellow and gray, or mottled gray, yellow, and red color and plastic structure of the heavy clay subsoil. Weathering has reached an advanced stage in the surface soils, but it is not always so complete in the subsoil. Drainage varies from fair to poor. These soils include in part material washed from the plains and prairie regions of Texas and Oklahoma.

Rough stony land is a nonagricultural type which consists mainly of steep slopes having considerable rock outcrop, and large quantities of rock fragments.

Riverwash consists of a very low-lying mixture of sands, silts, and clays, subject to frequent overflow by the river, and having little value for farming.

The different soil types are described in detail in subsequent pages. The names and the actual and relative extent of the soil types mapped are given in the table on page 507.

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Hanceville stony loam	10,624	46.8	Hanceville fine sandy loam	3,456	1.0
Steep phase	154,560		Teller very fine sandy loam	3,328	1.0
Hanceville stony fine sandy loam	40,320	11.4	Atkins clay	2,944	.8
Hanceville loam	14,016	6.7	Conway loam	2,816	.8
Valley phase	9,408		Holston silt loam	2,432	.7
Rough stony land	19,200	5.4	Muskogee silt loam	2,240	.6
Pope silt loam	15,616	4.4	Portland very fine sandy loam	1,664	.5
Casa fine sandy loam	11,136	3.2	Pope fine sandy loam	1,408	.4
Hanceville gravelly fine sandy loam	10,112	2.9	Muskogee silty clay loam	1,216	.3
Atkins silty clay loam	8,000	2.3	Yahola very fine sand	1,152	.3
Waynesboro loam	6,336	1.8	Yahola very fine sandy loam	1,152	.3
Conway silt loam	6,080	1.7	Bastrop clay	1,024	.3
Perry clay	5,440	1.5	Bastrop silt loam	448	.1
Casa loam	5,056	1.4	Riverwash	320	.1
Portland clay	4,224	1.2	Yahola silty clay loam	256	.1
Hanceville very fine sandy loam	3,712	1.0	Total	353,280	.....
Waynesboro fine sandy loam	3,584	1.0			

HANCEVILLE STONY FINE SANDY LOAM.

The surface soil of the Hanceville stony fine sandy loam consists of about 4 to 6 inches of a light grayish brown to brown fine sandy loam, which passes into light yellowish brown to light reddish brown fine sandy loam. The subsoil below 8 to 12 inches is a red, brownish-red, or yellowish-red fine sandy clay, clay loam, or clay. The lower 6 to 12 inches of the 3-foot section is in places a bright-red friable clay splotched with yellow, the result of the presence of partly decomposed fragments of rock. The surface 1 or 2 inches is sometimes dark brown to almost black in color over small areas owing to the presence of an abundance of organic matter from leaf mold. The surfaces of fields which have not been cultivated for a week or two, often have a decided grayish to brownish-gray appearance. Angular fragments of sandstone are strewn over the surface, and they occur through the soil section in places, but not everywhere. Along some of the slopes of the smaller stream courses, where the channels have been cut from a few feet to 10 or 12 feet deep, the rock fragments are large and abundant. Such areas really constitute a different soil, but they occur in such narrow and irregular belts that many of them can not be shown on the map. The larger areas of this character have been mapped as Hanceville stony loam, steep phase. Bedrock is encountered in many places at depths of less than 3 feet, but there is little rock outcrop. The type differs from the Hanceville stony loam, steep phase, chiefly in having a smaller content of rock fragments and milder relief.

This type is extensive and is well distributed throughout the county. The largest areas are found on Petit Jean Mountain, Fourche Mountain, between the Fourche la Fave and South Fourche la Fave Rivers, on Cedar Mountain, Main Mountain, and east of Thornburg. The type occurs in long, narrow strips on the crests of ridges, and in wide, irregular belts along gentle slopes of ridges and mountains. The elevation above sea level ranges from about 500 feet on the lower slopes to over 1,000 feet on the mountain crests. The slope areas vary from gently undulating to moderately steep and rolling. The mountain and ridge tops are generally level, with only small local differences in elevation.

With little exception, drainage conditions are good, the run-off being carried by main valley streams, whose numerous short tributaries carry the rainfall from the adjacent slopes. The ridge tops have small poorly drained depressions.

Although the type has a fairly large extent, it is of little importance in the agriculture of the county, probably not over 5 per cent of it being in cultivation. Pine, oak, and hickory constitute the principal forest growth. Blackjack oak is common on the higher elevations. Much of the larger merchantable timber has been cut.

Corn and cotton are grown to a small extent. The yields are generally low. Sorghum, Irish potatoes, and sweet potatoes, while not extensively grown, return fair yields, and appear to be adapted to the soil. Native grasses[2] flourish over practically all of the forest areas. Cattle are allowed to graze during the greater part of the year, with some supplementary feeding during the winter months.

The farming is not of an intensive type and the cultivated areas are usually small. Commercial fertilizers are seldom used. There are a number of cleared areas which represent abandoned homesteads, and on most of these the soil has been lying fallow for such a length of time that it now constitutes land which may be as desirable and fertile as any other parts of the type.

The average selling price of the Hanceville stony fine sandy loam is about $10 to $20 an acre, and large tracts that include other types of rougher topography can be bought considerably cheaper. The low prices are due largely to inaccessibility and to the care that is required to prevent erosion over much of the type.

The soil in its natural state is loose and friable, admits air and water freely, and generally the quantity of rock fragments is not sufficient to interfere seriously with cultivation. The common methods of farming employed quickly deplete the supply of organic matter, allow the soil to become more compact, and make the land more subject to erosion.

Deeper plowing and more frequent cultivation would increase the moisture-holding capacity of the soil. One of the greatest needs is to maintain the supply of organic matter, which can be done by growing green-manure crops, such as cowpeas or soy beans. Soil washing could be prevented by terracing and by growing winter cover crops, such as rye or vetch. This type seems to be especially adapted to the growing of grapes, peaches, and apples on the more accessible areas, but success will not be obtained without spraying and pruning. Lime probably would be beneficial, especially where it is desired to grow the clovers.

HANCEVILLE STONY LOAM.

In virgin areas the surface soil of the Hanceville stony loam consists of about 2 or 3 inches of dark-brown loam, containing much organic matter, underlain by 6 or 8 inches of reddish-brown to yellowish-brown loam, with a relatively high content of fine and very fine sand in places. The subsoil is a reddish or brownish-red friable clay loam, which is underlain at depths ranging from about 10 to 15 inches by red moderately friable clay or sandy clay, splotched with yellow here and there in the lower subsoil, where fragments of partly

[2] Named under Hanceville stony loam, steep phase.

decayed rock are present. Fairly large fragments of sandstone are abundant in places, and generally small fragments are common on the surface and in the soil and subsoil. In many places bedrock is reached at depths of less than 3 feet. A few long but very narrow strips of rock outcrops have been indicated on the map by the proper symbols. As mapped the type includes many areas of stony fine sandy loam too small and patchy to show separately.

A variation from the type occurs in several extensive areas along the south side of Fourche la Fave River, beginning east of Walnut Grove School and extending eastward to sec. 34, T. 4 N., R. 18 W., a distance of almost 7 miles. Here the type appears to have been strongly influenced by the waters of the river at a time when they flowed at a much higher level than at present. Subsequent erosion has removed most of the sediments which must have been deposited at that time, and the soil material is now practically identical with that of the typical soil. However, the surface is still covered with large quantities of well-rounded stones of sandstone and quartzite, varying from a few inches to a foot in diameter. These are seldom imbedded in the soil section to any appreciable depth. The underlying sandstone and shale strata are encountered in many places at depths of less than 3 feet and may be seen in road cuts.

The Hanceville stony loam is mapped over many widely scattered sections of the county. Its largest single development lies in the southeastern corner of the county, principally along Maumelle and Brown Creeks and their tributaries. Other important but scattered areas occur north and south of Bigelow, in the vicinity of Perryville, and southwest of Casa.

This soil occupies low ridges and hills and their moderately steep slopes, and flattish, gently sloping areas along the base of hills and ridges. Drainage is generally good, the surface water being carried off through steep-sided channels and gullies, which usually have a fairly steep gradient.

Very little of the type is in cultivation, largely because the soil is stony and more desirable farm lands are still available. However, nearly all of this soil can be farmed. The rock fragments will interfere somewhat with cultivation, but generally they are not so large or abundant as to form a serious hindrance. Their presence in the soil make it readily absorptive of moisture, so that steeper slopes can be cultivated with less danger of erosion than would be the case with similar slopes occupied by soils less pervious to rainfall. The stones on the surface also tend to retard erosion.

Most of the original forest growth has been removed, but there is still a considerable stand of pine, oak, and some hickory, which should furnish saw timber in 10 or 15 years.

Land composed of the Hanceville stony loam type has a sale value of $10 to $25 an acre.

A few small areas of Hanceville shale loam occur to the northwest of Bigelow. Several of these areas lie along the Bigelow-Houston Road, beginning 1 mile west of the fair grounds. This soil is unimportant both in extent and use, and is included with the Hanceville stony loam. It consists of brown shale loam passing at 2 or 3 inches into yellowish-brown shale loam, and this at about 7 to 10 inches into yellowish-red or brick-red friable clay or clay loam, with brick-red clay at 10 to 15 inches. Below depths of 10 to 20 inches yellow-

ish and dark-colored, partly decomposed, shale fragments constitute the mass of the material. Where the depth to shale is shallow the clay subsoil lies immediately beneath the surface layer. In a few spots, apparently where the shales are more argillaceous, the subsoil is a plastic, heavy clay, mottled red, yellow, and gray. Shale fragments are plentiful on the surface and in the surface soil and upper subsoil.

In a small area on the Bigelow-Houston Road, just north of Mill Creek, the soil is slightly heavier, being a red or brownish-red friable clay loam, passing at 5 to 8 inches into red clay of a friable or moderately friable structure. Decomposed bed shale is reached at depths of 10 to 20 inches.

This shale loam is derived from typical valley shales which have weathered only to shallow depths. The soil characteristically occupies gentle slopes. Drainage is good to excessive. Hickory, oak, and red haw are the principal growths. A little cotton is grown. The soil is inclined to be droughty. The best use for much of it would probably be as pasture and farm woodlots.

Hanceville stony loam, steep phase.—Hanceville stony loam, steep phase, as mapped, includes steep areas of Hanceville stony loam and Hanceville stony fine sandy loam. The colors and textures are about the same as in those types. In many places, however, the surface soil is shallower, the friable red to yellowish-red clay loam or sandy clay loam subsoil being encountered at depths of 5 to 8 inches. This phase is not uniform in texture and structure over wide areas, owing to the variation in quantity and distribution of rock fragments and to the varying depths of the fine material. The stones consist mainly of sandstone fragments, which in places cover the surface and continue through the soil section. In other places they are strewn over the surface in moderate quantities, so that it is possible to bore to a depth of 3 feet with the soil auger. Locally the stones consist of shale fragments, and in the southern part of the county quartz fragments are common. The depth of both surface soil and subsoil varies considerably. The depth of the weathered material ranges from a few inches to 30 feet, or possibly more. In places the surface soil rests directly upon the bedrock, and in other places there is only a thin subsoil layer betwen the soil and the underlying rock. Near the foot of steep slopes the soil material is in part colluvial and varies both in depth and character. Outcrops of massive sandstone occur on the summits of ridges and here and there on the slopes.

The steep phase is generally associated with areas of Rough stony land, but the two have been mapped separately over the greater part of the county. In the southern part, however, the land classification completed by the United States Forest Service was used to some extent in mapping the soils. This classification did not differentiate between the two, as they are both nonagricultural in character. During the present survey, however, several of the larger and more prominent areas of Rough stony land were mapped separately, but undoubtedly some smaller areas of Rough stony land are included in the steep phase in T. 2 N., R. 20 W., and T. 2 N., R. 21 W., and along the county line in T. 3 N., R. 18 W., and T. 3 N., R. 19 W. These areas are inaccessible and altogether unsuited for agriculture.

The steep phase of the Hanceville stony loam is by far the most extensive soil in the county, occupying 43.8 per cent of its total area.

Two mountain belts, separated by the Fourche Valley, varying from 1 to 6 miles in width and stretching across the entire length of the county, are covered chiefly by this phase. Large mountain tracts in the southern part of the county, occupied mainly by the steep phase, are easily the most prominent natural features of the region.

The topography is rough and mountainous. The ridges have steep, rugged slopes and narrow crests. Some of the crests are almost level, and others are featured by prominent spurs and peaks, many of which have been mapped as Rough stony land. The elevation above sea level ranges from 500 feet to 2,000 feet. The main higher ridges of the different ranges have only a few deeply cut gaps, but the minor ridges have been cut through more frequently. Drainage conditions vary from good to excessive. The surface waters are carried down the steep slopes, through gullies and ravines, to narrow V-shaped valleys, whose swift-flowing streams during periods of heavy rainfall often cause serious damage to fields, fences, and crops where they enter and traverse the larger valleys. The smaller stream channels usually become dry during the summer months, but most of the streams of any appreciable size have deep pools that are connected by water flowing under the dry, rocky channels.

Because of the steepness of slope, excess of rock fragments, and susceptibility to erosion, this soil is not used for farming. Practically all of it is forested with pine, oak, and scattering hickory. The higher elevations commonly support a growth of pine, blackjack oak, and post oak. Lumber companies have removed much of the virgin timber, principally pine, and the remainder is being rapidly removed. Native grasses grow rather abundantly. The leading grasses are poverty grass (probably *Aristida gracilis*), wild oat-grass (*Danthonia spicata*), broom sedge (*Andropogon virginicus*), and a grass (*Panicum villosissimum*) not known by any common name.

Cattle and hogs owned by people living in the valleys are allowed to graze in the mountains, where they subsist upon grass, bushes, mast, roots, and berries. The sedge grass is eaten by cattle when it is tender and succulent, but as it becomes tougher and drier it is avoided by them. There are very few fences and the range is practically open. During the short and moderately cold winter season the cattle are brought in from the range and fed on cotton seed and a little roughage; in a few instances concentrates are fed. The practice of "burning over" the forest is still followed by some people with the idea that the grass will grow earlier and better in the spring if the blanket of leaves on the ground is removed.

A large area of this phase, in the southern part of the county, is included in the national forest reserve. Here timber is sold and cut and live stock is permitted to graze under certain restrictions. The rule several years ago, which is probably still in force, was that 25 head of cattle or their equivalents, 50 hogs or 75 goats, could be grazed free of charge in the Arkansas National Forest. For every head in excess of that number a small fee is charged. The fee for cattle is 35 cents. Most of the remainder of the phase is owned in large areas by lumber companies and speculators. The cut-over land is for sale at $10 to $15 an acre, with lower prices for large tracts.

In the present state of development the chief uses of the large areas of this soil are for pasturage and forestry. The rough topography and the number and size of the rock fragments make any other agri-

cultural use impossible. In places where the soil is favorable the slope is too steep, and in other places the conditions are reversed. In countries where land is scarce similar land has been reclaimed by the removal of stones and the construction of terraces, but the general inaccessibility and low productiveness of this soil do not now warrant the expenditure of time, effort, and money that would be required for such improvements. The type is not so stony and rough as the average Rough stony land; it supports better forests and affords better grazing, and more of it can be used for forestry.

The practice of "burning over" the forest is not a good one. The fires which occur almost annually over large areas not only injure the range, destroy the supply of mast, and promote the growth of thickets, but they also prevent the accumulation of organic matter, which, when decayed, forms humus, a very essential factor in maintaining soil fertility. Furthermore, tender and succulent grasses are either injured or killed, while the larger and coarser grasses and thickets, which frequently survive a forest fire, increasingly occupy the land.

Water and pasturage are abundant, and if better winter feeding is practiced and the cattle tick is stamped out the cattle business should be profitable. A second growth of pine is growing, and within 10 or 15 years, or in some cases 20 years, it will give a valuable crop of timber.

HANCEVILLE GRAVELLY FINE SANDY LOAM.

The surface soil of the Hanceville gravelly fine sandy loam is a light-brown gravelly fine sandy loam passing at a depth of 3 or 4 inches into brownish-yellow or reddish-yellow gravelly fine sandy loam. The subsoil, beginning at about 12 inches, is a dull-red to yellowish-red friable clay, sandy clay, or sandy clay loam. With increase in depth the subsoil becomes streaked or splotched with yellow, owing to the presence of decomposed and partly decomposed sandstone. In places, especially in small depressions and in narrow strips along stream courses, the subsoil is yellow, and some mottlings of gray occur in the lower part. The gravel consists of small, angular fragments of sandstone and other arenaceous rocks, with comparatively few large stones. In some small areas the soil is much less gravelly than typical and constitutes a fine sandy loam, but these areas are not large enough to be mapped separately.

The largest areas of Hanceville gravelly fine sandy loam occur in the southeastern part of the county in the vicinity of Thornburg, principally south, and in the vicinity of Wye. A long strip lies south of the headwaters of Brush Creek, occupying the level crest of a high ridge. Except in this area, the type occurs on gentle slopes of ridges and in slightly undulating to steeply sloping and dissected country. There are numerous deep, V-shaped gullies, and the drainage is good to excessive.

Not over 15 to 20 per cent of the area of this soil is in cultivation, the remainder being forested with pine and oak. Most of the large timber has been logged off.

Corn, cotton, and fruit are the principal crops. The type is considered better for corn than for cotton. Corn ordinarily yields 12 to 20 bushels per acre. Cotton does not fruit well and averages only one-fourth to one-third bale per acre. Some thrifty orchards of apples

and peaches are located on the type, and grapes are grown successfully. Minor crops are sorghum, oats, and wheat. The forested areas are used for grazing cattle. Cultural methods vary from poor to fair. The depth of plowing is usually 4 or 5 inches, and not much attempt is made to prevent washing away of the soil.

A large part of the type is made accessible by means of roads and the Fourche River Valley & Indian Territory Railroad, and some of it is not far from Bigelow on the Chicago, Rock Island & Pacific. Much of the cut-over land is for sale at $10 to $15 an acre, and farms can be bought for $20 to $30 an acre.

The principal needs of the soil are deeper plowing, the addition of organic matter by means of legumes (cowpeas) in the rotation, winter cover crops (rye or vetch), and terracing to prevent erosion. Applications of acid phosphate and lime are necessary for the best yields.

HANCEVILLE FINE SANDY LOAM.

The surface layer of 1 or 2 inches of the Hanceville fine sandy loam is a dark-brown fine sandy loam, the dark color being caused by decaying organic matter. Beneath this, to a depth of 6 or 8 inches, the soil is brown to light yellowish brown fine sandy loam, which passes into light reddish brown fine sandy loam. Between 12 and 24 inches the subsoil is an orange-red, yellowish-red, or buff friable fine sandy clay, and the lower third of the 3-foot section is a bright-red and yellow friable fine sandy clay, the yellow color being caused by partly decayed sandstone material. A few angular sandstone fragments are found over the surface and through the soil section and bedrock may be encountered at depths of 18 inches to 3 feet. In road cuts the type in places shows a deeper red than is typical of the subsoil. In cultivated fields the soil has either a decidedly brownish-gray appearance or, where surface washing has occurred, a brownish-red color. In air-dry samples the shallow surface layer is grayish brown, the rest of the surface soil light yellowish brown, with only a faint reddish cast in the lower part, and the subsoil is rather dull red in comparison to the bright red of the material in place.

This type is not extensive, but it occurs in a number of relatively small areas in widely scattered sections of the county. Some of the most important areas are on Round Mountain, the western end of Petit Jean Mountain, along the Aplin and Perryville Road, northeast of Perryville, and southeast of Nimrod. The first area occupies an almost level plateau, consisting of two distinct benches, with fairly steep to very steep sides, and the remaining areas are gentle ridge slopes and valley areas of gently sloping or slightly undulating topography. The drainage is good.

Although occupying only a small area, the Hanceville fine sandy loam is agriculturally important. Its freedom from stones and favorable topography make it a desirable farming soil, and about 90 per cent of it is under cultivation. Pine and red oak are the common trees.

Corn, cotton, and peaches are the chief crops grown. Corn yields an average of 15 to 25 bushels per acre and cotton one-fourth to one-third bale. One-half bale per acre is often obtained where fertilizer is used, but the soil is generally considered better for corn than for cotton. Elberta peaches are grown commercially on Round Moun-

tain. Spraying has not been attempted, but the necessity for it has become apparent. Stone dams and a few terraces have been constructed to prevent the washing away of the top soil during times of heavy rainfall.

In the more thickly populated sections land sells for $25 to $30 an acre; in the more remote places the price varies from $15 to $20 an acre.

Lime, barnyard manure, and legume crops, either alone or in combination, would aid in producing larger yields. The use of acid phosphate for cotton is also recommended. The prevalent system of farming, which makes no provision for maintaining the supply of organic matter, has resulted in a marked decrease in yields as compared with yields obtained on the newly cleared land. Many areas of this soil are adapted to the growing of fruit. This soil also should be especially desirable for growing vegetables.

HANCEVILLE VERY FINE SANDY LOAM.

The surface soil of the Hanceville very fine sandy loam is a brown to slightly reddish brown very fine sandy loam, underlain at a depth of 2 or 3 inches by yellowish-brown to reddish very fine sandy loam, which extends to a depth of about 10 inches. The soil is usually shallower where the surface is reddish. The subsoil is a bright yellowish red or brick-red clay or fine sandy clay to about 30 inches. Below this the subsoil is splotched with yellow or is reddish yellow or light reddish with splotches of bright red. Some small areas of Hanceville loam, gravelly loam, gravelly fine sandy loam, stony loam, and stony fine sandy loam are included in the type as mapped. Small angular fragments of sandstone and arenaceous shale are very common on the surface and in both the soil and subsoil. Bedrock is reached within the 3-foot section in some places. In air-dry samples the surface soil is commonly light brown to light yellowish brown, and the subsoil is a rather brownish red, with some yellowish red in the lower part.

This type is confined to the eastern part of the county, where it occurs in two regions. One of these begins 2½ miles northeast of Bigelow and continues in a northeasterly direction for about 3½ miles. The other begins at Houston and extends south and southwest from that town. The type occupies slopes, ridges, and gently rolling to undulating valley areas. Drainage is generally good.

Cotton and corn are the principal crops. Cotton yields one-fourth to one-third bale per acre and corn from 12 to 20 bushels. A number of farmers are using fertilizer on cotton at the rate of 150 to 200 pounds per acre, and usually better yields are obtained when this is done. Oats and sorghum are commonly grown for hay. The soil is easy to cultivate and is regarded as among the best upland soils in the county.

Most of the type is well situated with reference to markets and roads, and it sells for $25 to $50 an acre.

The methods for improvement are about the same as recommended for the Hanceville fine sandy loam. Applications of 400 pounds instead of 200 pounds per acre of commercial fertilizer for the cotton crop should be tried in an experimental way, as it is believed that the results would more than pay the increased cost.

HANCEVILLE LOAM.

The surface soil of the typical Hanceville loam is a brown to reddish-brown loam, 6 to 10 inches deep, generally containing a relatively large proportion of fine or very fine sand. In places the surface layer of 2 or 3 inches is dark brown, owing to the presence of organic matter. The subsoil is a yellowish-red, brownish-red, or brick-red friable clay loam or sandy clay loam, passing at 12 to 15 inches into a brick-red or, in places, a yellowish-red, friable clay or sandy clay. The lower part of the subsoil locally contains splotches of yellow, representing either partly decomposed rock or limonitic material. In air-dry samples the soil colors are less pronounced, the surface soil being a light reddish brown and the subsoil having a rather subdued brownish red as the dominant color.

The Hanceville loam is residual from sandstone and arenaceous shale, with some local influence from finer grained or argillaceous shale. As mapped the type includes small bodies of Hanceville very fine sandy loam, stony loam, gravelly loam, and gravelly fine sandy loam, and in addition includes some variations. Bedrock or partly decayed bedrock is reached within the 3-foot section in many places, and fragments of sandstone and occasionally of shale are present in the soil and subsoil. On lower slopes the lower subsoil is reddish yellow or even yellow in places, with occasional gray mottling. These areas were developed under conditions caused apparently by subsoil seepage from the adjacent slopes. The larger areas of this kind have been mapped as Hanceville loam, valley phase. In a few places the material of the lower subsoil is stiffer than the upper subsoil, rather plastic in spots, and locally mottled yellowish and grayish.

The Hanceville loam occurs in small to fairly large areas, and it is scattered over widely separated sections of the county. It is well developed in the vicinity of Bigelow, 2 to 3 miles south of Perryville, east of Adona, in Rose Creek Valley, in the vicinity of Casa, and along Brown Creek. The type occupies gentle to moderately steep slopes and smooth to rather hillocky areas in the valleys. It is generally intermediate in elevation between the higher stony types of the Hanceville series and the lower Conway soils or the lower alluvial soils. Most of the type is well drained, but the internal drainage is imperfect in some small areas.

The Hanceville loam is one of the most important upland soils of the county. At least 95 per cent of it is in cultivation, with cotton and corn as the chief crops. Many small fields are devoted to oats, mostly for hay. Minor crops commonly grown are wheat, kafir, cowpeas, peanuts, Irish potatoes, sweet potatoes, strawberries, garden vegetables, and fruit. The average yield of cotton is about one-third bale per acre. If the land is run down or the season is unfavorable, the yields are lower. On the other hand, by means of good farming yields of one-half to three-fourths bale occasionally are obtained. The corn yield usually ranges from 12 to 20 bushels per acre. Oats do fairly well, but wheat does not fill well and returns low yields. Cowpeas and peanuts are easily grown, sweet potatoes yield from 75 to 100 bushels per acre, and Irish potatoes average from 60 to 90 bushels. Strawberries do well, and the peaches are of good quality, but apples, pears, and plums do not thrive, being

subject to blight and disease. Cattle and hogs are kept on nearly every farm and are pastured in the neighboring mountains and forested valley areas.

The Hanceville loam is usually an early soil; gardens are often planted in February, and during a fairly mild winter plowing is started in January or February. Cotton is usually planted on smoothed ridges and corn is either planted level or on ridges. Commercial fertilizer is not widely used, but some farmers apply 150 to 200 pounds per acre for cotton.

At the present time (1920) land is selling at $20 to $50 an acre, nearness to towns and the character of improvements being the most important factors influencing prices.

Cotton and corn easily occupy the largest acreage, and the practice of leaving the fields bare after gathering the crops is bad, because the winter rains leach and wash away the valuable surface soil and form gullies in the fields. In addition not enough attention is given to the maintenance of an adequate supply of organic matter for maximum crop production. Winter cover crops, such as rye or vetch, should be more commonly grown to prevent destructive washing and add organic matter to the soil, and legumes, such as peanuts, cowpeas, and soy beans should be included more frequently in the rotations.

Practically all of the upland soils are low in lime, and it may be good farm practice to use some. Since lime purchased in small quantities is rather expensive, cooperative buying of lime in carload lots is suggested. Commercial fertilizers containing phosphoric acid and potash probably can be profitably used. Nitrogen could be supplied, in part at least, by growing the legumes at frequent intervals, but it can also be supplied in the form of fertilizer or manure.

A more thorough preparation of the seed bed should be strived for, by deeper plowing, more thorough harrowing, and the more widespread use of the drag or roller.

Yields could be readily increased by giving more attention to the selection, care, and testing of seed for planting.

In many seasons the yield of corn and even of cotton is reduced by drought, but more commonly by "laying by" the crops too early. This loss could be prevented in part by frequent shallow cultivations continued as long as possible, which would not only conserve moisture, but would also keep down the ever-present crab grass and cocklebur, which rob the crops of plant food and moisture.

Many farmers do not produce enough hay and feed for their own needs, but grow mainly cotton, buying feed for their work stock and other cattle. Under a better type of farming, with a greater diversification of crops this feed could be economically grown at home. The production of live stock, Irish potatoes, sweet potatoes, sorghum for sirup, vegetables, strawberries, grapes, peaches, and peanuts can be easily adapted to conditions in Perry County.

Hanceville loam, valley phase.—The surface soil of the Hanceville loam, valley phase, is a reddish-brown to brown loam to a depth of 3 or 4 inches, passing into yellowish-brown loam, which continues to a depth of 10 inches. The subsoil is a red to yellowish-red friable clay loam to a depth of about 24 inches, below which it is a pale-yellow silty clay that becomes mottled with gray and brown at 30 inches and generally contains some concretionary material. This phase is like the typical Hanceville loam in the surface soil and upper subsoil,

but the lower subsoil is yellowish or yellow, mottled with gray, resembling the subsoil of the Conway types. As mapped the phase includes patches of Hanceville loam, very fine sandy loam, and fine sandy loam and Conway silt loam.

This phase occupies valley floors consisting of undulating areas, low hillocks, ridges, and flats with dome-shaped mounds, averaging much smoother or more flattish than the typical Hanceville loam. Much of the soil is exactly like the typical Hanceville loam in its physical features, but there is on some of the flats and gentle low slopes and in depressions a phase or gradational soil (gradational between Conway and typical Hanceville) having imperfect drainage in the deep subsoil. If there had been much of this kind of soil it would have been mapped in a different series. The surface drainage is generally good and the underdrainage is fair to good, with the exception noted.

This soil is mapped in many parts of the county, with large representative areas occurring from beyond Lipsmeyers Store, northeast of Bigelow, to about 2½ miles west of Houston. Several large areas of the phase occur west of Perry in the vicinity of Rocky Cypress Creek, where in places the topography has a terracelike appearance. Another fair-sized area lies 3½ miles southeast of Perryville.

A very large proportion of this soil is used for producing about the same crops as are grown on the typical Hanceville loam, principally cotton and corn, and the yields are generally about as good. The more poorly drained spots do not produce quite as high yields, and are frequently used for pastures or hay land. A large percentage of this land lies in close proximity to the Chicago, Rock Island & Pacific Railway, and the average selling price is as high as that of the typical Hanceville loam.

The improvements suggested for the Hanceville loam are recommended for its valley phase. In addition, much of the soil needs underdrainage, and it appears to be valuable enough to warrant the installation of tile drains.

CONWAY LOAM.

The typical Conway loam consists of about 4 or 5 inches of a brown to light-brown loam or light loam, grading into brownish-yellow to yellowish-brown loam, and at about 10 inches into pale-yellow silty clay loam to silty clay, which is somewhat friable. Below a depth of about 15 inches the subsoil is mottled yellow, gray, and sometimes brownish red. Generally it contains some black concretions, and in places the concretions are numerous both on the surface and through the soil.

On the mounds that occur here and there the soil is a reddish-brown fine sandy loam and represents a valley phase of the Hanceville fine sandy loam—that is, a soil intermediate between the Hanceville and Conway soils—with a reddish soil and upper subsoil and a yellow to mottled yellow and gray subsoil. Another variation occurs north of Mulberry Church, where a strip lying north of the creek bottoms consists of light-brown loam, underlain by yellow to pale-yellow, moderately friable fine sandy clay, mottled in the lower subsoil with gray, and containing an abundance of dark concretionary material, enough in places to make it difficult to bore into it with the soil auger. Included with the Conway loam are small patches of Conway fine sandy loam and very fine sandy loam. Some areas, such as that at Casa, also

include small spots of the valley phase of the Hanceville loam and of Conway silt loam. A good many small bodies of the Conway loam have been included with the Conway silt loam owing to their patchy distribution.

This type occupies higher and slightly more undulating valley areas than the Conway silt loam. Most of it occurs in the valleys of Big Creek and Rocky Cypress Creek, beginning at Casa and extending about 1½ miles east of Adona, and in small areas in the South Fourche Valley. The type does not occur in the larger valleys, and its restriction to relatively narrow valleys suggests the conclusion that the soil is not derived entirely from the underlying shales, but that the sandstones underlying the near-by slopes have also contributed to the soil formation and have furnished enough gritty material to form a loam. It is also likely that in places the surface soil has been modified by colluvial material, particularly where the subsoil consists of silty clays and rather heavy clays. The drainage is fairly good to rather poor.

This type is not extensive, but practically all of it is in cultivation to cotton and corn, its favorable topography, freedom from stones, and fair degree of productiveness making it a desirable farming soil. Newly cleared land has yielded as high as 1 bale of cotton per acre, but the usual yields vary from one-third to one-half bale. Corn yields from 15 to 25 bushels per acre. The soil does not warm up as quickly as the Hanceville loam and can not be plowed quite so early, but it is better than the Conway silt loam in this respect.

Most of the type is valued at $25 to $50 an acre, and only a few remote areas would sell for less.

In addition to the general recommendations given under Hanceville loam, the soil would be especially benefited by improved drainage and probably also by applications of lime. Yields gradually decrease, particularly on the mounds, if the supply of organic matter is not maintained.

CONWAY SILT LOAM.

The surface soil of the Conway silt loam is a yellowish-brown to grayish-brown silt loam 8 to 10 inches deep. When dry the soil has a light-brown color, with a slight grayish cast. The subsoil is a mottled yellow and gray silty clay loam, grading at about 15 to 18 inches into silty clay, mottled pale yellow and gray, with reddish brown here and there. The lower subsoil in places is compact and rather plastic. Small concretions are locally abundant on the surface and through the soil and subsoil.

In some areas, usually small and very poorly drained, gray is the principal color of the subsoil, and in places even of the surface soil, and the lower subsoil contains enough concretions and dark or brownish concretionary material to give it a decidedly compact or true hardpan character. In a low, narrow strip, adjacent to the bottoms of Big Creek, near Homewood, the lower subsoil is a yellow very tough clay, without concretions. The type has many mounds of a perfect dome shape, some as high as 6 feet above the surrounding flat soil, but averaging about 3 or 4 feet. The soil of these mounds has a deeper brown color, and in many places the mottled yellow and gray material does not occur above 24 to 30 or even 36 inches. Some of the mounds are occupied by Hanceville very fine sandy loam and

loam, and some by the valley phase soil described previously as an intermediate soil between true Hanceville and true Conway. Shale chips of the parent rock are present in places in the lower subsoil and fragments of sandstone are abundant on some of the mounds. Some patches of Conway loam and Conway fine sandy loam are included, but where the areas are large enough they have been mapped as Conway loam.

The Conway silt loam is one of the typical residual valley soils. It is derived principally from dark-colored shales. The type occurs mainly in low areas in the wider valleys. The topography ranges from almost flat to very gently sloping, and the drainage is poor, particularly the lower subsoil. In a few low areas water stands for some time after periods of rainfall. Important areas lie near New Dixie and Houston, 3½ miles northwest of Perry, and west of Casa.

The total acreage of the type is relatively small, as there are few wide valleys. About 75 per cent of it is in cultivation to cotton and corn, the rest being used for hay and pasture land. Lespedeza and native grasses are fairly abundant. Willow oak, post oak, and hickory are the common trees. The soil is slow in drying out after rains, can not be plowed early, and is inclined to form clods. The better-drained areas are used for crop production. Cotton yields from one-fourth to one-half bale per acre and corn 10 to 15 bushels per acre. Oats are grown successfully on this soil, most of the crop being cut for hay. The selling price of this land varies from $20 to $35 an acre.

The soil should be improved by ditching or tiling. Addition of lime might prove profitable. Fertilizers containing a relatively high proportion of phosphoric acid in applications of 200 to 400 pounds to the acre have been used profitably for cotton. Cowpeas are very valuable for building up this soil.

WAYNESBORO FINE SANDY LOAM.

The surface soil of the Waynesboro fine sandy loam is a brown to reddish-brown fine sandy loam 8 to 10 inches deep. The subsoil generally is a deep-red or brownish-red fine sandy clay, which becomes somewhat lighter red in the lower part of the 3-foot section, but in places it is a light brownish red, heavy fine sandy loam, which grades at about 15 inches into red or yellowish-red fine sandy clay. Freshly plowed fields have a decidedly reddish cast. In some poorly drained depressions the soil is less red in color. Rounded and angular pieces of sandstone are found here and there on the surface and through the soil mass.

With the type as mapped are included a few areas not altogether typical. One of these areas occupies a high benchlike position on the south side of a small ridge about three-fourths mile southeast of Aplin. Here the soil consists of about 10 inches of a light-brown fine sandy loam, underlain by bright-yellow sandy clay, which passes at about 24 to 28 inches into mottled red and yellow friable clay, the red color increasing with depth. There are also included some areas of Waynesboro very fine sandy loam, such as those lying 2 miles southeast of Nimrod, 1½ miles southwest of Cherry Hill School, and 1¾ miles southeast of Perryville.

The more important areas of the typical soil occur 1 mile west of Walnut Grove School, 1 mile east of Pleasant Grove School, and in

several places northeast of Perryville. Many smaller areas occur in the South Fourche Valley, two of the largest being 1 mile east of the Hawk School and just east of the Ark School.

The Waynesboro fine sandy loam is developed on terraces or second bottoms, high above present overflow, and on a few alluvial strips along large mountain streams, where the elevation above overflow is not so pronounced.

The surface ranges from almost level to undulating, and the slopes to the first bottoms vary from gentle to rather steep and abrupt. Drainage is generally well established. In places the surface soil has been washed off to such an extent as to expose the red sandy clay subsoil, and some slopes have also been badly gullied.

The soil is fairly large in extent and of considerable economic importance, at least 90 per cent of it being in cultivation. The principal trees are pine, red oak, white oak, and sweet gum. Cotton and corn are the principal crops, and the yields are about the same as or a little better than those obtained on the Hanceville loam and fine sandy loom. Minor crops are oats, wheat, sorghum, Irish potatoes, and sweet potatoes. The use of commercial fertilizer for cotton is becoming fairly common, the rate of application being 150 to 200 pounds per acre.

The Waynesboro fine sandy loam is very susceptible to gullying and washing, and the building of terraces should be hastened to prevent the serious loss of surface soil. Probably of equal importance is the planting of winter cover crops, such as rye or vetch. Most of the type is very low in organic matter, and cowpeas should be planted in the corn at the last cultivation or should follow small-grain crops and be turned under as green manure. Commercial fertilizers containing phosphoric acid, applied to cotton at the rate of 300 to 400 pounds per acre, give increased yields. The use of lime probably would be beneficial.

WAYNESBORO LOAM.

The surface soil of the Waynesboro loam consists of about 10 inches of a brown to reddish-brown mellow loam. The subsoil is a reddish-brown or brownish-red to brick-red friable clay, showing little change within the 3-foot section, except that in places the lower subsoil is a slightly lighter shade of red, and sandstone gravel occurs locally below 20 to 24 inches. Small sandstone fragments appear on the surface in small quantities, being more abundant on the mounds. In a few places, as near Aplin, large quantities of cobblestones have been removed from the surface and collected into piles. Wells sunk in this soil almost invariably encounter beds of gravel and bowlders. The mounds are circular and somewhat flattish and consist of reddish-brown or light-red fine sandy loam to very fine sandy loam, grading into red clay loam and below this into friable red clay, with sandstone gravel in the lower subsoil.

There are included with the typical soil a number of areas, mainly between Aplin and Perryville, where the soil is intermediate between the Waynesboro and Holston soils. Here the surface soil consists of 8 to 10 inches of a brown to reddish-brown loam. The subsoil generally is a dull-red friable clay loam, passing at a depth of 18 to 20 inches into a yellow clay filled with black concretionary material, but

in places the subsoil is a yellowish-red to reddish-yellow clay loam, which, at about 18 to 24 inches, grades into a crumbly mass of mottled yellow and gray clay containing an abundance of black concretionary material. Throughout these variations are small areas of the typical Waynesboro loam and of Waynesboro very fine sandy loam, so that no practical separation could be made. However, the larger, more poorly drained areas have been mapped as Holston silt loam.

The Waynesboro loam occupies nearly level to gently undulating benches or terraces in the valleys of the larger streams, which drain the sandstone and shale uplands. Its greatest development is along the Fourche la Fave River, where large areas occur from 2½ miles west of Nimrod to Perryville. The town of Adona is situated on a typical area of this soil. Small areas occur along Maumelle Creek and in other parts of the county. Drainage is generally good, but is not so good where the type begins to merge into other types with poorer drainage.

This type is considered among the more desirable soils of the county, and it equals or surpasses the Hanceville loam in productiveness. The soil admits air and water freely and is quickly brought into a loose, crumbly condition by cultivation. Cotton averages from one-third to one-half bale, but ranges up to three-fourths bale per acre. Irish potatoes, sweet potatoes, and vegetables are grown with excellent results. Several thrifty peach orchards are located on the type. Some farmers apply about 200 pounds of fertilizer per acre, the ordinary mixture containing 10.60 per cent phosphoric acid, 1.65 per cent nitrogen, and 0.40 per cent potash. The average yield of corn is 15 to 25 bushels per acre. Barnyard manure and green-manure crops are not used to any extent. This land brings from $20 to $50 an acre.

The crop-producing power of much of the type has been lessened by its continuous use for the same crop, either cotton or corn. Rotations, including the legumes, and the growing of winter-cover crops should be adopted. Much of this soil has been in cultivation since the early settlement of the county, but little has been done to maintain its productiveness. Alfalfa should succeed on the better drained lands, with liberal use of lime and inoculation of the soil.

HOLSTON SILT LOAM.

The typical Holston silt loam consists of about 8 inches of a brown silt loam passing into pale-yellow silty clay loam, which grades at about 15 inches into a mottled pale-yellow, gray, or reddish-brown to yellowish-brown, heavy silty clay. When dry the surface soil is light brown.

In places there are numerous mounds, similar in shape to those on the Conway soils. The soil of the mounds varies from a loam to a fine sandy loam in texture and is brown in color, but becomes lighter brown with depth, and passes at about 12 inches into the subsoil. This is a pale-yellow heavy fine sandy loam which becomes heavier and more sticky with increasing depth. Mottled gray and pale-yellow sandy clay occurs locally at depths of 30 to 36 inches. Some of the depressions between these mounds are wet and "slashy," resembling the Tyler soils mapped along streams of the Appalachian Mountain

region. Here the surface soil is a mottled gray and yellow silt loam which passes at 8 or 10 inches into mottled gray and yellow silty clay loam, and this at about 15 to 18 inches into heavy gray or drab and yellow clay. A hardpan of black concretionary material is encountered here and there in the subsoil of these poorly drained areas, and in places the subsoil approximates a loam or fine sandy loam where local washing in of soil material occurs.

In contrast to these poorly drained spots there are a number of included areas that are better drained than the typical soil. In these the soil is a deep-brown silty loam, passing at 6 or 8 inches into bright-yellow silty clay, with mottlings of gray and red or yellow below depths of 18 to 24 inches.

The Holston silt loam occupies flat terraces and is closely associated with the better-drained Waynesboro soils, being likewise formed from sediments washed from the regional sandstone and shale soils and deposited when the streams flowed at much higher levels than at present. Drainage conditions are only fair to poor, being especially deficient in the subsoil. The type is confined mainly to the Fourche Valley. Large areas occur southeast of Nimrod and also east of Aplin for a distance of 6 miles.

Probably one-half of the Holston silt loam has been cleared, the rest being forested chiefly with pine, red oak, and willow oak. Lespedeza grows naturally. Crop yields depend largely upon the character of the drainage, cotton yielding from one-fourth to one-third bale per acre and corn from 10 to 18 bushels. Low, wet areas are commonly used for pasture.

Better drainage conditions are essential before the best yields can be obtained. The soil is particularly in need of lime and also needs more organic matter.

TELLER VERY FINE SANDY LOAM.

The soil of the Teller very fine sandy loam is a light-brown to grayish-brown loamy very fine sand to very fine sandy loam, passing at about 6 to 15 inches into brick-red or yellowish-red sandy clay. Locally the lower subsoil is reddish yellow or mottled reddish yellow and bright red and is more friable than the upper subsoil. Mounds are common in places, and between these the soil is more brown than on the higher lying areas without mounds. On the slopes there are eroded patches of clay and sandy clay loam. Indian-red calcareous clay in the deep substratum has been exposed in places by erosion.

Where the topography is nearly level or very gently sloping, the process of oxidation has been somewhat retarded, and the soil is a grayish-brown very fine sandy loam which passes at 8 to 12 inches into yellow or pale-yellow sandy clay, with mottlings of gray here and there below depths of 18 to 24 inches. Such areas represent an approach toward the characteristics of the Muskogee soils. There are some included patches of flat land where the original soil apparently was the poorly drained Muskogee silt loam, which has received a surface coating of very fine sandy loam by wash from higher elevations. In a few places, where the topography is somewhat undulating, the soil is a grayish-brown to brown loamy very fine sand, which passes at 18 to 24 inches into a yellow very fine sandy loam.

The Teller very fine sandy loam has the largest area of any of the terrace soils along the Arkansas River. Beginning at a point 1½ miles northeast of Bigelow, it extends northward in only slightly interrupted areas for a distance of 7 miles. The maximum width of the terrace is here about one-half mile. Another strip about 1¼ miles long lies just north of Dogtown. A large area occurs along the county line north of Perry. The type commonly occupies higher elevations than any other alluvial soil, and also seems to be of greater age. The topography in different localities affords considerable contrast in that it ranges from almost level to gently undulating, with slopes varying from gentle to steep. These changes from the probable original level surface have been brought about largely by erosion. On most of the type the drainage is good to excessive.

Only a small part of the Teller very fine sandy loam remains uncleared. The soil is more highly esteemed for cotton than for corn. Cotton, fertilized at the rate of 200 pounds per acre, averages one-third to one-half bale per acre. Small amounts of barnyard manure are also used. Yields of corn are not large, ranging from 15 to 25 bushels per acre. The type seems to be well adapted to the growing of peaches, strawberries, and peanuts. The soil warms up early and is adapted to vegetable gardening. Some steep slopes and rolling areas are covered with Bermuda grass, which is pastured or cut for hay. Land values are $25 to $40 an acre.

The areas having steep slopes that wash badly should be covered with Bermuda grass or, if cultivated crops are to be grown, the slopes should be terraced. The soil leaches easily, and therefore the growing of cowpeas and winter cover crops is especially beneficial.

BASTROP SILT LOAM.

The surface soil of the Bastrop silt loam, while extremely variable, generally consists of 5 or 6 inches of reddish-brown, brown, or yellowish-brown silt loam, which is underlain by a subsoil of heavy Indian-red silty clay. In places the upper subsoil is more of a brick-red color, with traces of yellowish-red. Lime nodules occur locally in the lower subsoil and nearly everywhere in the substratum.

The type is confined to areas that have been influenced by old alluvium from the Arkansas River. It occupies terrace positions above overflow, mainly on the slopes of small drainage ways, and the surface is generally sloping. One area 2 miles southeast of Houston, another 2½ miles northeast of Stony Point School, and a few other small areas constitute the entire development of this type in Perry County.

Post oak, red oak, and white oak are common trees. A part of the type is cultivated to cotton, which yields about one-half bale per acre, without fertilization.

BASTROP CLAY.

The surface inch or two in virgin areas of the Bastrop clay is a chocolate-brown silt loam or silty clay loam, containing considerable organic matter. Beneath this is a layer of 6 or 8 inches of a rather light-red clay, which passes into Indian-red plastic clay. In places the light-red layer is absent and the Indian-red plastic clay begins immediately below the shallow surface layer. Lime concretions

are present in the lower subsoil or in the substratum (the material below 3 feet) and generally the clay itself contains enough lime carbonate at depths of 3 feet or less to effervesce freely with hydrochloric acid. In places the subsurface layer ranges to brown. The subsoil also shows variations. In some areas just northeast of Bigelow the subsoil is mottled yellow and red and the Indian-red clay begins at depths of 3 feet or more. Locally this variation resembles the Muskogee types in the subsoil, but it has a more brownish surface soil, and for that reason has been included with the Bastrop clay. In places the subsoil is yellowish, with very little mottling.

The type generally occupies second bottoms of the Arkansas River and of the lower course of the Fourche la Fave River. Less commonly it occurs on the lower slopes of other terraces. The typically developed terrace areas are almost level to slightly undulating, while the slopes are gentle to steep. Drainage is generally good. The largest and most typical development of this soil is in the vicinity of Bigelow.

A large proportion of the Bastrop clay is in cultivation, with cotton, corn, and alfalfa as the leading crops. Oak is the principal growth on the forested areas. From one-half to three-fourths of a bale of cotton and 25 to 30 bushels of corn per acre are average yields. Three to four cuttings of alfalfa are made yearly. Fertilizers are not used. Recently the practice of "bedding up" cotton and corn has been giving way to the practice of breaking the land and planting on the level surface, and this is said to have increased yields. Some farmers do not break up the middles, but throw the furrow up on each side of the row and then plant on this bed after smoothing it off. Corn is first harrowed when 5 or 6 inches high. This is followed by one deep cultivation, after which shallow cultivations are given with a plow locally known as a "gee whiz." This is a strong, durable soil, valued at $75 to $150 an acre.

MUSKOGEE SILT LOAM.

The surface soil of the Muskogee silt loam is a yellowish-brown to grayish-brown silt loam, passing at 4 to 7 inches into yellow or mottled yellow and gray silty clay loam, which continues to a depth of 12 to 15 inches. The subsoil is a mottled gray to bluish-gray, yellow, and yellowish-brown silty clay. In places streaks of red occur in the lower subsoil, and the red color increases with depth until Indian-red, highly calcareous clay occurs in the substratum at depths of 4 to 6 feet. In spots this layer of Indian-red clay is relatively shallow, and the underlying shales are reached at depths of 6 or 8 feet, but in general this substratum layer appears to be considerably deeper than this. In places the lower subsoil is stiff, in other places it is compact and contains dark concretionary material.

This type is developed on terraces, now above normal overflow, which were deposited by flood waters of the Arkansas River when flowing at higher levels than at present. Unlike many of the soils of similar origin, the 3-foot section of this type is not calcareous nor shaded with Indian red or chocolate brown, probably owing to deep weathering and inhibited oxidation.

The type is mapped along the Arkansas River, about 4 miles northeast of New Dixie, at Bigelow, and in a number of smaller areas. It

is more extensively developed along the lower course of the Fourche la Fave River, where the areas show the influence of the Arkansas River backwater as far west as 2½ miles southeast of Perryville. The surface is usually flat and the drainage is generally poor.

At least one-half of this type is forested with pin oak, post oak, and hickory. Cotton is the most common crop, with an average yield of one-third bale per acre, although this yield is exceeded on newly cleared land. Oats, sorghum, and Bermuda grass are grown for hay.

This soil is inclined to turn up in clods unless it is plowed when its moisture content is decidedly favorable. It also becomes rather compact during rains and forms a surface crust. Practically the entire area of the Muskogee silt loam needs to be drained before it will produce maximum crops of cotton or corn. In its present natural condition most of it is adapted to pasturage and hay production.

Most of the land of this type sells for $20 to $30 an acre; near towns it brings higher prices.

MUSKOGEE SILTY CLAY LOAM.

The surface layer of the Muskogee silty clay loam consists of about 3 to 6 inches of yellow or yellowish-brown silty clay loam, mottled with gray. The upper subsoil is a mottled light-gray, pale-yellow, and yellowish-brown silty clay, containing in places some small concretions, which may also continue in the subsoil, and the lower subsoil is mottled bluish gray and yellow or reddish, or is salmon colored to Indian red with grayish mottlings. Both upper and lower subsoil contain small concretions in places. The substratum is Indian-red calcareous clay, and also contains lime concretions. On some of the better drained areas occupying faint slopes or higher ground the soil is a brownish silty clay loam, with grayish mottling, passing into mottled red and gray plastic clay, and this into yellow tough clay, which in turn grades into mottled yellow and dark Indian-red tough clay. On some of the mounds occurring in this type the soil is a brown silt loam and the subsoil a yellowish-brown silty clay with red mottling.

Four areas of Muskogee clay have been included with this type, because of their small extent. This clay soil has about the same characteristics as the silty clay loam, except that the heavy material begins at the immediate surface. The larger of two small areas, one-half mile northeast of Fourche, is an exception in which the material varies greatly. One boring showing mottled dark-gray to drab and brown clay, 15 inches deep, passing into dark-drab clay, and below 30 inches is a dark-brown to almost black clay. Another showed 6 to 8 inches of very dark brown clay, passing into dark-drab clay and this into mottled reddish and drab clay. One area of Muskogee clay lies less than one-half mile east of the Bigelow Fair Ground and another area lies 1¼ miles northeast of Lipsmeyers Store.

The typical silty clay loam is mapped just north of Bigelow, in other areas northeast of this for a distance of about 5 miles, and in one area a mile southeast of Houston. It occupies poorly drained flats, in many places in association with the Bastrop clay, which occupies the terrace slopes.

Very little of the typical soil is in cultivation. The principal forest growth consists of willow oak, post oak, spotted oak, and hickory. Yields of 12 to 15 bushels of corn and one-third bale of cotton per

acre were noted. Sorghum does well. At least part of the clay soil appears to be more productive, yielding one-half bale of cotton per acre, after incurring injury from the boll weevil. In one instance about $500 worth of broom corn was sold from a crop grown on 1½ acres. All this land must be drained before the best yields are obtainable.

POPE FINE SANDY LOAM.

The typical Pope fine sandy loam consists of brown fine sandy loam varying in depth from 10 to 20 inches, underlain by yellowish-brown or brownish-yellow slightly heavier fine sandy loam, sandy clay loam, or sandy clay. The various shades of red associated with the Casa soils are entirely absent.

This type is of small extent and is confined to the valley of Fourche la Fave River. The largest development begins at The Narrows, southwest of Nimrod, and continues eastward in narrow, irregular areas to the confluence of the Fourche la Fave and South Fourche la Fave Rivers. A smaller area lies just southeast of Perryville. In the eastern part of this area patches of Pope loam are included.

The Pope fine sandy loam occurs mainly near the river banks and the inner part of sharp bends, where flood waters have deposited the more sandy materials, while the finer silt and clay particles have been deposited farther away from the stream banks. The topography is generally level, although there are local depressions and different elevations above normal water level, some areas being above ordinary overflows, while others are flooded more frequently. Flood waters do not cover the land for more than a day or two at a time, and between floods the drainage is well established.

Gum, sycamore, and birch grow along the stream banks, but most of the type is in cultivation. Corn is the principal crop, with average yields of 20 to 40 bushels per acre. A small acreage is devoted to cotton and to forage and hay crops, such as sorghum and Bermuda grass. Fertilizers are not used. The soil warms up quickly and may be plowed early. Tillage operations do not require heavy draft animals, as the soil works easily into a very desirable tilth. The average selling price is from $30 to $50 an acre.

Land of this type is naturally productive, but for best results care must be taken to maintain the supply of organic matter. One way of doing this is to sow cowpeas in the corn at the last cultivation and turn the vines under either before or after pasturing. The higher areas are well adapted to truck crops.

POPE SILT LOAM.

The surface soil of the typical Pope silt loam is a brown silt loam, averaging about 10 inches deep. The subsoil is a yellowish-brown, fairly heavy silty clay loam, to a depth of about 24 inches, and the lower part is a brownish-yellow to yellow silty clay. An air-dry sample of the soil shows lighter shades of the same colors. In places the surface soil is 8 to 10 inches deep; in other places it is 15 to 18 inches deep. Where the surface soil is deep the subsoil is a heavy silt loam or light silty clay loam.

In a number of areas, including some that are rather extensive, the surface soil is brown, the upper subsoil yellow, and the lower subsoil

mottled yellow and gray. This variation represents a gradation toward the Atkins soils, but it is only slightly less productive than the typical Pope silt loam. A few areas of Pope fine sandy loam and loam and Atkins silt loam and silty clay loam are included, but these are small and unimportant.

The Pope silt loam is a first-bottom soil along streams receiving wash from the sandstone and shale upland soils of the region. It occurs in large bodies along the Fourche la Fave River, until it approaches territory influenced by deposits from backwater of the Arkansas River, where the alluvium is composed of different material. Smaller areas lie along Big, Rocky Cypress, and Mill Creeks.

The general topography varies from level to gently undulating. There are, however, many local differences in elevation, with pronounced terracelike features having a slight but abrupt drop from one benchlike surface to another. A few areas are gently sloping, and in some of the bends the land is much more subject to overflow than is common. The surface is also broken by old stream channels, sloughs, cypress brakes, and the entrance of tributary streams. Drainage is fairly good to good, but many areas, especially those farthest from the streams, are lacking both in surface and internal drainage. Overflows usually occur in March, April, and May, but occasionally they occur before and after this period.

Probably 15 to 20 per cent of this soil is in forest, the principal trees being sycamore, sweet gum, black gum, birch, holly, scalybark (or shellbark) hickory, maple, oak, ash, and cypress, the last named in wet situations. Cane grows abundantly.

The Pope silt loam is considered one of the best and strongest soils in the county. It is principally this type that makes the Fourche Valley the leading corn-producing section of Perry County. The corn yields are much higher than the average for the county, ranging from 30 to 60 bushels per acre. The success in growing cotton is not so marked and the crop is not so commonly grown. Yields of one-half to three-fourths bale per acre are obtained, but after the land has been cleared and cultivated for a few years, rust is said to injure the crop. Additions of potash salts might correct or check this tendency. Small areas are used for the production of hay, mainly oats, Bermuda grass, sorghum, Sudan grass, and native grasses. The leaves of cornstalks are often pulled for fodder. During the winter months cattle, hogs, horses, and mules are pastured in the bottom lands, where they feed on dead grass, leaves remaining on the cornstalks, roots, cotton seed, and sometimes cane, which lines the banks of streams. Occasionally too much tramping by animals when the soil is wet results in compacting the soil.

In places the top soil has been washed away during floods, and here the land is not so productive as the typical soil. A few levees have been constructed as a protection against high water. Farm operations on this soil are generally later than on the upland Hanceville soils and the second-bottom Waynesboro soils. If plowed when too dry or too wet, the soil turns up in clods which when once dry are very difficult to break down. Some instances were noted where continued plowing at the same depth had formed a "plow sole," resulting in decreased yields. Tile drains have been installed in a few places. Commercial fertilizers are not used.

Average selling prices for this land have been $40 to $50 an acre, but many tracts are held for more than $75 an acre.

The Pope silt loam is a good, fertile soil, and if handled right it returns good yields. Probably one of the most common mistakes is "laying by" the crop too early. Increased yields would result from keeping down the abundant crab grass and cocklebur if one or more shallow cultivations were added to the number usually given. In one instance, where an extensive system of tile drains had been installed, the expense incurred was easily justified by the increased yields resulting from the ability to get on the land earlier in the spring.

ATKINS SILTY CLAY LOAM.

The Atkins silty clay loam is a mottled dark-gray to gray and brown or rusty-brown silty clay loam, 2 to 3 inches deep, passing abruptly into yellowish or light-brown and light-gray to bluish-gray silty clay loam, which at 12 to 15 inches changes to a mottled gray and brownish-yellow silty clay. In an air-dry condition the dominating gray color becomes a light gray to grayish white. This is particularly noticeable in forested areas, where the soil clinging to the roots of fallen trees has a characteristic light-gray color. Black concretions and concretionary material occur locally in the subsoil.

In places, as along Pine Creek, the surface soil consists of 8 to 10 inches of a mottled gray and yellow silty clay loam, which passes into drab and yellow to brownish-yellow heavy clay. Along the outer margin of the South Fourche la Fave River bottoms there are a number of poorly drained areas which will average a loam in texture, although they are not uniform in the content of gritty material. Small areas of Atkins silt loam and clay and very narrow belts of Pope silt loam along the banks of sloughs and minor drainage ways are included with the type as mapped.

The Atkins silty clay loam is developed mainly in the bottoms of the Fourche la Fave River, with a few areas along the larger tributaries. It is closely associated with the Pope silt loam, and is likewise composed of wash from sandstone and shale soils. Characteristically, it occupies flat, poorly drained areas, situated some distance from the stream banks. Overflows occur, but they are of short duration, although there are many depressions in which water stands for long periods.

Not more than 5 to 10 per cent of the type is in cultivation, and much of this represents small areas which are parts of fields consisting mainly of Pope silt loam. The growth consists largely of willow oak, overcup oak, red oak, sweet gum, black gum, hickory, elm, maple, ironwood, smilax vines, and, in "rich" spots, mulberry. Where ditches have been employed to aid in drainage, yields of 25 to 40 bushels of corn and one-half to three-fourths bale of cotton per acre have been obtained. A fairly large acreage is used in the production of hay, principally Bermuda grass, redtop, and native grasses.

The land ranges in value from $10 to $30 an acre, depending upon the stand of timber and the condition of the drainage.

The Atkins silty clay loam, or "white land," is a strong soil, in some cases apparently stronger than the highly esteemed brown soil of the Pope silt loam. However, most of it should be ditched, or preferably tile drained, before being put into cultivation. The productivity of the soil warrants the outlay necessary to provide drainage.

ATKINS CLAY.

The surface 6 or 8 inches of the Atkins clay is a drab to bluish-gray and brown heavy clay, the remainder of the 3-foot section being a mottled drab to light bluish gray and yellowish-brown to yellow, heavy, plastic clay. Black concretionary material is present in places in the subsoil. The soil on the upturned roots of trees on this type does not possess the almost whitish appearance of the Atkins silty clay loam under similar conditions. As a rule the type is uniform.

The Atkins clay includes some of the most poorly drained land in Perry County, and swamp symbols have been placed on the map over most of the type. The lowest flats and swampy depressions, including cypress brakes, shallow lakes, and sloughs following old channels, are usually occupied by this type. The largest area lies north of Perry and contains an excellent stand of cypress. Another area 2 miles southeast of Perryville occupies a low, swampy basin, only partly drained by Coffee Creek. It is treeless in part and contains about 800 acres. Other smaller areas occur in this vicinity and in a few other parts of the county, particularly east and southeast of Cherry Hill School.

Very little land of this type is in cultivation, most of it being covered with a dense forest, consisting of cypress, pin oak, gum, vines, and mosses. The land from which the timber has been removed is valued as low as $15 to $20 an acre. The large area at Perry is being slowly cleared and reclaimed by a system of main canals and lateral ditches. After this project has been completed, it is believed that the land will produce three-fourths to 1 bale of cotton per acre, and have a value of $100 to $150 an acre.

CASA FINE SANDY LOAM.

The typical Casa fine sandy loam is a brown to reddish-brown fine sandy loam, passing at about 10 to 12 inches into a brownish-red fine sandy loam and at about 24 inches into brownish-red sticky, heavy fine sandy loam. There are many low mounds on some of the areas, giving rise to a faintly billowy surface. On the mounds the soil is reddish brown at the surface and red in the subsoil, and between the mounds the soil is brown to only faintly reddish brown. In places the lower subsoil is either yellowish red or reddish yellow. A layer of gravel is encountered locally at 30 to 36 inches.

As mapped the type includes small areas of Casa stony fine sandy loam, which have been indicated by stone symbols. This soil occurs along the upper courses of streams, especially where they flow through narrow mountain valleys. The main mass of the material consists of gravel, cobbles, and bowlders, mixed with a small amount of fine sandy loam, although there are also small patches in which the soil is almost free of rock. Small areas of Casa loam are also included with type.

The red color of the Casa soils is probably due in part to the red color of the uplands (chiefly Hanceville soils), from which the material has been derived, and in part to good drainage favorable to oxidation.

The type occurs along Rose Creek, Rocky Cypress Creek, Rankin Creek, Cedar Branch and numerous other small mountain branches, but the largest area lies along the South Fourche la Fave River. The topography ranges from level to slightly billowy. The land is subject to overflows from swift mountain streams, but between overflows drainage is generally well established.

At least 80 per cent of this type is being farmed, most of the rest constituting narrow stony areas hemmed in by ridges and mountains. Cotton, corn, oats, and hay are most commonly grown. Yields of 1 bale of cotton per acre have been obtained on land newly cleared, but present yields do not range above one-third to one-half bale per acre. From 15 to 20 bushels per acre is the common yield of corn. Wheat is said to make a rank growth of stalk, but to give low yields of grain. Land intended for corn is usually plowed, harrowed, and laid off with light shovel plows, then planted level. Cotton is occasionally planted level, but only when there are indications of a dry season.

Where this soil lies near railroads and markets, $40 an acre is the average selling price. In more remote sections, as along South Fourche la Fave River, good cleared land of this type can be bought for $20 to $25 an acre. Here it would seem that the selling price of the land is lower then its productive capacity warrants.

Much of the land has been cropped continuously for many years, and little or no attention has been paid to maintaining its productiveness. Legumes, particularly cowpeas, should be introduced into the rotations. The common practice is to leave the land bare during the winter months, and as a result some of the fields have been so badly washed by swift overflow waters that they have been nearly or entirely ruined for crop production. In a few cases the soil has been removed to a depth of 2 or 3 feet. The growing of winter cover crops, to be plowed under in the spring, would check soil washing and help maintain the supply of organic matter.

CASA LOAM.

The surface soil of the Casa loam consists of a reddish-brown or brown loam 6 to 8 inches deep. The subsoil is a reddish-brown loam which passes at about 15 inches into friable, reddish-brown, light clay loam. In places the subsoil is red to brownish red, and in a few more poorly drained situations the lower subsoil is reddish yellow. Very commonly the type is underlain at depths of 18 inches to 3 feet by rounded gravel, cobblestones, and bowlders. Some small areas subject to frequent overflow contain quantities of sand and gravel, and locally there are patches of Casa fine sandy loam.

There are included areas of Casa stony loam, most of which occur along the narrow banks of the bowlder-strewn channels or along the upper courses of mountain streams having a steep gradient. In places this land has very little soil material between the numerous rock fragments and is largely nonagricultural. It was not mapped separately because its small area and its close association with the typical Casa loam make it almost impossible to separate the two types on a map of the scale used in this survey. The areas are indicated by stone symbols.

The topography is comparatively level, with some local areas having a gently undulating or billowy surface. Some bottoms occupied by the Casa loam are traversed by numerous stream channels filled with rounded bowlders, and most of them carry water only during times of heavy rainfall. This type occurs mainly in the southern part of the county along Dry Fork, Bear, Cedar, and Maumelle Creeks. Corn and cotton are the chief crops. They return fair yields in favorable seasons. The average selling price ranges from $15 to $25 an acre.

Deeper plowing and more thorough cultivation, together with the growing of legume crops, would increase the yields.

PORTLAND VERY FINE SANDY LOAM.

To a depth of 12 to 18 inches the Portland very fine sandy loam is a light chocolate brown very fine sandy loam, which is underlain by chocolate-brown, heavy, rather sticky very fine sandy loam. The subsoil is a chocolate-brown to faintly reddish-brown or Indian-red clay to sandy clay.

The type is not uniform and contains many local variations. In the area near Dogtown both surface soil and subsoil consist of brown very fine sandy loam, the subsoil being somewhat darker in color and slightly more compact than the surface 8 to 12 inches. Here are also included small spots of Yahola very fine sandy loam and loamy very fine sand. In some places the surface soil to a depth of 8 to 12 inches is a brown very fine sandy loam, which passes into friable silt loam containing thin layers of very fine sandy loam and very fine sand. Throughout the type, particularly in the subsoil, the material has a decidedly reddish cast, but not the pronounced red of the Miller series.

The typical Portland very fine sandy loam is confined to first bottoms of the Arkansas River, where it occurs in long, narrow belts, closely associated with the Yahola soils. A little of the type has been mapped on a second terrace. The soil is composed in part of Permian Red Beds material, transported by the Arkansas River from Oklahoma and Texas.

The surface is level to very gently sloping. Overflows are seldom of long duration, and between overflows the soil is adequately drained. The soil on the second terrace lies above present overflows.

Most of the type originally supported a growth of cottonwood, hackberry, pecan, sycamore, and cane, but practically all of it is now cleared. The average yield of cotton is between one-half and three-fourths bale per acre. Corn yields 25 to 40 bushels per acre. One large area is used for producing Bermuda-grass hay.

The soil is fertile and does not require lime. The normal value has ranged from $60 to $100 an acre, but at present (1920) the maximum value is more nearly $200 an acre. Several small areas of Portland silt loam are included with the type as mapped. These areas lie in the bottoms of the Arkansas River, principally at and northeast of Stony Point School, along Ballard Creek, and north of Copperas Spring School.

In these areas the soil generally consists of a chocolate-brown silt loam, grading at about 8 inches into chocolate-brown silty clay loam, somewhat lighter in color, and passing at about 12 to 18 inches into chocolate-brown to Indian-red silty clay.

The area northeast of Stony Point School includes some poorly drained land. Here the surface soil is a mottled gray and brown silt loam, passing at 8 or 10 inches into silty clay loam of about the same color. Below 15 to 20 inches the subsoil is a heavy clay, mottled with drab and brown. Black concretions are present on the surface and through the soil section.

The drainage on the Portland silt loam varies from good to fair. Good yields of cotton, corn, and Irish potatoes are obtained. The present value of this land is $100 to $150 an acre.

PORTLAND CLAY.

The typical Portland clay consists of a brown to chocolate-brown clay, grading at a depth of 6 to 8 inches into chocolate-brown, Indian-red, or salmon-colored plastic silty clay. In places the surface soil is mottled brown and gray or drab, but the brown color increases with depth, and below 18 to 24 inches the soil is a dull Indian red. Locally the subsoil is mottled red and yellow, or red, gray, and yellow, with Indian-reddish clay beneath. Either the lower subsoil or substratum is calcareous, and the latter contains lime nodules.

With the area mapped along Cypress Creek, northeast of Perry, there are included areas which resemble Osage clay. Here the entire soil section of 3 feet is very dark brown to black, but Indian-red clay may be encountered at 36 inches and is everywhere present in the substratum. At the railroad bridge near Kenney an area of Portland silty clay loam has been included with the clay type.

In addition to the area along Cypress Creek, the typical soil occurs along the edge of the Arkansas River bottoms farthest from the river, where the overflow waters have deposited the finer clay particles. The largest development of the Portland clay is along the lower course of the Fourche la Fave River, beginning below the May shoals and continuing almost to the Arkansas River. Here the type occurs along both banks of the river and along its tributaries. The material has been deposited from the backwater of the Arkansas River, which, at flood stage, has been known to back up the Fourche la Fave River as far as Perryville. Along this stream the overflow from backwater sometimes continues for several weeks, but this is said to occur only once in three to five years. Between overflows the drainage is fair to good. The areas along the Arkansas River do not suffer from prolonged overflows and have good drainage.

The Portland clay has a wide range in adaptation. Practically all of the soil along the Arkansas River and most of that along Cypress Creek is in cultivation to cotton, corn, and alfalfa. The black variation and the typical Portland clay are excellent soils producing an average of one-half to three-fourths bale of cotton per acre and an occasional yield of 1 bale per acre. Yields are sometimes reduced by the boll weevil, but so far no serious loss has been suffered. The yield of corn varies from 25 to 75 bushels per acre, with a few yields even higher. Alfalfa is cut 4 to 5 times in a season, with an average annual yield of 3 to 5 tons per acre. Most of this land is plowed in a fairly wet condition, the resultant clods soon breaking down into granules, giving a very desirable state of tilth. This characteristic has given rise to the name "buckshot" land. A few farmers prefer to plow the land when it is not so wet and then reduce the clods by tillage. The land is now valued at $100 to $200 an acre.

Only a small part of the type along the Fourche la Fave River is in cultivation. This lack of development is apparently due, in part at least, to the fear of damage from overflow. However, an increasing area of the land is being converted into farms. Oak, ash, elm, and other hardwoods constitute the principal forest growth. Yields have been obtained that are well above the average for the county—one-half to two-thirds of a bale of cotton per acre and 25 to 40 bushels of corn. Much of the type in this section is used for pasturing cattle. Bermuda grass thrives. Lespedeza does not grow naturally, but probably would succeed, as it probably would on all the

alluvial soils of the region. It is said that some of this land, if not plowed at the right time, forms intractable clods, which do not break down like the clay soils along the Arkansas River. The soil appears to be productive, and the present value of $15 to $30 an acre for forested areas seems low.

PERRY CLAY.

The surface soil of the Perry clay is a dark bluish gray heavy silty clay, usually mottled with rusty brown, 6 to 8 inches deep. The subsoil is a mottled light bluish gray, rusty-brown, and yellowish-brown, plastic silty clay, with splotches of red here and there. The substratum below the 3-foot section is an Indian-red or chocolate-brown to salmon-red or mottled reddish and yellowish heavy silty clay. The Perry clay differs from the Portland clay in that it has poorer drainage, contains more gray material, and typically does not have Indian-red or chocolate-brown material within the 3-foot section, though it does have this color in the substratum. The type resembles the Atkins clay in color, but is composed largely of sediments deposited by the overflow waters of the Arkansas River, while the Atkins soils have been derived from sandstone and shale sources and do not have the Indian-red to chocolate-brown substratum.

The Perry clay occurs in the lowest parts of the Arkansas River bottoms, along Cypress Creek, and in large areas along the lower course of the Fourche la Fave River, west of Bigelow and Graytown. Along the Arkansas River there are some swampy areas, having cypress as a typical growth, which have been indicated on the map by swamp symbols. Extremely swampy conditions do not exist along the Fourche la Fave River, but there are poorly drained areas which are covered with shallow water during much of the year. Willow oak is the principal tree growth. Practically none of this type is in cultivation, being used mainly for pasturing cattle. It is valued at $15 to $25 an acre.

In order to reclaim the greater part of this soil for crop production, it will be necessary to establish a system of main drainage ditches and laterals. Small ditches will suffice for restricted areas. After the land is cleared, Bermuda grass and lespedeza could be successfully grown, with only a minimum of drainage. The livestock industry should be profitable in this region by using these bottom lands for hay and pastures and growing corn and other feed crops on the near-by uplands and terraces. Cotton and corn should yield heavily after good drainage is established.

YAHOLA VERY FINE SAND.

The surface soil of the Yahola very fine sand is a brown very fine sand, 12 to 18 inches deep, having typically a reddish cast. The subsoil is a light salmon colored very fine sand. Locally at about 30 inches a stratum of light brownish yellow or even yellowish-gray very fine sand is encountered. There are included a few patches of Yahola very fine sandy loam and also of Portland very fine sandy loam, which occupies minor depressions and old, narrow sloughs.

The type occupies the immediate banks of the Arkansas River and is composed of sedimentary material. It is subject to overflow, but between overflows it is thoroughly drained. Some levees have been constructed. The total area is not large. A narrow strip about 3

miles long occurs in the northeast corner of the county, and another area, about 6 miles west of this one, occupies land that has been added to Perry County in comparatively recent years by deposits from the Arkansas River. This stream in turn has destroyed much valuable land across the river from this area, in Conway County, by undermining its banks. The topography of the type is generally level, but in places it is decidedly billowy, with many local depressions.

Practically all of the type is cleared. A few pecan trees remain, and cottonwoods line the river banks in places. Good yields of cotton and corn are obtained, without the use of commercial fertilizers. Some of the land is in Bermuda grass for hay production. The land is now valued at $75 to $150 an acre, and very little of it is for sale.

On such a light textured soil the growing of legume crops in the rotation would be beneficial in maintaining the supply of organic matter.

YAHOLA VERY FINE SANDY LOAM.

The Yahola very fine sandy loam consists of about 8 to 10 inches of brownish Indian red very fine sandy loam, underlain by light Indian red very fine sandy loam or loamy very fine sand. In places the lower subsoil is yellowish or shows only a faint tinge of pink, and is as light in texture as very fine sand. Strata of Indian-red clay or silty clay loam occur locally in the sandy subsoil.

This type occurs in interrupted strips along the Arkansas River, from the vicinity of Dogtown to Ledwidge, a distance of approximately 20 miles. It either occupies the immediate stream bank or is separated from it by a strip of Yahola very fine sand. Most of the land has a very gentle slope away from the river. The surface ranges from smooth to slightly billowy. The type is subject to occasional overflows. A few narrow belts of higher elevation are covered only at high flood stages of the Arkansas River. In places these belts constitute natural levees near the present or old stream channels, and numbers of houses are situated upon them for easy access to the lower lands more easily overflowed. On the other hand, some low benches of this soil of more recent origin are inundated rather frequently. The drainage between overflows is very good.

The soil is valuable for cotton, corn, alfalfa, and Bermuda-grass hay. Cotton easily averages one-half to two-thirds bale per acre, and a yield of one bale is not uncommon. Yields of corn range from 30 to 50 bushels per acre.

Very little of this land is for sale. Its value at present is estimated at $125 to $200 an acre.

Continuous cropping to cotton and corn has resulted in decreasing the yields of even this fertile soil, indicating that crop rotations including legumes should be used. More care in the selection of seed, particularly of early-maturing varieties of cotton, would aid in combating the boll weevil and increasing the quality and yield of crops.

YAHOLA SILTY CLAY LOAM.

The Yahola silty clay loam is a chocolate-brown silty clay loam passing at 5 or 6 inches into Indian-red silty clay loam containing a relatively large proportion of very fine sand. At a depth of 10 to 20 inches the subsoil becomes a light Indian red very fine sandy loam, and in places this is interbedded with Indian-red clay or silty clay. The type shows considerable variation in both surface soil and subsoil. Free lime carbonate is plentiful, particularly in the lower subsoil.

This type is confined to three small areas, two of which lie northeast of Bigelow, and the other near the junction of the Fourche la Fave and Arkansas Rivers. The surface is very gently undulating, with many local, shallow depressions. The type is subject to overflow, but drainage is well established between overflows.

A large part of the Yahola silty clay loam is used for the production of alfalfa and Bermuda-grass hay, and cattle are pastured on these areas during the winter months. Alfalfa yields from 3 to 5 tons per acre from 4 to 5 cuttings per season. The first cutting is made about the second week in May. A "bull rake" is used to carry the hay to the baler, and the baled hay is stored in sheds in the field. Some cotton and corn is grown, with yields about the same as on the Yahola very fine sandy loam.

ROUGH STONY LAND.

Rough stony land embraces very steep, stony slopes, ledges of rock outcrop, and rock slides. In places there is little soil material. This land has no potential value for cultivation, but has some value for pasturing stock and for timber.

Rough stony land is rather extensive and is found in many different parts of the county. Some of the largest representative areas occur on the slopes of Petit Jean Mountain north of Adona, on Fourche Pinnacle and near-by slopes west and northwest of Perryville, west and southwest of Thornburg, in the southeast corner of the county, and on Potato Hill in the southwest corner of the county.

RIVERWASH.

Riverwash consists of recently deposited, low-lying alluvial material along the Arkansas River. Very little vegetation is established on this material, owing to the frequency of overflows and the changes caused by deposits and river erosion. Practically all of the Riverwash occurs northeast of Dogtown, where it occupies parts of the interior of the sharp bend of the Arkansas River. Here the river is rapidly undermining its banks in Conway County, while the prominent tip of land in Perry County is receiving fresh acquisitions of sand, silt, and clay. The land has little agricultural value.

SUMMARY.

Perry County is situated slightly northwest of the center of Arkansas. Its maximum length and width are 38 and 20 miles, respectively. The total area is 552 square miles.

This county is situated entirely within the Ouachita Mountains, here characterized by a plateau and numerous parallel ridges. The valleys range from narrow and V-shaped to a maximum width of 5 miles. Elevations range from less than 300 feet above sea level along the Arkansas River to about 2,000 feet in the southern part of the county. The topography varies from level to rugged and mountainous. Almost all the county drains into the Arkansas River and its large tributary, the Fourche la Fave River. The areas with poor drainage are small as compared to the well-drained undulating valley areas and ridge slopes.

Perry County was organized in 1840. The first settlers came from Tennessee, Mississippi, Georgia, and other States east of the Mississippi River. The wider and more important valleys are fairly well settled and the mountain areas have very few inhabitants. The

population is 9,905. Bigelow, Houston, Perry, Casa, Perryville, and Aplin are some of the leading trading centers.

The Chicago, Rock Island & Pacific Railway traverses the northern part of the county. There is no extensive system of public roads, but some of the main roads are being improved.

The climate is characterized by short moderately cold winters, long hot summers, moderate extremes of temperature, excessive humidity, and a fairly heavy rainfall. The average length of the growing season is 210 days. Climatic conditions are adapted to the production of a wide variety of farm crops.

Agriculture and lumbering are the important industries. The southern part of the county is included in the national forest. The 1920 census reports one-fourth of the county as being in farms. The farms average 68.6 acres each, of which about one-half is improved land.

Cotton and corn occupy larger acreages than any other crops. The average annual production of cotton is between 4,000 and 5,000 bales, with an average yield of about one-third bale per acre, and a range of one-fifth to 1 bale. Short-staple varieties predominate. Corn is extensively grown for domestic use and as feed for livestock. Yields range from 10 to 60 bushels per acre, with a general average of 15 to 20 bushels. The area devoted to oats and wheat is not large. Oats, Bermuda grass, alfalfa, cowpeas, sorghum, redtop, Sudan grass, and native wild grasses are the most common hay crops. Sweet potatoes, Irish potatoes, vegetables, strawberries, muskmelons, watermelons, and peaches are minor crops. About one-sixth of all farm income is from the sale of livestock and livestock products. Cattle and hogs have free access to large areas of open mountain range.

In its present development Perry County does not rank high in the agriculture of the State, but it presents good opportunities for the growing of fruit and truck crops and the raising of livestock. Poor methods rather than poor soil account for the average low yields.

The upland soils are included in the Hanceville and Conway series. The smoother and more stone-free types of the Hanceville, and the Conway soils are good to fair soils for the common crops of the region.

The terrace soils derived from sandstone and shale soils have been mapped as of the Waynesboro and Holston series. The first series is well drained, while the latter has only fair to poor drainage.

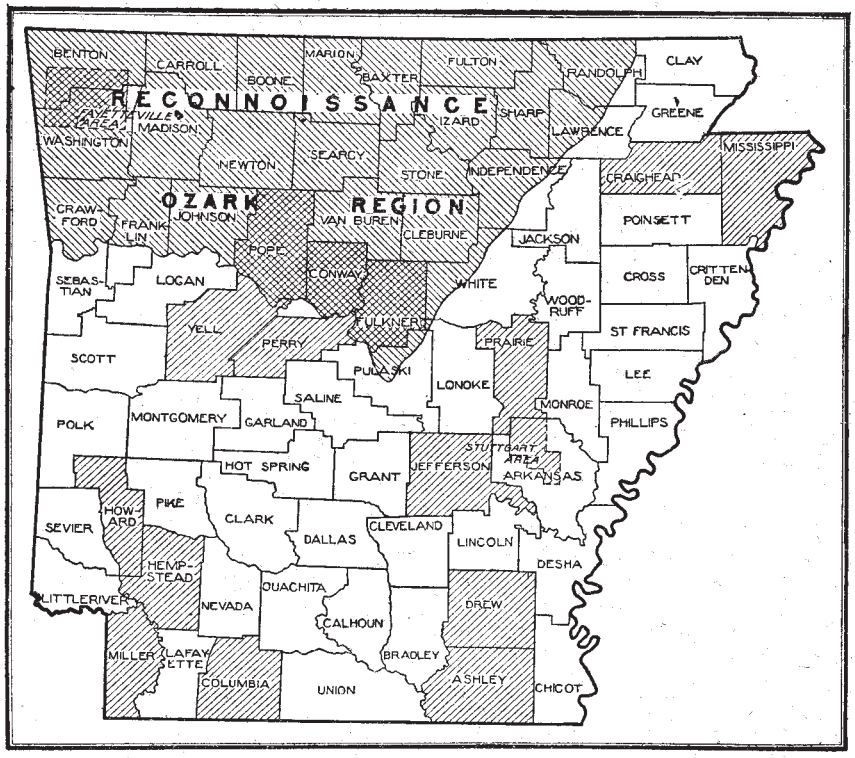
Second-bottom or terrace soils influenced in formation by Arkansas River alluvium are included in the Teller, Bastrop, and Muskogee series. The Muskogee soils are in need of drainage. The others of this group are almost entirely in cultivation to the general crops.

The Pope and Casa types are well-drained first-bottom soils especially adapted to corn growing. The Atkins series represents poorly drained alluvial soils, which only need drainage to become productive.

The first-bottom soils composed in part of sediments of the Arkansas River are included in the Portland, Yahola, and Perry series. The first two are well drained and produce excellent crops of cotton, corn, and alfalfa. The Perry clay is poorly drained and mostly in forest.

The first-bottom and second-bottom soils of the Arkansas River alluvium are characterized by the presence of Indian-red material from the Permian Red Beds of Oklahoma and Texas. These contain lime in the subsoil or in the substratum (below 3 feet).

○



Areas surveyed in Arkansas, shown by shading.

Accessibility Statement

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

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